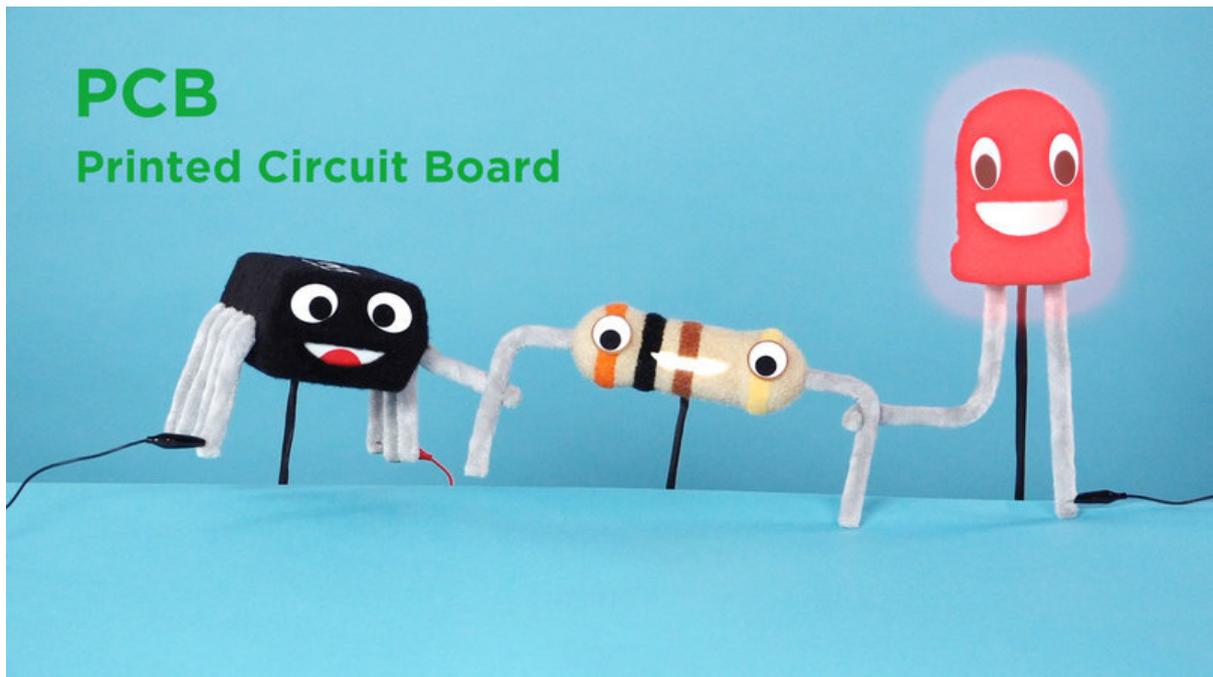




Circuit Playground - P is for PCB

Created by Collin Cunningham



<https://learn.adafruit.com/circuit-playground-p-is-for-pcb>

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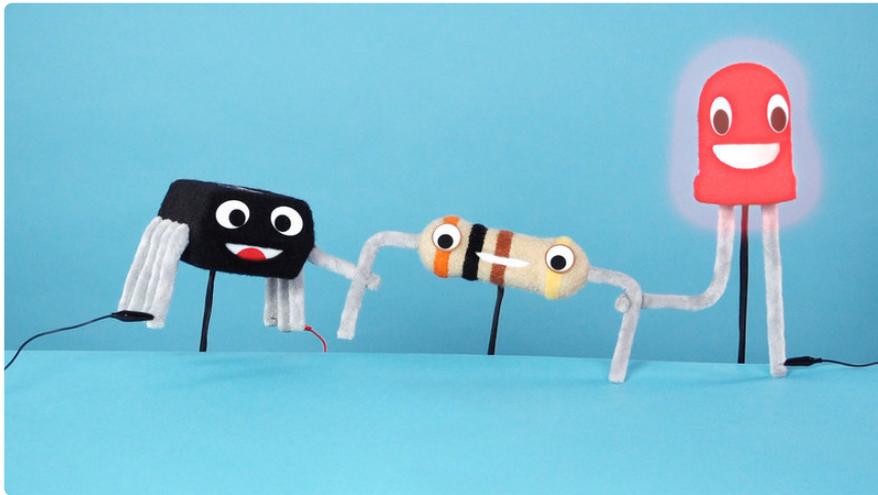
Table of Contents

Video	3
Transcript	3
Learn More	9
<ul style="list-style-type: none">• What's a PCB?• How PCBs are made• Links	

Video

Hans, Ruby, & Mho are trying to make a circuit but are finding it hard to keep it all together. Have no fear, printed circuit boards are here - PCBs to the rescue!

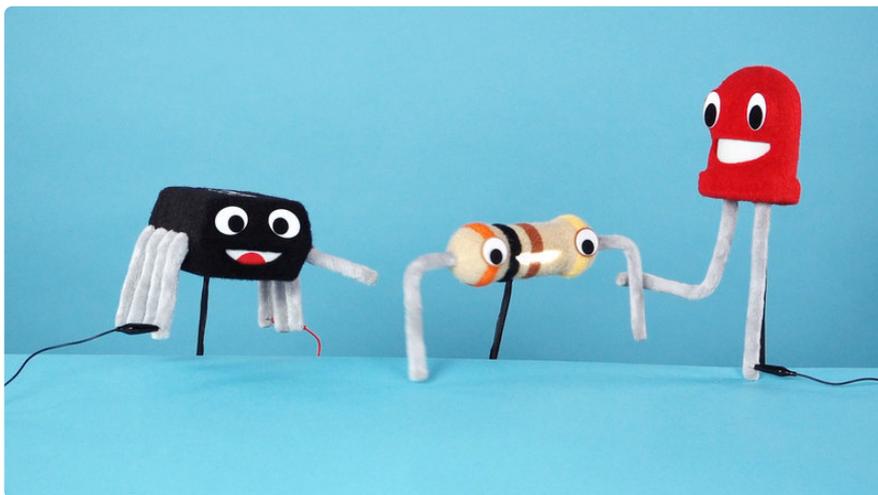
Transcript



Hans: Ok good. Now Mho, you're a resistor, so you go in the middle.

Mho: Ok - let's do this. Grab onto me guys.

Ruby: Oh it's working - I'm blinking again!



Mho: Oh - let me see! I don't see any blinking, Ruby.

Hans: Well, that's because you disconnected the circuit! Let's give it another go. Please reconnect us, Mho.

Mho: Ok - let's do this. Grab on.

Ruby: Ok - I'm working! I'm blinking again!

Mho: I will take your word for it.

Ruby: No really - look!

Mho: Ruby!



Hans Ok guys - group meeting! You've got to stay still if we're going to make a circuit together.

Ruby: Sorry Hans - I just got so excited.

Hans: I understand Ruby, but we need to stick together in order for the power to flow between us.

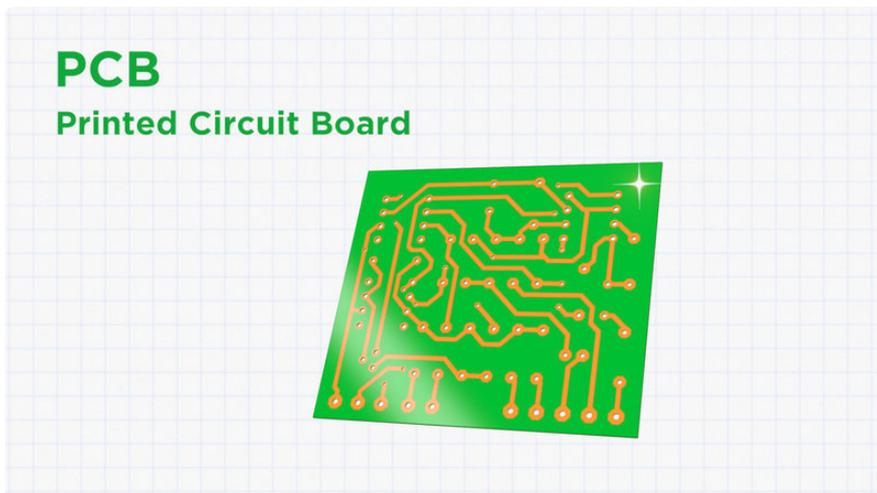


Mho: Huh - you know making a circuit is harder than I thought.

Hans: Yes - well, there is one thing that would make it much easier.

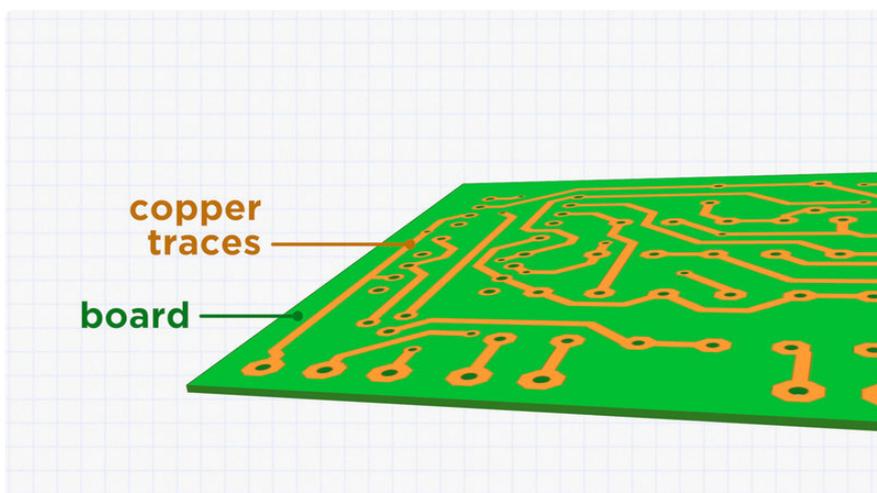
Ruby: What's that?!

Hans: A PCB!

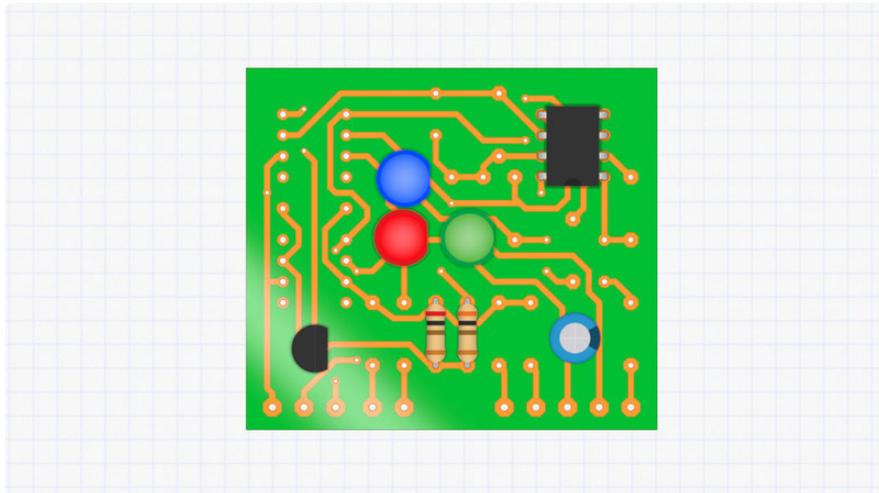


Mho: PCBs are awesome - I use them everyday! ... what's a PCB again?

Hans: PCB stands for printed circuit board. A PCB is a stable and sturdy way to connect electronic components like us together!



Ruby: Oh totally - PCBs are the best! There's a board part, that's the flat and strong support and then copper circuit traces are printed on top.

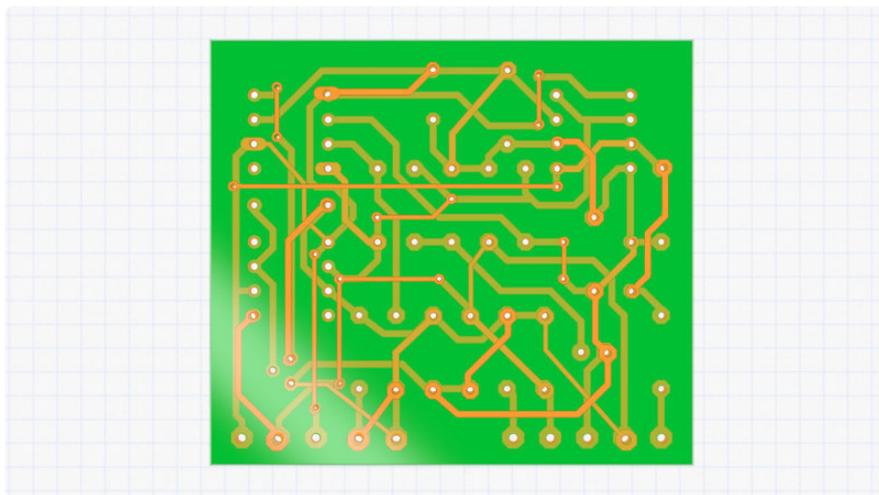


Ruby: That keeps LEDs like me, connected and centered.

Hans: Or, integrated circuits like me!

Mho: What about resistors?

Ruby: Of course - and our best friends, Cappy, Connie, Gus, and Billie too!



Hans: Yes! PCBs can be simple, with just a single layer of copper circuit traces ... or really complex with multiple layers of connections stacked on top of each other.

Mho: Woah - how many layers can we make?

Hans: Most PCBs are two layer - One top and one bottom. But for advanced circuits like a phone or a computer, there can be up to sixteen layers!



Ruby: Hey guys - this PCB over here would be perfect for us! Check it out!

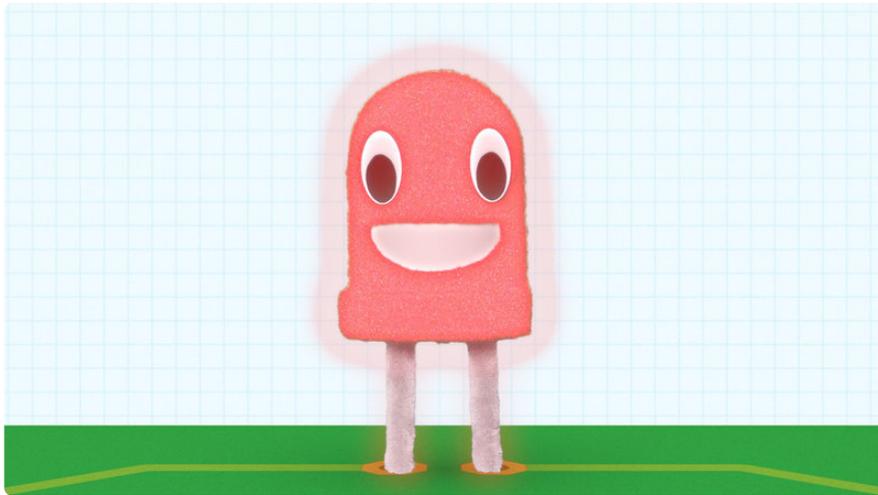
Mho: Wha - ? You mean we had a PCB over here the whole time?

Hans: Shh - just go with it!

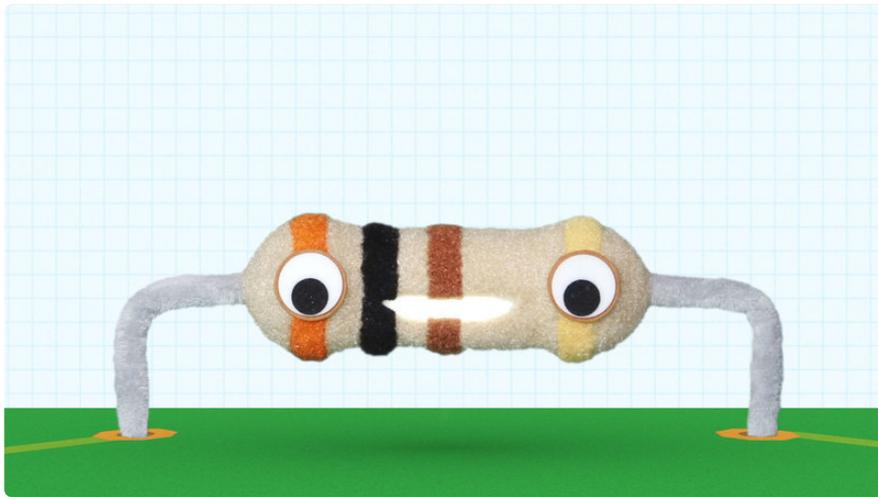
Mho: Uh - Ok.



Hans: Ahh - this is a nice PCB! Very cozy, no?

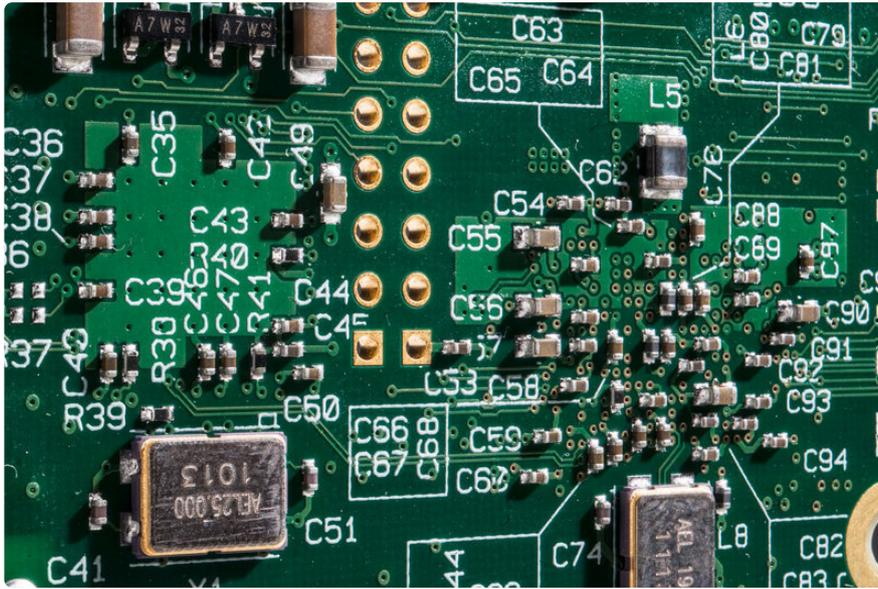


Ruby: Absolutely - I could blink here forever!



Mho: This is the life ...

Learn More



What's a PCB?

Wikipedia gives the official [definition](https://adafru.it/D5E) (<https://adafru.it/D5E>) of a PCB as:

A printed circuit board (PCB) mechanically supports and electrically connects electronic components or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate. Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it.

How PCBs are made

Most PCBs are made in factories with special equipment which can produce large batches of PCBs in sheets or 'panels'. The video below takes an in-depth tour of a PCB manufacturing facility:

There's a number of different ways to make your own printed circuit board. Each method starts with a "copper-clad" board - a flat piece of rigid material covered on each side with a thin layer of copper.

Milling

CNC Milling machines are great at making PCBs. They use a rotating motor controlled by a computer to cut away unwanted copper, leaving only the traces needed by your circuit.

Etching

You can also make PCBs with a chemical process called etching. First, the area we don't want removed from the board is covered in w a protective layer that will resist etching. Next the board is submerged into a chemical that dissolves copper. Once the etching process is complete, the protective layer is removed, leaving only circuit traces.

Links

[The History of Printed Circuit Boards – Infographic \(https://adafru.it/D5F\)](https://adafru.it/D5F)

[How Printed Circuit Boards Are Made \(https://adafru.it/D5G\)](https://adafru.it/D5G)

[Inside a PCB Factory \(https://adafru.it/D5H\)](https://adafru.it/D5H)