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E190AK Design Project 1: Filter

Design a ladder filter which will be implemented on the stock filter PCBs. The ladder filter should be a lowpass which meets the following specifications:

- Pass band edge of 100MHz
- Stop band start of 200MHz
- 20dB of rejection in the stop band
- Insertion loss of less than 3dB
- In-band ripple of less than 1dB

Simulations using SimSmith or ltSpice (you can plot S-parameters using the .net command) may help you to verify your filter design. Be careful to account for component variation and parasitics. The parasitics you extracted in lab 3 are important, but if you still can't dial your design in exactly then consider the parasitics of the components themselves: you may need to add a little series inductance to your models, and you can extract the value of that inductor with a 0 ohm resistor on an open board.

You'll find that your soldering job affects the quality of your impedance match, so you may achieve the design specifications faster by paying close attention to the Smith chart as you construct your filter rather than rigidly adhering to your initial design. Read the impedance matching guide for more details. Be sure to document this design/implementation process and import any quirks from your physical measurements into your simulations and calculations.

Theory, simulation and measurement need to match in your final design. Be sure to comment on the comparison between the predicted, simulated and measured values in your final report.