EEE116 Experimental, Computer Skills and Sustainability

Week1 Soldering pre-lab tutorial



Outline



- General Information
- > LED running light
- Soldering skills

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Assessment for LED light (5%)



Bench inspection: Week 2

Ask the TA or the module leader to check your work before the end of the lab (6PM)

- □ Online Quiz in ICE (0%)
 - Can't start lab without finish the Quiz.
- Functionality (2%):
 - Working perfectly (2%)
 - Partially working (1%)
 - ➤ Not working (0%)
- □ Soldering quality (3%)

Lab Rules!



Please strictly obey the lab rules!

Please review Health and Safety Handbook of EEE and check the lab rules posted on the wall of each lab!

It is compulsory for every student to attend their assigned section. There is a assessment in the end of every lab section.

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LED Running Lights



Individual project

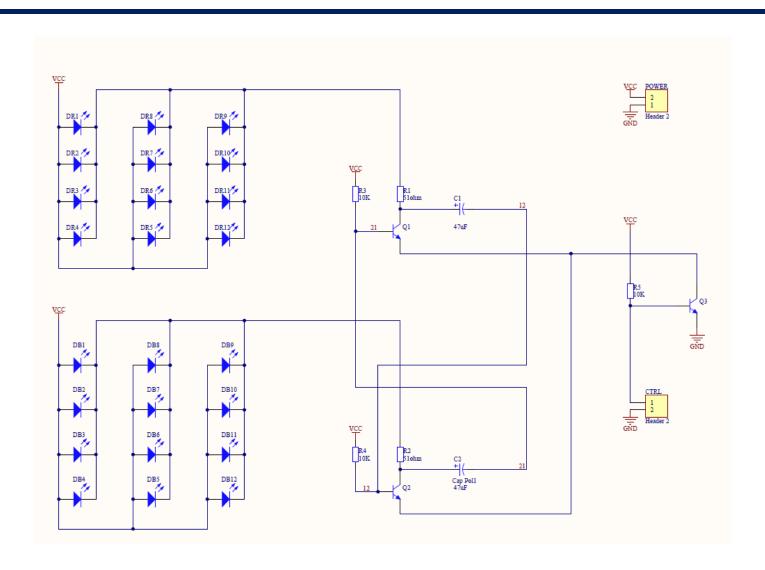


Objective:

- To learn and practice the soldering skills
- To build the simple electronic circuits from a given circuit diagram.

Schematic Diagram

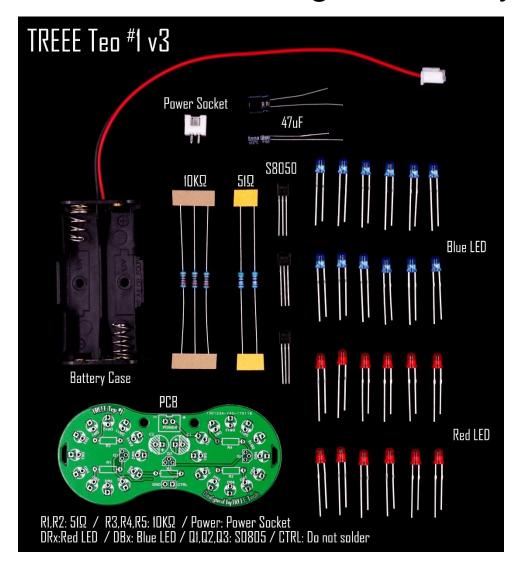




Component list

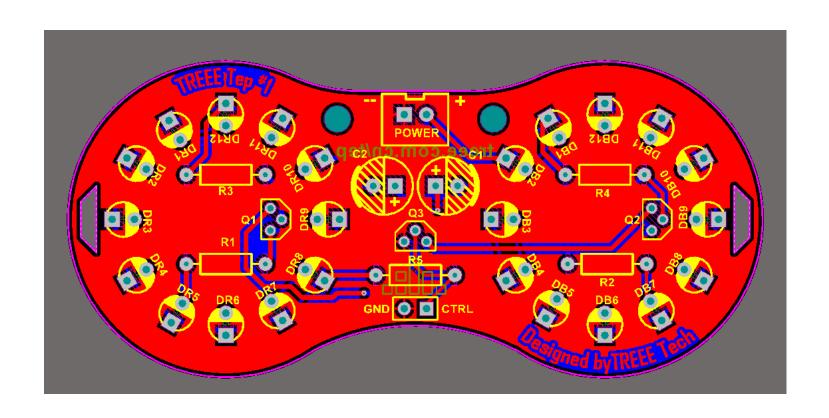


Don't start soldering if miss any



Components Layout



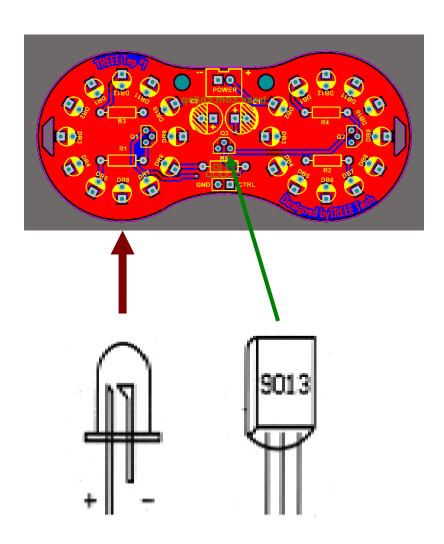


Visit for more details:

http://www.treee.com.cn/?id=tep1v3&winzoom=1

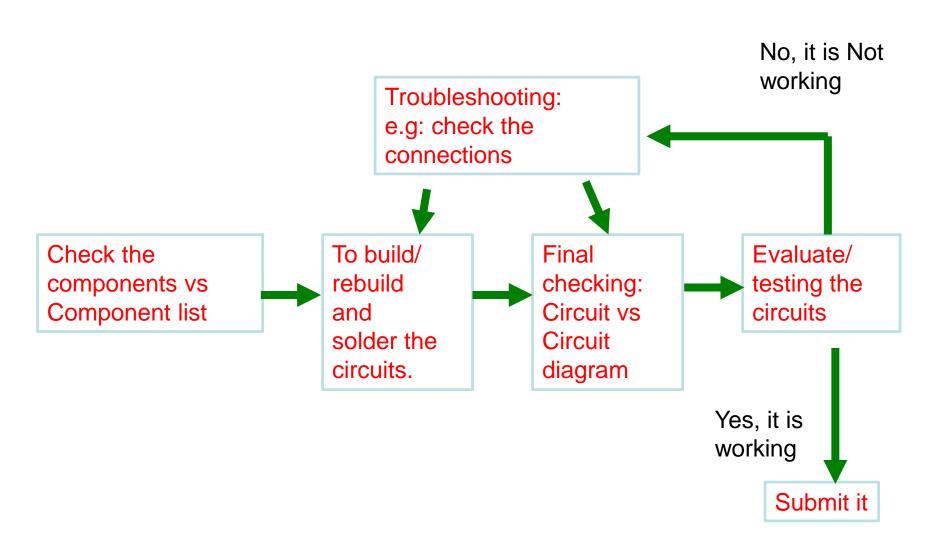
LED and Transistor pins layout





Work flows





Outline



- General Information
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Introduction to Soldering





The creation of this video is funded by: XJTLU TDF project (14/15-R10-087): Introducing Customized Video Demonstration (CVD) Into The Lab-based Teaching At XJTLU

Tools you will need







Solder

Soldering iron, stand and damp sponge

Prepare the iron



Step 1: Plug in the iron and turn it on.

Step 2: Clean the tip.

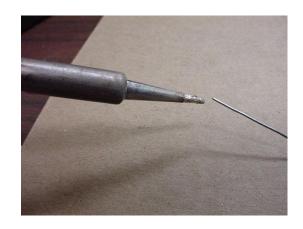
When the iron is hot, wipe both sides of the soldering tip on the sponge.

Step 3: Tin the tip.

Put a light layer of solder over another piece of metal, it is called 'tinning'.

Keep working surfaces tinned, wipe only before using, and retin immediately.





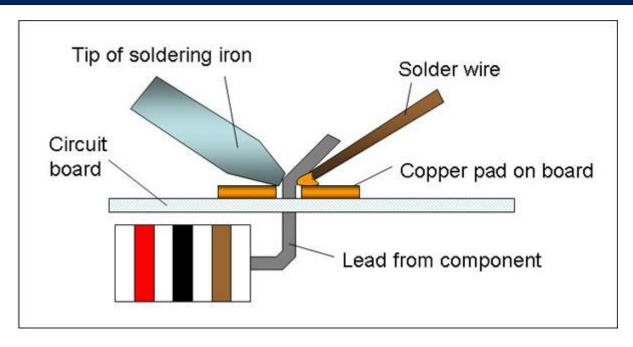
Surface Preparation



- A clean surface is very important if you want a strong, low resistance joint.
- All surfaces to be soldered should be cleaned with <u>abrasive paper or tweezers to scrape</u>.
- Don't neglect to clean component leads, as they may have a built up of glue from packaging and rust from improper storage.

To solder





The tip of the soldering iron heats both the copper pad and the lead from the electronic component. Solder melts when placed in contact with the hot metals to be joined.

Apply Heat



- Apply a very small amount of solder to the tip of the iron.
- •This conducts the heat to the component and board, but it is **not the** solder that will make up the joint.
- •Now actually heat the component and board. Lay the iron tip so that it rests against both the component lead and the board.
- •Hold the iron tip there for one or two seconds to heat the component up enough to solder, but larger components may need more time.

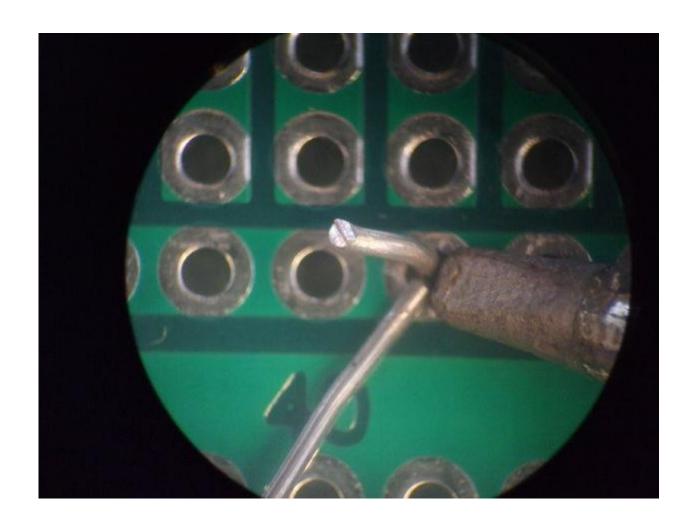
Apply Solder And Remove Heat



- Once the component lead and solder pad has heated up, you are ready to apply solder.
- •Touch the tip of the strand of solder to the component lead and solder pad, but not the tip of the iron!!!
- If everything is hot enough, the solder should flow freely around the lead and pad.
- Once the surface of the pad is completely coated, you can stop adding solder and remove the soldering iron (in that order).
- •Don't move the joint for a few seconds to allow the solder to cool. If you do move the joint, you will get what's called a "cold joint".

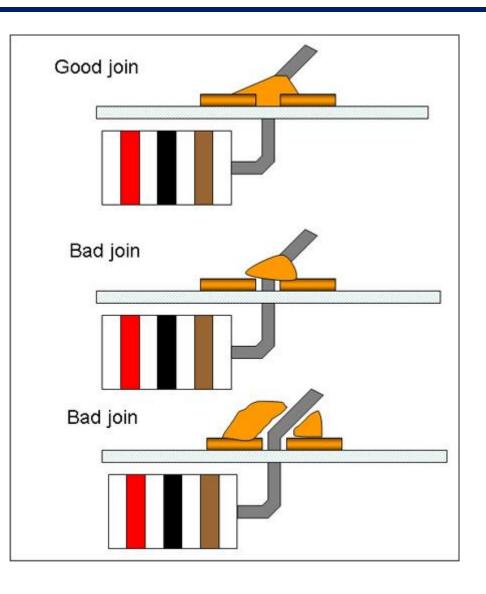
Apply Solder And Remove Heat





Good VS Bad Joints

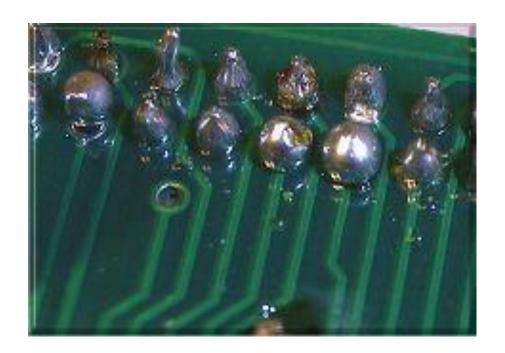


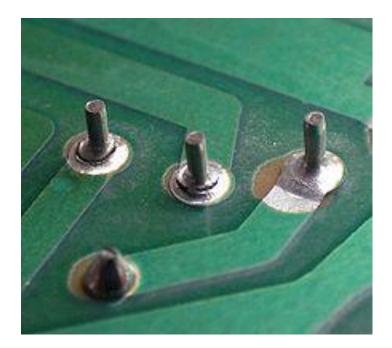


Bad soldering



A tenfold excess of solder on this hand-soldered printed circuit board, and (extreme left) an incomplete solder joint with poor coverage. There is no need to add more solder "for luck".





How To Desolder







A Solder Sucker

How To Desolder



Preparation And Heat Application

- •There isn't really too much to worry about when removing solder.
- •Make sure to get any grease, varnish or glue off the joint before you start heating. If you don't, you will probably foul the tip of your soldering iron pretty quickly.
- •Lay the iron tip so that it rests against both the component lead and the board.
- •Again, it takes one or two seconds to heat the component up enough to solder, but larger components and larger soldering pads on the board can increase the time.

How To Desolder



Remove Solder

- Push down the plunger so it locks into place.
- •Usually, you will feel or hear a click. If the tool has been used before, a small "plug" of solder may be pushed out of the nozzle.
- •Once the solder sucker is cocked, put the nozzle into the molten solder and press the button.
- •The plunger will pop up quickly take the solder with it. This should remove most, if not all, the solder from the joint.
- Don't worry if the tip softens a little, but don't melt it.
- •You may need to repeat this step a few times in order to get all the solder or even add more solder to be able to get better suction.

- •Keep the iron tip clean and tined. A clean iron tip means better heat conduction and a better joint. Use a wet sponge to clean the tip between joints.
- •Double check joints. It is a good idea to check all solder joints with an ohm meter after they are cooled. If the joint measures any more than a few tenths of an ohm, then it may be a good idea to resolder it.
- Polarity. Remember that diodes certain capacitors etc need to be put in the circuit a certain way so be careful and check before you solder!

Safety When Soldering



DANGEROUS END!



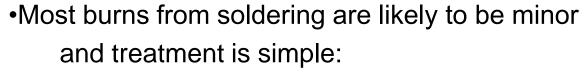
Safety When Soldering



- •The soldering iron and liquid solder are HOT! A typical soldering iron is 370C.
- Solder in a well ventilated area.
- Do not let it blow on the iron or your work as this can cause bad solder joints.
- Pay attention to the job at hand. Do not solder if you can't devote full attention to the job.
- Do not snap the iron down to flick solder off. A small flying drop of solder will splatter and stick to your skin.

First Aid for Burns







- •Immediately cool the affected area under gently running cold water.
- •Keep the burn in the cold water for at least 5 minutes (15 minutes is recommended). If ice is readily available this can be helpful too, but do not delay the initial cooling with cold water.
- Do not apply any creams or ointments. The burn will heal better without them. A dry dressing, such as a clean handkerchief, may be applied if you wish to protect the area from dirt.
- Seek medical attention if the burn covers an area bigger than your hand.

Acknowledgement



For use of some content and pictures

http://www.aaroncake.net/electronics/solder.htm

http://http://www.instructables.com/id/Soldering-101%3a-Lesson-1%3a-Tin-the-Tip/?ALLSTEPS

http://pcwww.liv.ac.uk/eee/undergraduate/

http://http://www.instructables.com/id/How-to-Solder-Basic-Soldering-Guide/?ALLSTEPS

http://http://www.sciencebuddies.org/science-fair-projects/project_ideas/Elec_primer-

solder.shtml#soldering

http://https://www.astro.umd.edu/~harris/docs/WellerSoldering.pdf

To do list for Week 1 & 2



Find your team mates, form a group of 3 students.

Submit the name list for your group.

Start the discussion about the open project with your teammates.

Do the online quiz for soldering.

Attend your assigned lab section.

Make your LED light

Assessed by the TA before the end of the lab.

Collect your Arduino Nano

Do the Arduino home work (Arduino-Part II-Hello world) during your own time.

THANKS

