Lecture 06.01 Soldering

soldering
work pieces
solder
solder joint
PCBs

Soldering is the process of joining two pieces of metal (*work pieces*) by introducing molten metal called *solder*, which bonds to both metals, creating a *solder joint*, which joins the work pieces both mechanically and electrically.

In large-scale production of *printed circuit boards* (PCBs), soldering is automated. However, when prototyping for applications that require strong mechanical connections or have space or weight constraints, the mechatronicist must solder the prototype circuit.

Before you begin soldering, please watch Collin Cunningham's video introduction *Soldering*:

https://youtu.be/QKbJxytERvg.

Here are some additional tips.

1. Integrated circuits such as the 555 timer can be easily damaged due to excess heat, so it is important not to overheat it, keeping the iron on the terminal for as little time as possible (< 2 sec). Practice by soldering other components first.
2. Use flux paste, which aids in breaking the surface tension of the melted solder.

tinning

3. *Tinning* the tip of the soldering iron will improve its performance.
4. An oxide layer will periodically form on the tip of your iron, to remove it simply wipe the tip on a wet sponge.
5. Temperature control allows you to find the ideal temperature so that it will solder without overheating the components.
6. The soldering iron is extremely hot so practice caution when using it. Always place it into the holder when it's not in use.