

Guide for Buying Your Own Tools and Components

CSE 3323 – Electronics

This is a very basic guide to common components and tools used for prototyping and soldering circuits. This will not go into incredible detail about each component/tool but this guide will at least point you in the right direction and give you the correct key terms to search further into each item. Always read reviews of tools and components (if available) when researching parts to purchase. ALWAYS pay attention to the packaging and size of components, you don't want to buy *surface mount* devices when you need *through-hole* devices so it can be properly soldered onto prototyping circuit boards.

Some items listed below will have direct links to known products that are of high quality but, of course, you may purchase any item you find online. The links are merely example products you can use to further your own research when buying parts.

Note: You don't necessarily have to purchase the more expensive tools; if they are in the electronics lab you may use them in the lab during open lab times. (Oscilloscope, bench-top power supplies, etc.)

Great YouTube videos about buying equipment for your own electronics setup (his whole channel and other videos are also very informative and interesting):

- [Video #1](#)
- [Video #2](#)
- [YouTube Channel Link \(EEVblog\)](#)

Best websites to find electrical components and tools:

- [Amazon](#) (great for tools and generic components/parts, even small-bulk purchases)
- [Mouser](#) (best for very specific components, based in Mansfield - fast delivery)
- [SparkFun](#)
- [Digi-Key](#)
- [Jameco](#)
- [Fry's Electronics](#) (physical store in Arlington, but normally cheap components will be much more expensive here)

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1. Soldering Station (Iron)

Always buy a variable temperature soldering station (with iron), not just the standalone soldering iron that plugs directly into a wall. The simple plug irons are cheap, unreliable, dangerous, and you have no control on how hot you wish to solder components.



Stations with a heat gun (hot air gun) attached are not necessary for basic soldering.

[Hakko FX888D](#)

[Weller WES51](#)

[X-Tronic Model 3020-XTS](#)

2. Solder

Solder with lead is much easier to work with and usually creates better connections in your circuit. Lead-free solder can be difficult to manipulate when heating up. The ratio of tin/lead in solder varies, but the reliable common ones are “60/40” or “63/37”.

Many options on Amazon and SparkFun.

3. Additional Soldering Tools

a. Additional Iron Tips

Every soldering station/iron will come with at least one iron tip but if you'd like to have additional or different-shaped tips you can usually buy them for cheap.



[Link 1](#) [Link 2](#) (many others on Amazon)

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b. Desoldering Pump

Also known as: solder sucker

To remove large clumps of solder when an error is made.



c. Desoldering Copper Wick

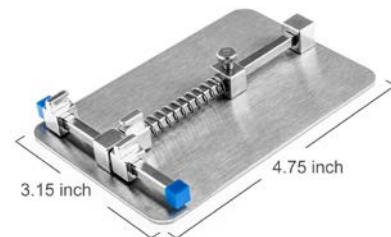
Also known as: desoldering wick, solder wick, desoldering braid

To remove smaller amounts of solder when an error is made.



d. Circuit Board Holders

Also known as: helping hands, PCB holder



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4. Misc. Tools

a. Multimeter

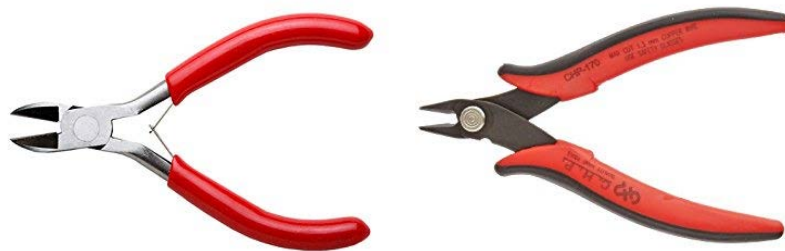
There are a ton to choose from online. Read reviews carefully and be sure it's not a cheap volt-meter but an actual MULTI-METER. Buy one that can measure DC and AC voltage, current, resistance, capacitance, etc. Buy digital, not analog.



b. Wire Strippers



c. Wire Cutters



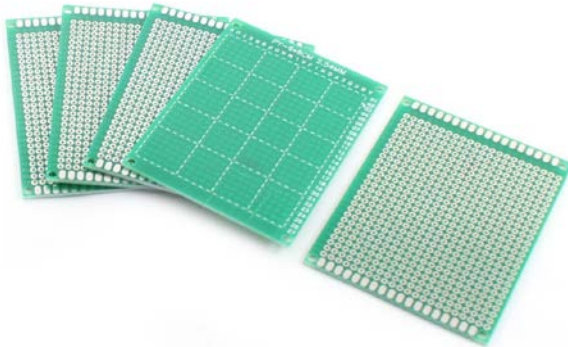
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5. Solderable Circuit Boards

Also known as: PCB boards, printed circuit universal boards, solder breadboards, prototyping circuit board

There are double-sided and single-sided boards in terms of the circular metal connection pads on the board. Single-sided boards are much easier to handle. Double-sided boards can be difficult when soldering, the solder tries to flow through the hole to the other side when that wasn't the intention. I recommend single-sided boards. Pay attention to the size (dimensions) of the board when purchasing, always choose larger rather than smaller to ensure your entire circuit will fit comfortably on the board.



[Prototyping Circuit Board 1](#)

[Prototyping Circuit Board 2](#)

[Prototyping Circuit Board 3](#)

[Prototyping Circuit Board 4](#)

[Prototyping Circuit Board 5](#)

[Prototyping Circuit Board 6](#)

6. Basic Passive Components (Resistors, Capacitors, Inductors, etc.)

You can find the common valued resistors, capacitors, etc. on Amazon usually in a large kit or set but if you need uncommon or very specific valued components, Mouser is the better place to purchase them. MAKE SURE you order “through hole” components, not small surface mount components.

7. Active Components (ICs, transistors, diodes, op-amps, etc.)

Same as the above ^^ for passive components, but with active components there are more specs to pay attention to. Mouser has incredible detail on their website for each component, but when in doubt look at the component's datasheet (which Mouser usually includes in the product link).

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8. Wall Power Components

a. DC Plug Power Supply

After you design your circuit and know the appropriate voltage to power it up, you can purchase the correct DC Wall Power Supply. Amazon and SparkFun have many to choose from. Read the reviews carefully. Pay attention to the type of plug (barrel connector).



b. DC Plug Adapter (barrel jack adapter)

You'll also need to pair your power supply with an appropriate connector on your soldered circuit board. Pay attention to the exact type/size of plug/adapter.



[Connector 1](#)

[Connector 2](#)

[Connector 3](#)

9. Battery Power Holder

If your circuit is battery powered instead of directly from a wall outlet adapter, you'll need a holder/adapter to place the batteries in that also has nice wire connections to attach to your circuit board. Many on Amazon and SparkFun.



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10. Misc. or Other Components

You might also need various other components to complete your circuit and make it “more presentable” and professional looking. Amazon and SparkFun are reliable for these parts.

- **Wire (solid, 22 gauge/AWG fits nicely through circuit boards)**
[Wire 1](#)
[Wire 2](#)
- **Pin Headers (male/female, pins/sockets)**
[Headers 1](#)
[Headers 2](#)
- **Push Buttons**
[PB 1](#)
- **Switches**
[Switch 1](#)
- **Board Legs to lift your circuit board (spacers, standoffs)**
[Legs 1](#)
[Legs 2](#)

