

6.101 Project Miscellanea

1. GET IN LAB! DON'T WAIT! Don't sit around and intellectualize too much. Get into lab and try some of your most difficult circuits. Get some hands-on experience with them so that we will have time to help you with the tough stuff. Remember, you must present your finished projects to the teaching staff on one week before the last day of class. You need to get busy NOW!
2. Each group has a budget of \$100, in addition to any of the stuff we have in the stockroom. I've given you a list of the semiconductor parts we stock. Other things we stock include 28V RMS center tapped 2A power transformers, some real, non-breadboard-type pots, motorized pots, batteries and 9V battery snaps, lots of odds and ends of power transformers from previous projects, bridge rectifiers, very large filter capacitors, LED arrays, etc. If you need it, ask the stock room clerk first, then ask me, then order it yourself. I will be glad to help you choose from the catalogs.
3. When ordering cheap parts, especially semiconductors, be sure to order a few extra pieces in case of disaster! Shipping is often way more expensive than an extra 3 or 4 pieces, and "desperation" shipping the last few days before your project is due is very expensive. If in doubt, check with me.
4. You may order parts yourselves from the catalogs we gave you, from the websites in the related resources section, or any place you can find. If you do this, KEEP THE ORIGINAL RECEIPT for reimbursement. MIT will NOT reimburse for SALES TAX. All receipts for reimbursement must be submitted to me no later than one week after the last day of class.
5. You may ask the stock room clerk to order parts. Generally, he will order parts every Thursday, but more frequently as projects near their end. You may also ask me to order parts.
6. Remember that your DRAFT PAPER is due to me the Tuesday before the last day of class to give to the Writing Coordinator the next day. She will review it, make comments and suggestions and return it to you as soon as possible, hopefully by the following Monday, so that you can use her commentary in your final paper, which is due the following Wednesday. Then the TA and I will read your papers, grade them, and pass them on to the writing coordinator for her final comments.
7. As the end nears, industry guys will be in on Sundays and/or weeknights to lend a hand with your problems. I will also be here most of those times. We will give you notice so you can plan to be in lab and take advantage of their expertise.

8. Analog Devices has a student sample website listed in the related resources section. Analog will send samples you need in a day or two! Be sure to ask for a few extras! If you need parts from Linear Technology, ask me.

9. Space: Building 38, 6th floor may be too small to hold 7 project teams and their projects. You may also use space downstairs on the fifth floor. Best to use space to the right as you enter, in the area of office on the fifth floor. If that is filled, use space in the 6.002/003 area.

10. RF Projects: Your lab kit protoboards are OK up to about 1 MHz. Above that, the stray capacity is just too much. For higher frequencies, use the “dead bug” wiring technique on a piece of copper clad board that you can get from John Sweeney. The name comes from the fact that all wiring is done “floating” over the board, by direct, short, point-to-point soldered wires; to do this, IC’s and transistors are oriented upside down and thus look like dead bugs with their legs in the air! All grounded leads and grounded circuit elements are soldered directly to the copper clad board, with, again, the shortest possible leads to minimize stray inductance. The copper becomes a “ground plane” or a common ground and an RF shield. This helps to direct stray capacity to ground instead of between circuit nodes, and minimizes the effect that would be caused by hand capacity or capacity to other circuits, metal cases, power supplies, antennae, etc.

When your RF circuits are fairly mature, you should mount them in a metal case, especially if they are to be hand-held or carried on the body. We can purchase small metal boxes, or you may use the limited number of “Altoids” boxes that we have on hand.

WARNING: At high frequencies the ground lead on your ‘scope probe can do a lot of nasty things to your circuits, including make them oscillate! This is due to the inductance associated with that long lead and alligator clip. Instead of using the ground lead and clip, take a heavy-duty paper clip and wrap it around the probe where the ground lead snaps on and then straighten out the rest of it so that the end of the clip can touch the ground plane in your circuit. The shorter the better! You may also want to remove the “witch’s hat” from the end of the probe and just use the point inside to connect to your circuit. This reduces the capacity that the probe presents to your circuit.

11. PC Boards: We also have a number of small “universal” pc boards with holes and copper on the back side, that are designed to receive IC’s. While these are not the best for high frequency stuff, they are useful for building your more mature circuits if you don’t want them tied down to a protoboard; and, of course, soldering is more reliable than are protoboard connections. One can also fashion a sort of ground plane by connecting together all the unused copper nodes on these boards and then grounding them. See mee for these boards and the Altoids boxes.