

DIY Sensors – Analogue/Organic

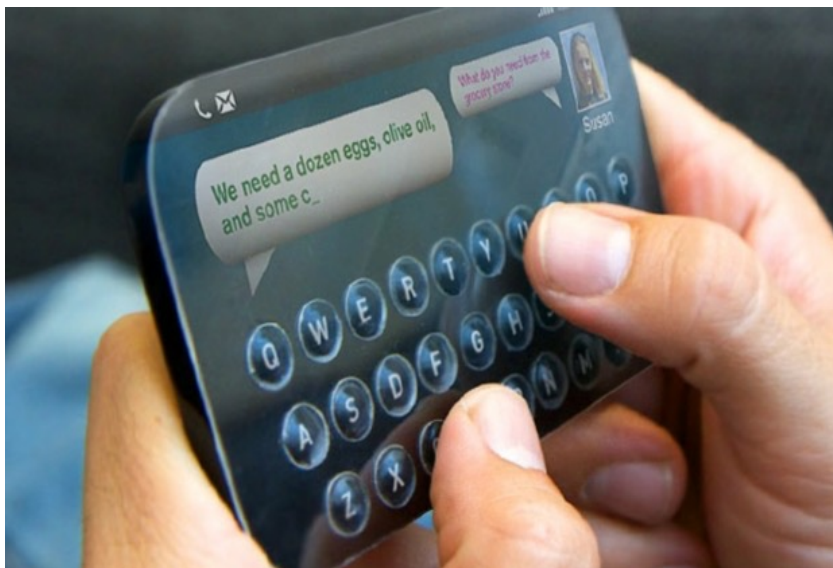


Introduction: Conventional Touch Surface

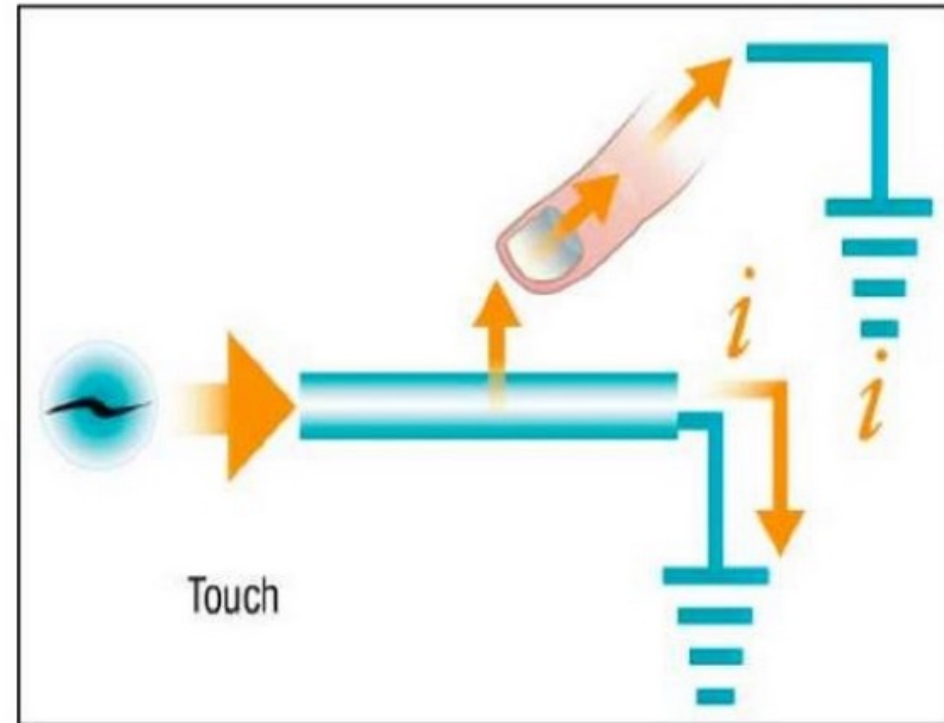
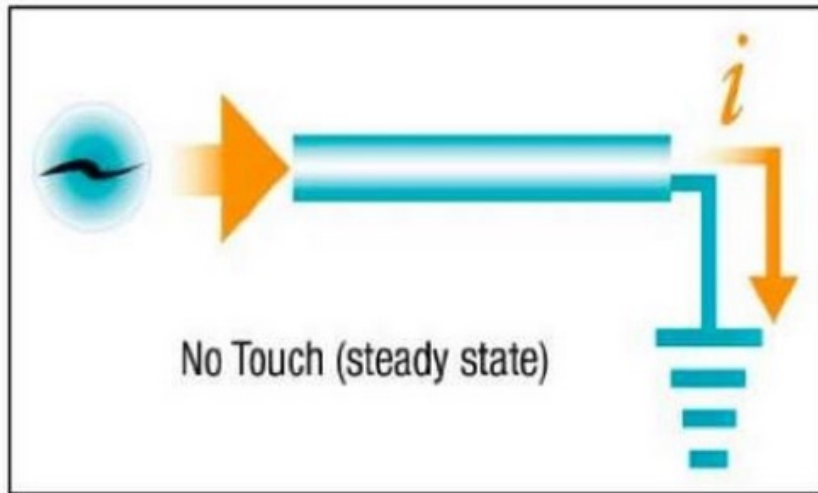
- ✓ A touch surface is an input device that allows users to operate a device by simply touching the display screen.
- ✓ The display screen has a sensitive glass overlay placed on it and we can give the desired input by touching on it.
- ✓ The term generally refers to touch or contact to the display of the device by a finger or hand.



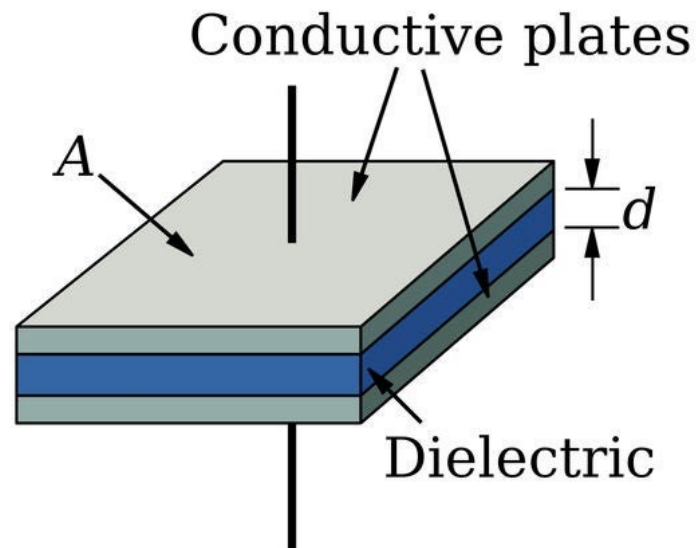
Almost everywhere in our life



Capacitive Sensing Technology



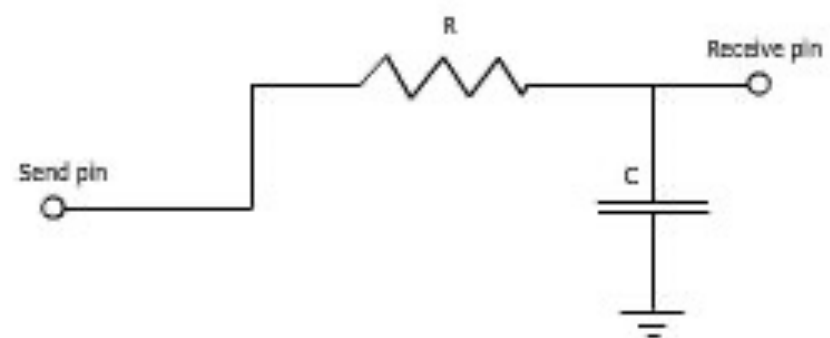
The Capacitor (C)



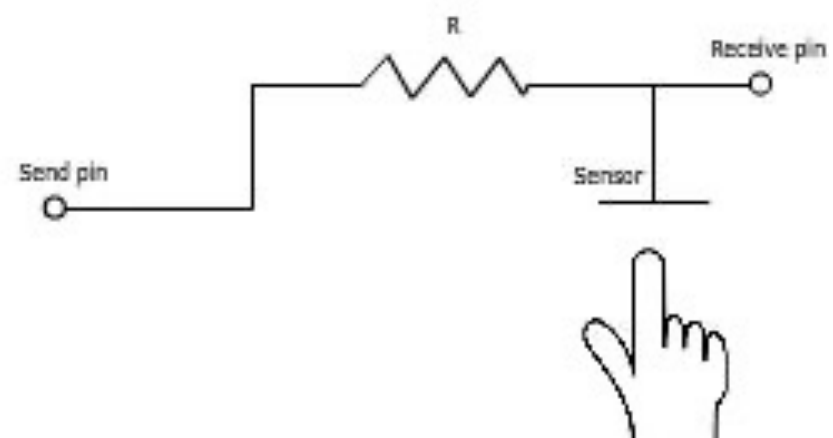
To understand how capacitive sensors work, first you have to understand how a capacitor works.

A capacitor consists of 2 electrical conductive surfaces (also called electrodes), one is connected to the positive pole of the electrical circuit and the other is grounded. Between these surfaces there is a non-conductive layer which is called a dielectric. The capacitor can be compared to a small battery. When sending a pulse to the capacitor, it quickly charges. When the signal goes to zero, the capacitor discharges. This creates a delay in the pulse due to the time it takes to charge and discharge the capacitor.

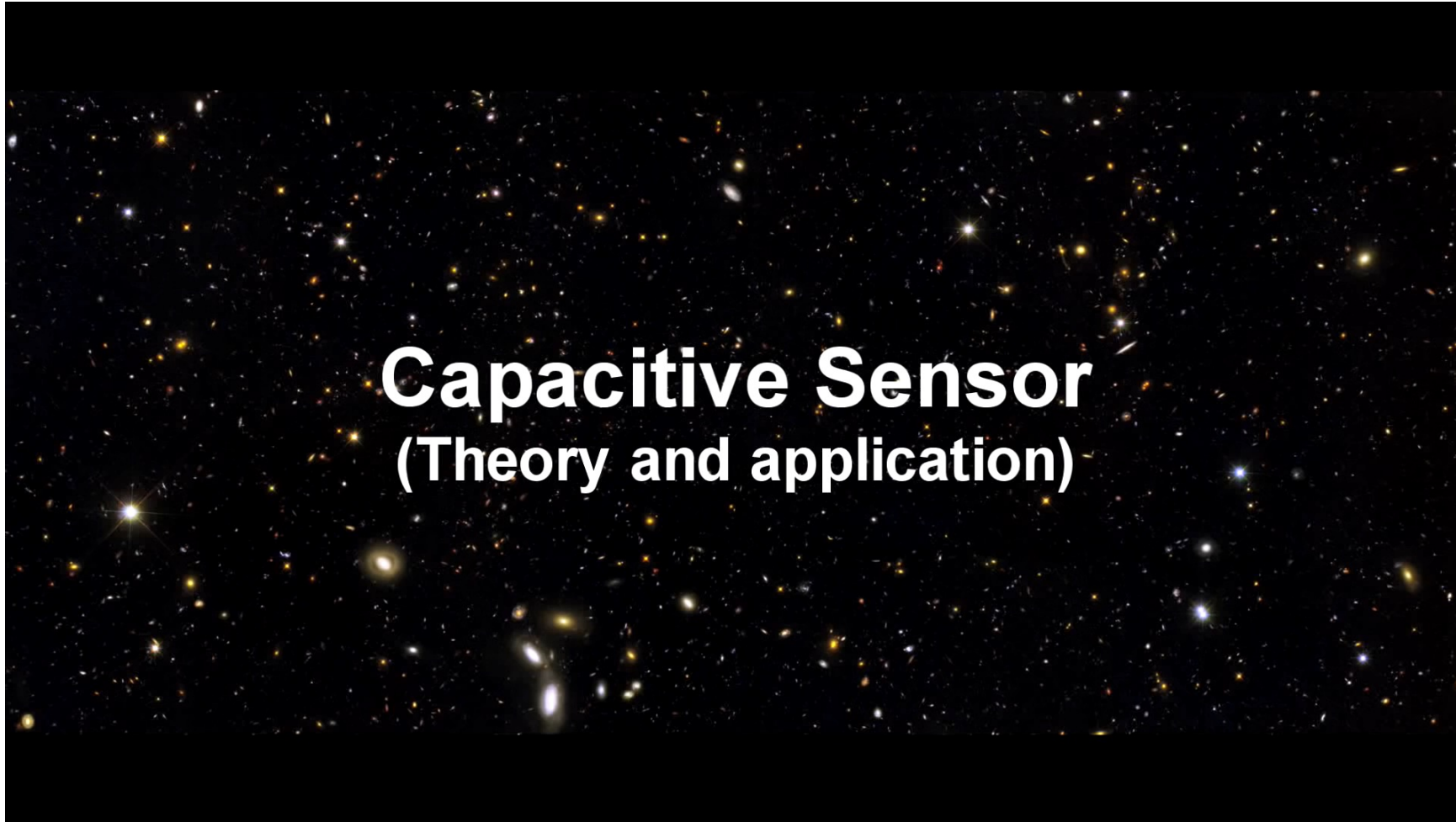
<https://www.instructables.com/id/Capacitive-Sensing-for-Dummies/>



=



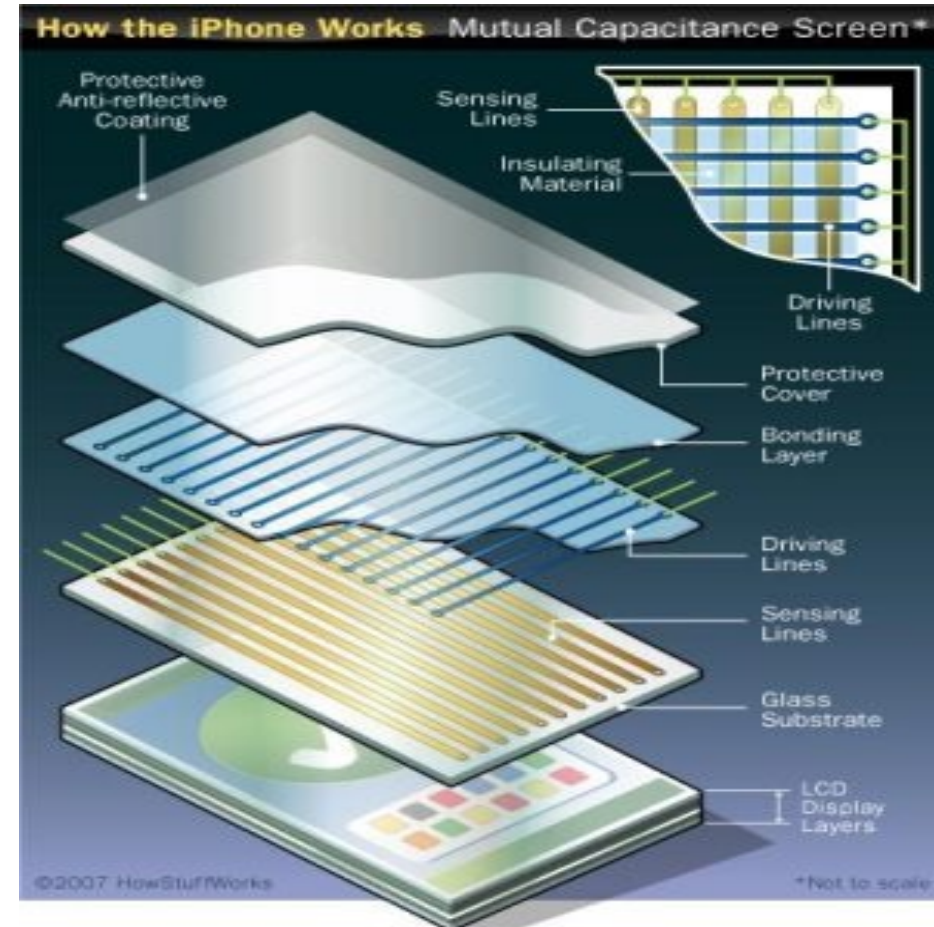
How it works



<https://www.youtube.com/watch?v=QItuf6lNvmI>

Capacitive Sensing Technology in Our Life

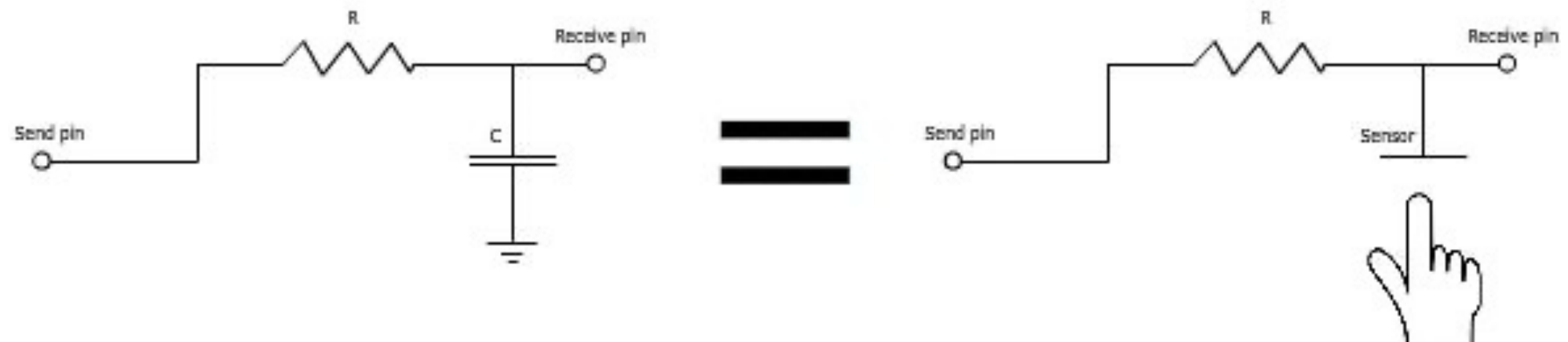
- A capacitive touch screen panel is one which consists of an insulator such as glass, coated with a transparent conductor such as Indium tin oxide (ITO).
- As the human body is also a conductor, touching the surface of the screen results in a distortion of the screen's electrostatic field, measurable as a change in capacitance.

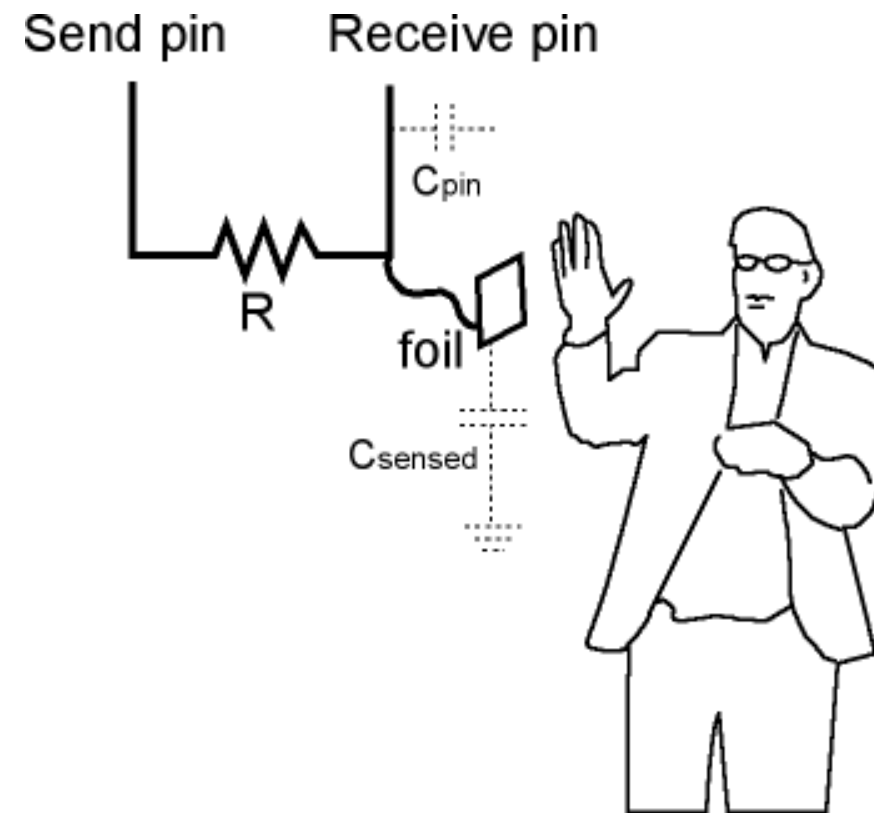


What if we want everything to be touch-sensitive?



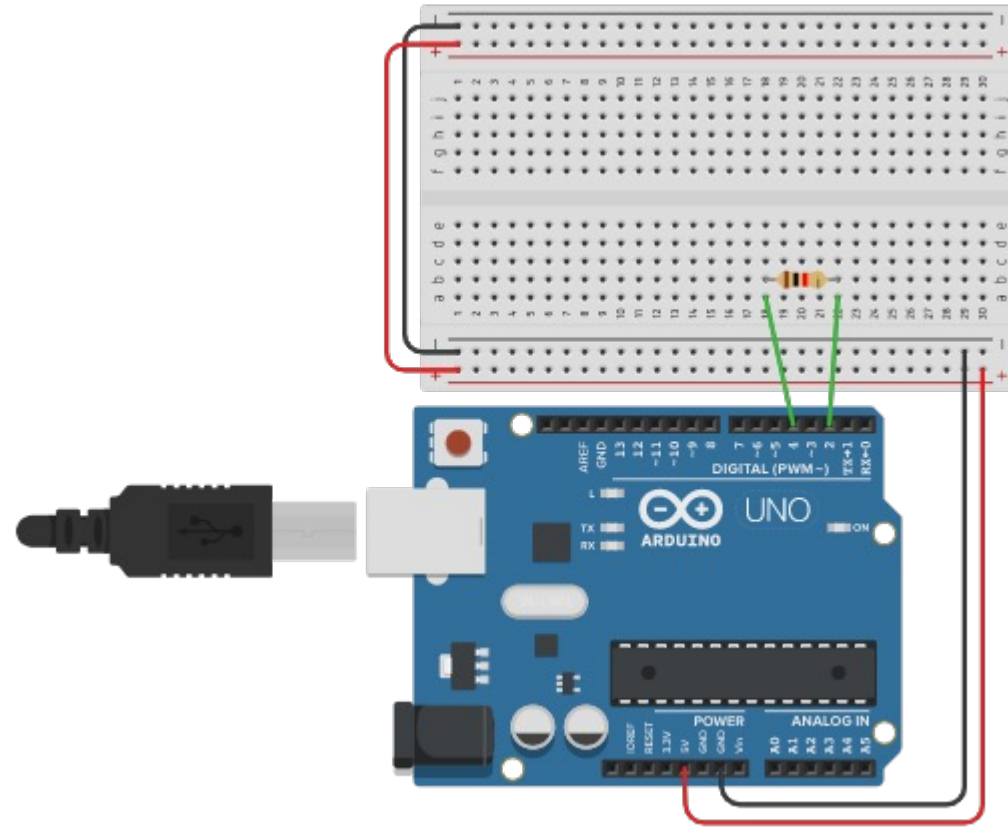
DIY our own cap-sensor







https://www.youtube.com/watch?v=BHQPqQ_5ulc



<https://www.tinkercad.com/things/14SQiZDKoZf>

Demo

- Conductive Wire
- Water
 - Ice will work too.
 - <https://www.youtube.com/watch?v=rwVppityTJQ>

Anything else we can make touch-sensitive?

- Basically anything that's conductive
- Quick Task:
 - Please write down something that could be touch-sensitive in our every day life.
 - Submit the paper with your name and student number.

MADE IN THE USA

Proto-pasta

POWERED BY
PROTOPLANT



This spool is designed to be lightweight, rigid, and recyclable. Its unique all-cardboard form has a large diameter core, level window, and integrated clips.

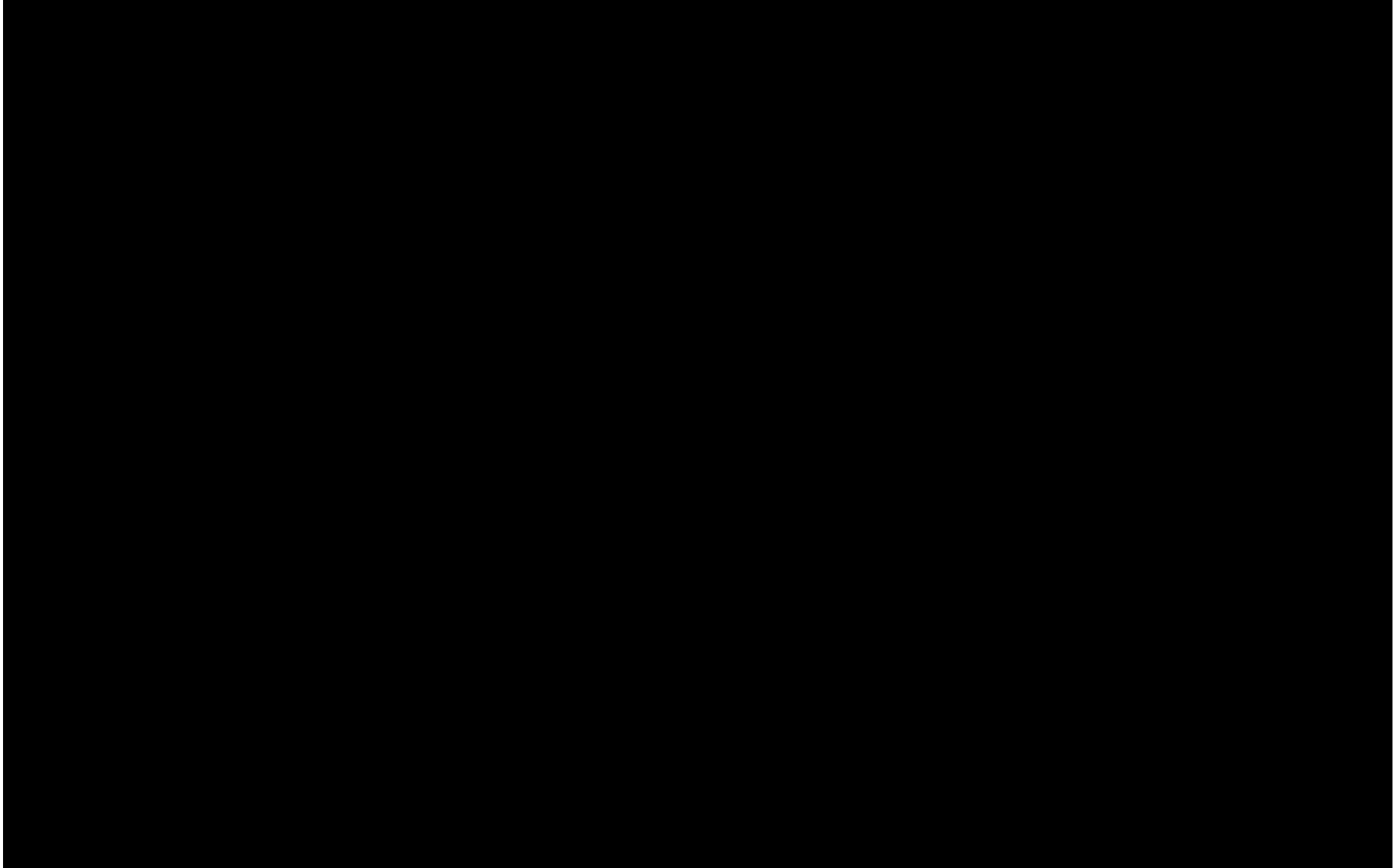
With packaging this cool, think how great the filament is!

Conductive PLA

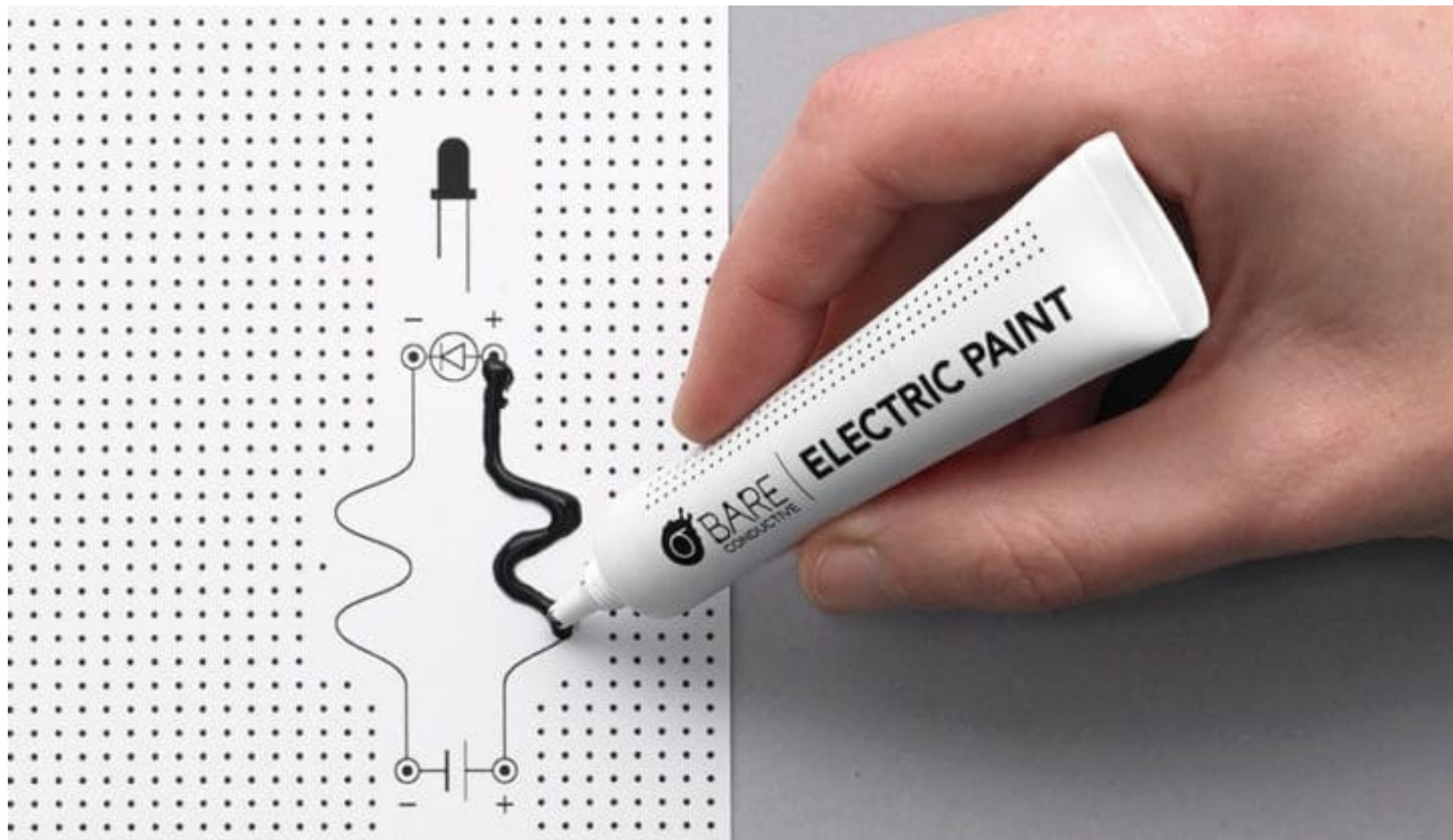
Ø 1.75 mm | 1150 kg/m³
500 g (1.1 lbs) – approx. 202 m

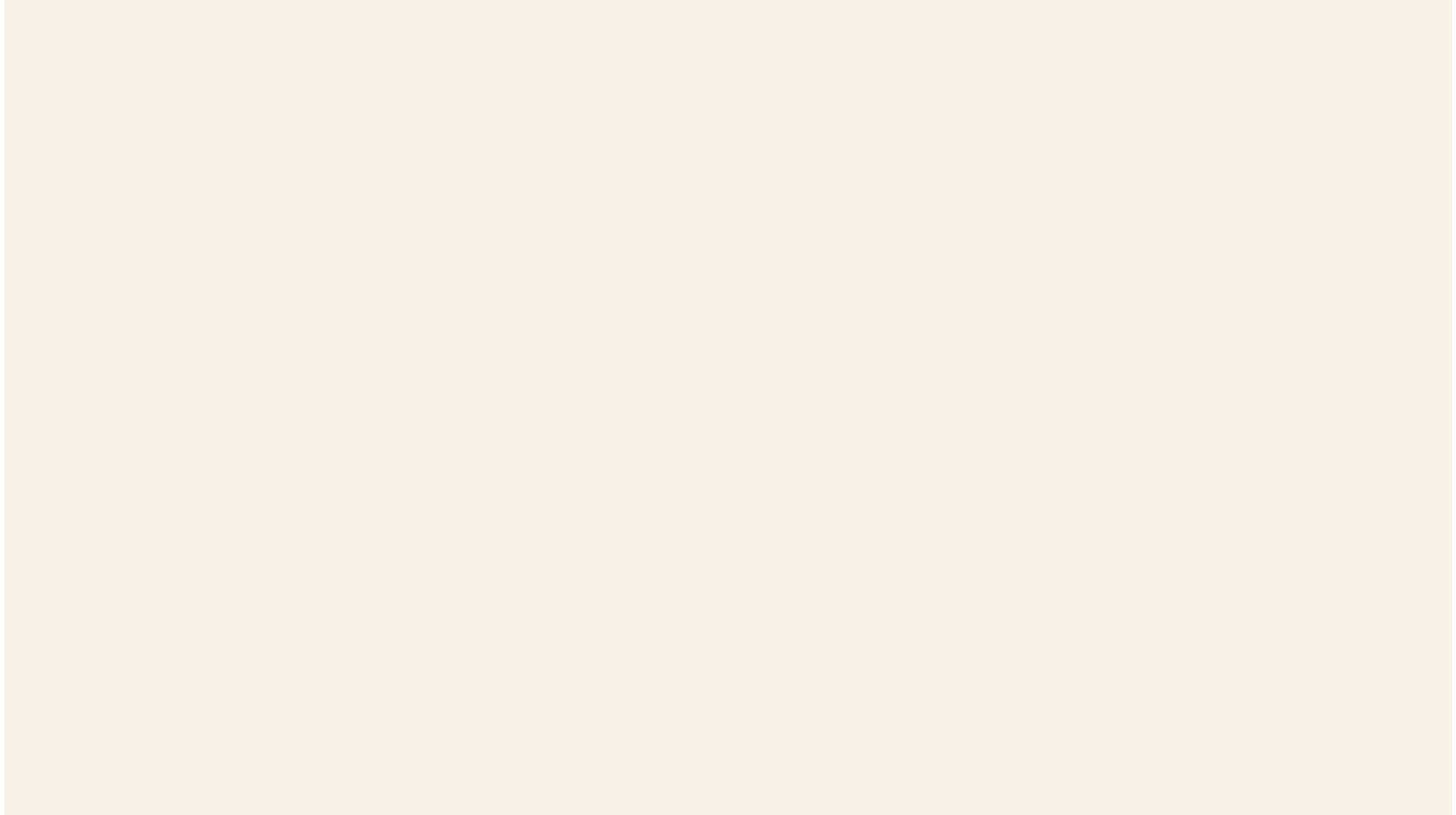
Made by makers. Proto-pasta exotic 3D Printer Filament is crafted to the highest standards. Our unique blends are extruded in-house on equipment designed and built by ProtoPlant. Thanks for sharing your passion for making with us!
- The Proto-pasta Team

Proto-pasta.com
[@proto_pasta](https://twitter.com/proto_pasta)
[#proto_pasta](https://www.instagram.com/proto_pasta)



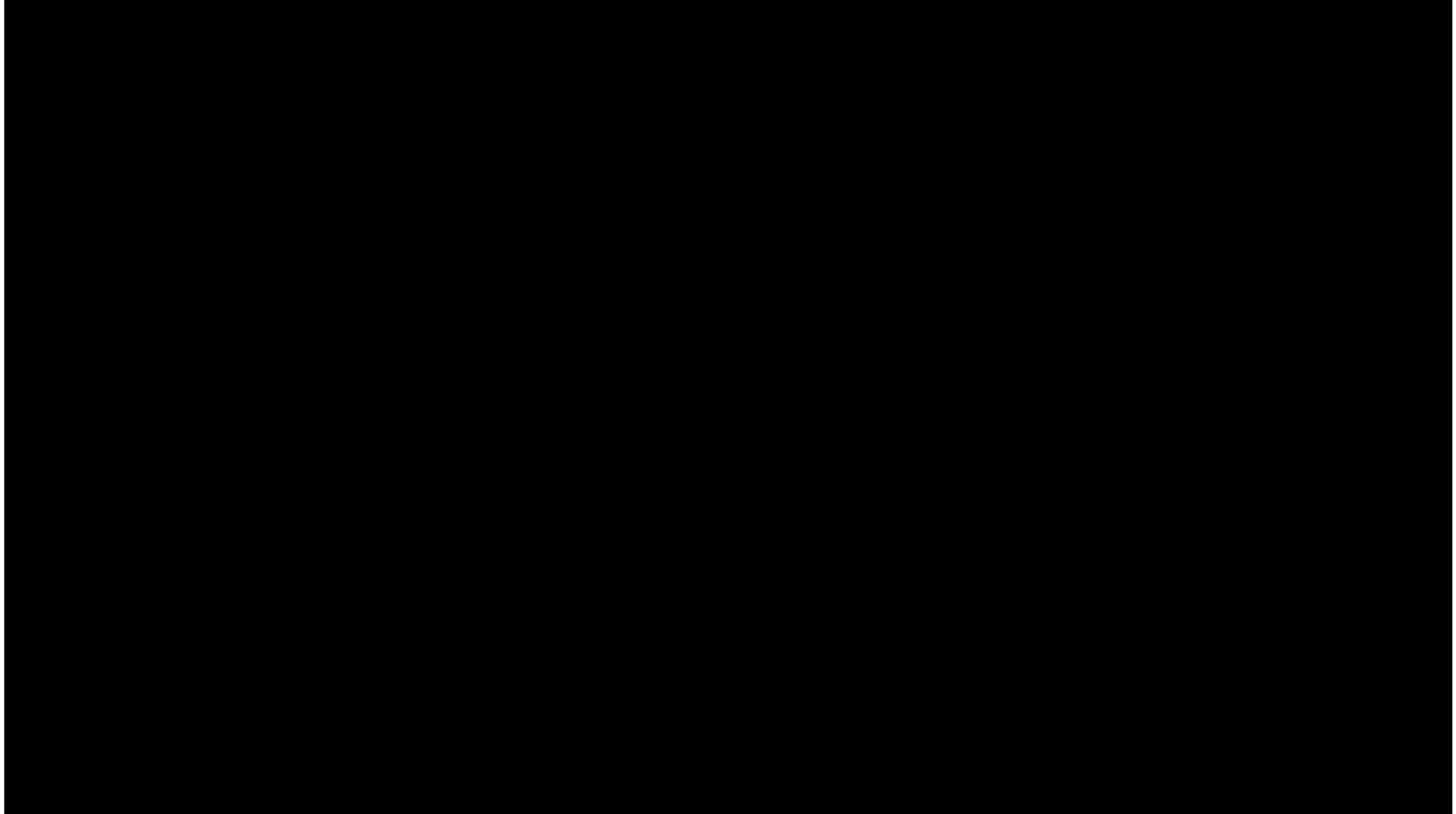
https://www.youtube.com/watch?v=HwPS9_AzaLM





<https://vimeo.com/251359867>



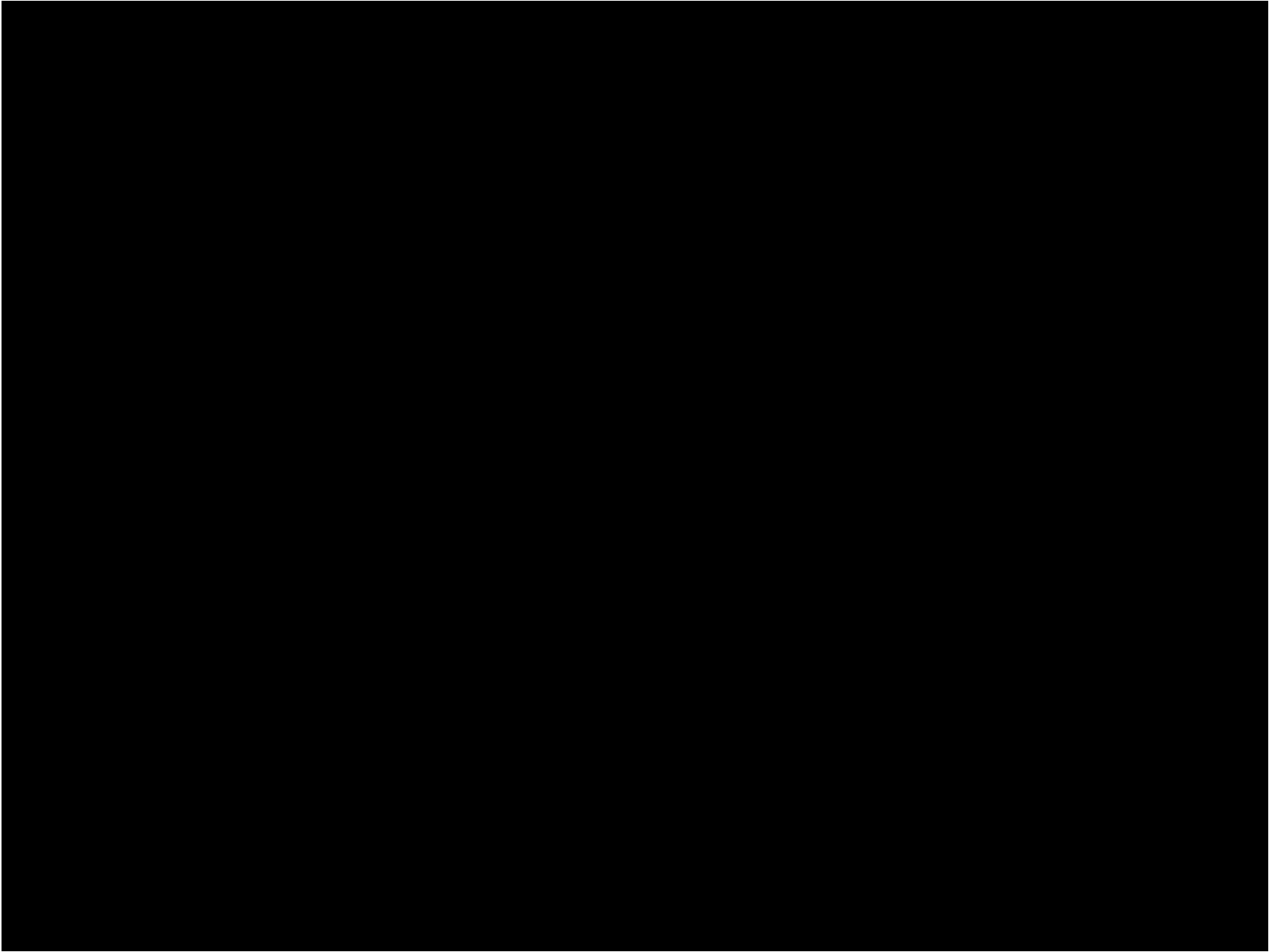


<https://www.youtube.com/watch?v=qObSFfdfe7I>

What can we do with cap-based touch sensor?

A black and white photograph of a man in a tuxedo playing a theremin. He is standing behind a wooden podium, with his hands positioned near two vertical metal antennas. A microphone on a stand is positioned in front of him. The background is dark.

Theremin



<https://www.youtube.com/watch?v=K6KbEnGnymk>

In-class Practice

- Please use Arduino to create a touch-sensitive circuit.
- Not counted into grade