

ESE 112 - Intro. to ESE

Lab 2 part 2- Electronic Prototyping

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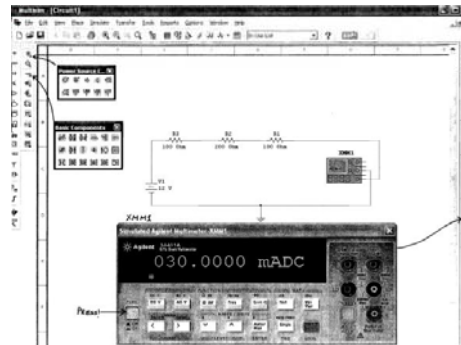
Circuit Design Process 1

- Objective - What do you want to build?
- Constraints & Specification:
 - cost
 - size
 - power consumption
 - operating conditions



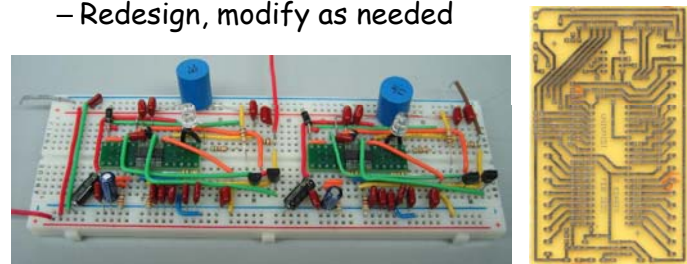
Circuit Design Process 2

- Design
 - Component
 - Calculations (Theory)
 - Computer Simulation
 - MultiSim
 - ORCAD PSpice



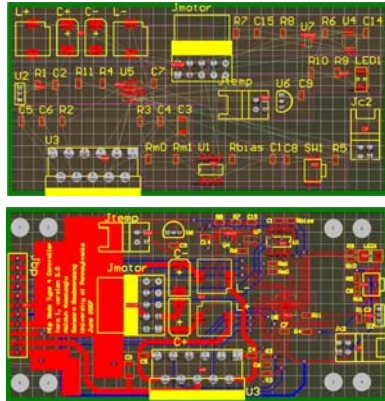
Circuit Design Process 3

- Testing the Real Circuit
 - Protoboard, PC Board, PCB
 - Debug (easier during this stage)
 - Redesign, modify as needed



Circuit Design Process 4

- PCB Design
 - Schematic -> PCB
 - Layout
 - Routing
 - Error Checking



Design Process 5

- PCB Manufacturing/Assembly
 - Send design to PCB manufacturer
 - Higher quantity => lower unit price



Hand Soldering

- Cheap and convenient
 - Soldering Iron (\$10-\$300)
 - Low maintenance cost
- Not as consistent.

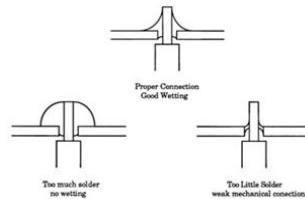


Soldering

- Turning on the Soldering Iron
 - Keep iron tip clear of obstacles
 - Iron tip can get to 500°F
 - Set temperature ~375°F
 - Add water to sponge
 - Wait until the tip gets hot
- Hard to explain how to solder.

Making a Connection

- Pick up and hold the iron like a pencil.
- Hold the solder with your other hand.
- Touch the tip of the iron to the component lead and pad for 2 seconds to preheat.
- Touch the solder to the preheated lead and pad. Solder should start to flow.
- The joint should be cone shaped and shiny.
- Cut the excess lead from the component.



Common Mistakes

- Using too much or too little Solder
- Iron tip is not kept clean (use the sponge)
- Burning the component (ICs)
- Cold Joint
 - Moving the component before it cools
 - Will result in inconsistent and weak connection

Soldering Safety

- Don't touch the tip
- Put the iron back in its stand after use
- Work in a well ventilated area
- Remember to turn OFF the soldering iron after use
- Wash your hands after soldering