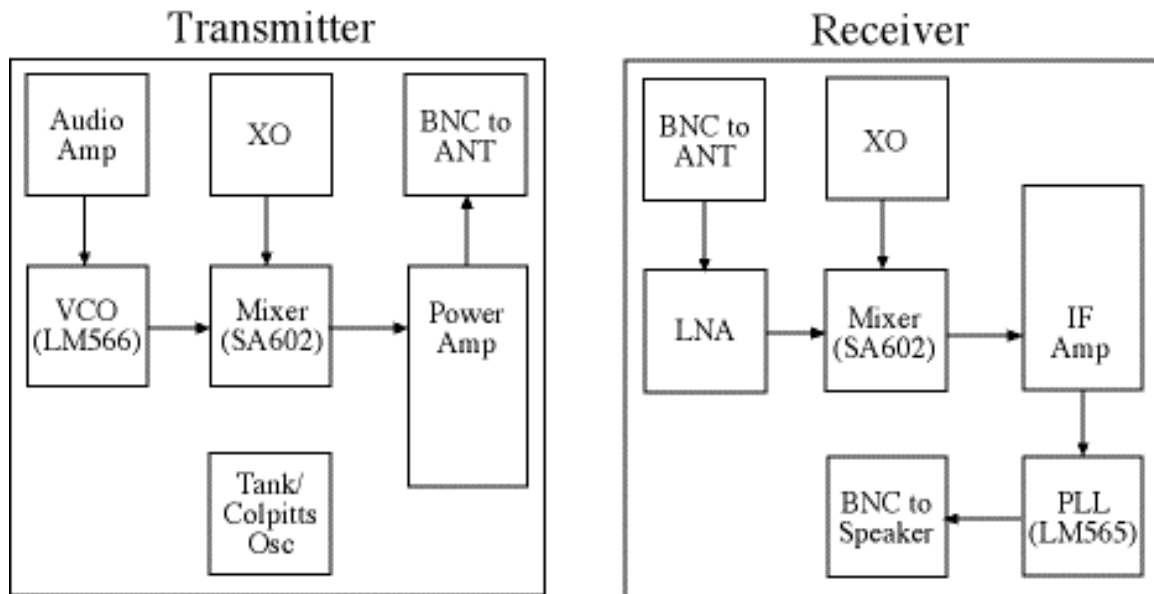


EE133: Analog Communications Lab A Quick Circuit Orientation and Lab Schedule

This quarter you will be building a FM radio transmitter and receiver, operating at 24MHz. Each lab will be a part of this final project, which you will characterize and integrate at the end of the quarter. You will be soldering your circuits on through-hole boards with metal traces on the back. Below is a block diagram of the transmitter and receiver circuits you will be building, and the recommended approximate placement of the blocks on your solder boards.



Don't worry if none of these blocks makes sense to you yet. That's the whole point of the class. This is just the map to help you understand how all the parts are connected.

As you can probably guess, there are several ways to build each block. In this class, we present options and topologies for each, but we encourage you to do your own exploring. Usually the labs will center around the characterization of a particular block. This is ultimately a design lab, so we encourage you to get your creative juices flowing as you try to improve the performance of your circuits.

That said, the next page gives an overview of the topics covered by each of the labs, and the associated readings from the text. By the end of the quarter, you should all have a firm grasp of the main principles and challenges of real-world RF circuit design.

EE133 Lab Schedule

<u>Week</u>	<u>Lab</u>	<u>Topics</u>	<u>Readings</u>
1/5	Lab Intro, HSPICE Tutorial	Use of Lab Equipment, Lab Safety, Soldering, HSPICE, "Real World" Issues (non-idealities)	Ch. 3 (3.11-3.13), Ch. 5 (5.3-5.7), Ch. 6 (all)
1/12	Lab 1: Amplitude Modulation and Demodulation	Fundamentals of AM, Peak Detection, Synchronous Detection, 2-Quad, 4-Quad Multipliers	Handouts, Lecture Notes
1/19	Lab 2: Using Oscillators to Generate FM Signals (Lab 1 Writeup Due)	Fundamentals of FM, Voltage-Controlled Oscillators, Colpitts Oscillators, Impedance Transformations, LC Tank Resonance, Crystal Oscillators	Ch. 17 (17.5.1-2), Ch. 6, Ch. 11 (11.1-11.5), Ch. 4 (4.3-4.4)
1/26	Lab 2: Using Oscillators to Generate FM Signals (cont'd)	(cont'd)	(cont'd)
2/2	Lab 3: Low Noise Amplifier (Lab 2 Writeup Due)	Impedance Matching, Shunt-Shunt Feedback Amplifiers, Smith Charts, S-Parameters	Ch. 9 (all), Ch. 10 (10.3), Ch. 11 (11.1-11.5), Ch. 4 (4.3-4.4)
2/9	Lab 4: FM Demodulation using the PLL (Lab 3 Writeup Due)	Demodulation, Phase-Locked Loops, Transmitting and Receiving	Handouts, Lecture Notes
2/16	Lab 5: IF Amplification and Filtering (Lab 4 Writeup Due)	Intermediate Frequency Amplifiers, "Cookbook" Passive Filters	Handouts, Lecture Notes
2/23	Lab 6: The Power Amplifier and LNA (revisited)	Power Amplifiers, Power Efficiency, Linearity, LNA Input Filtering, Antenna Matching	Ch. 16 (16.5), Ch. 14 (all)
3/1	System Integration and Catch-up	System Characterization and Optimization	Handouts, Lecture Notes
3/8	Dead Week: Presentations and Demo Day	Characterization, Field Testing	
3/15	Finals Week: Final Project Writeups Due		