



互动装置

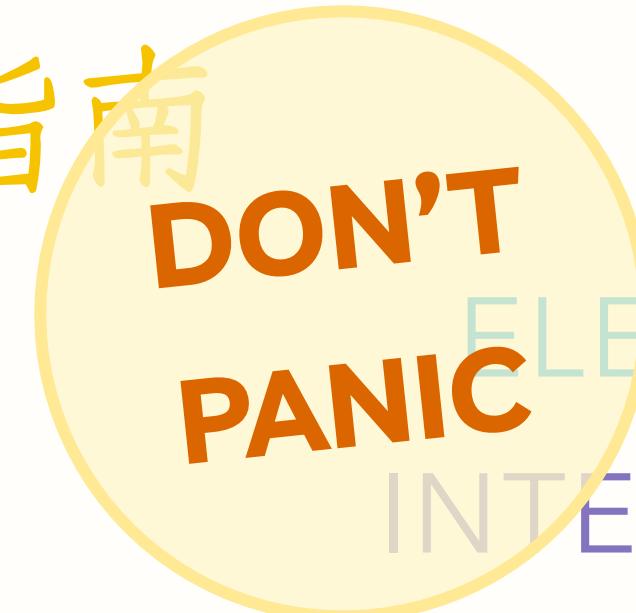
搭车漫游指南

Ayu

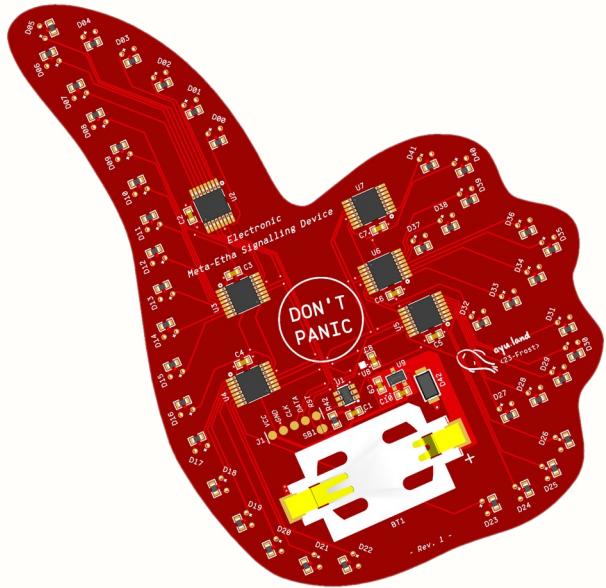
2023.10.26 · MI Lab



THE
HITCHHIKER'S
GUIDE
TO
ELECTRONIC
INTERACTIVES



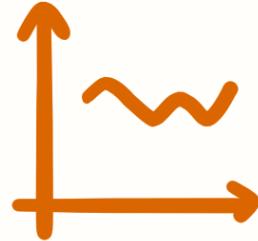
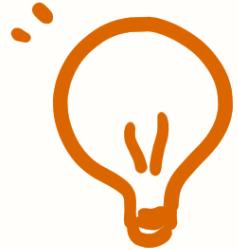
搭车漫游.....?



THE HITCHHIKER'S GUIDE TO ELECTRONIC INTERACTIVES



目录

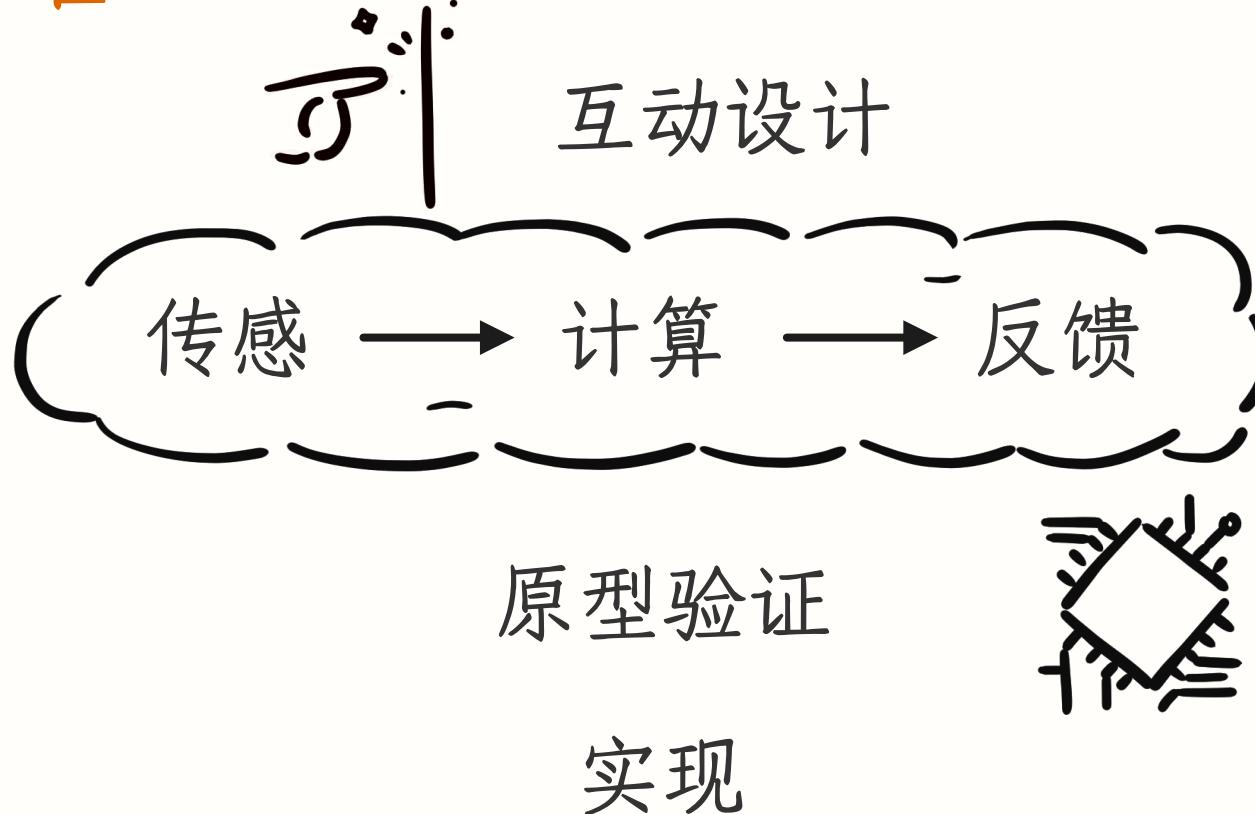




流程概览

流程概览

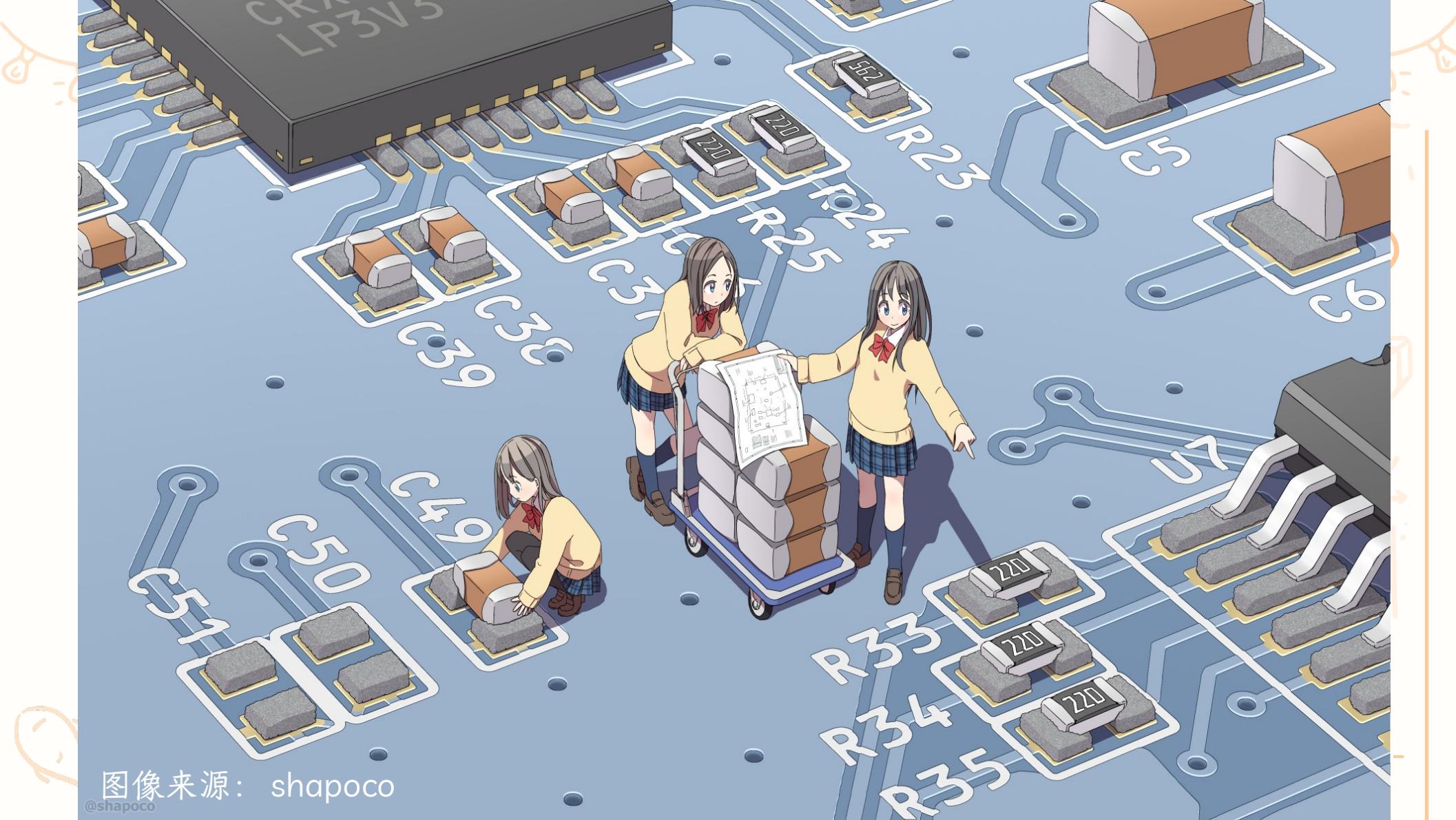
起承转合





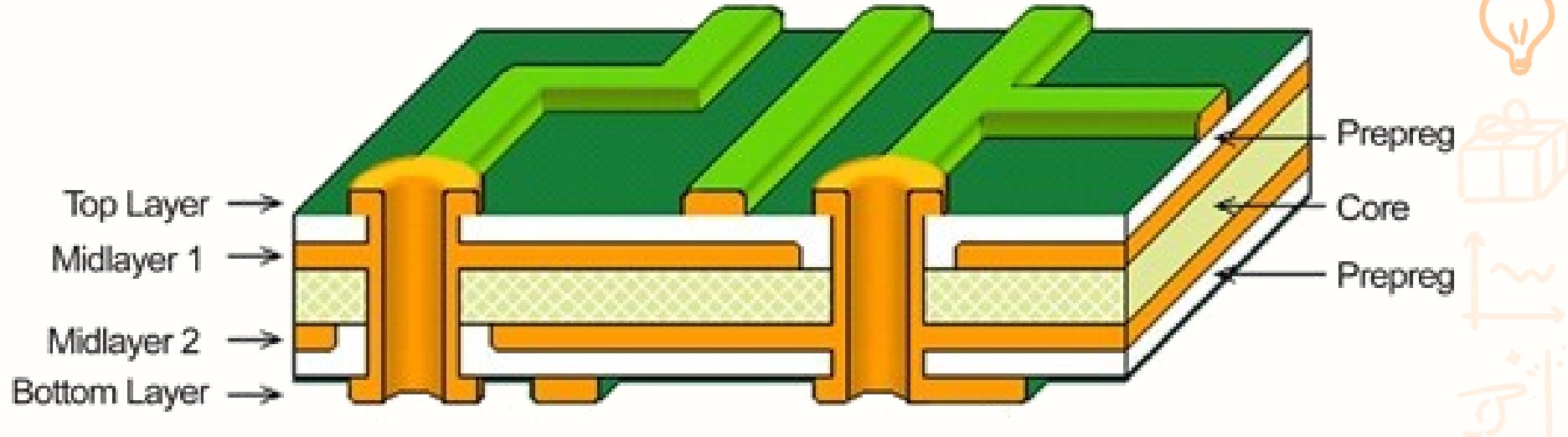
背景知识





图像来源: shapoco
@shapoco

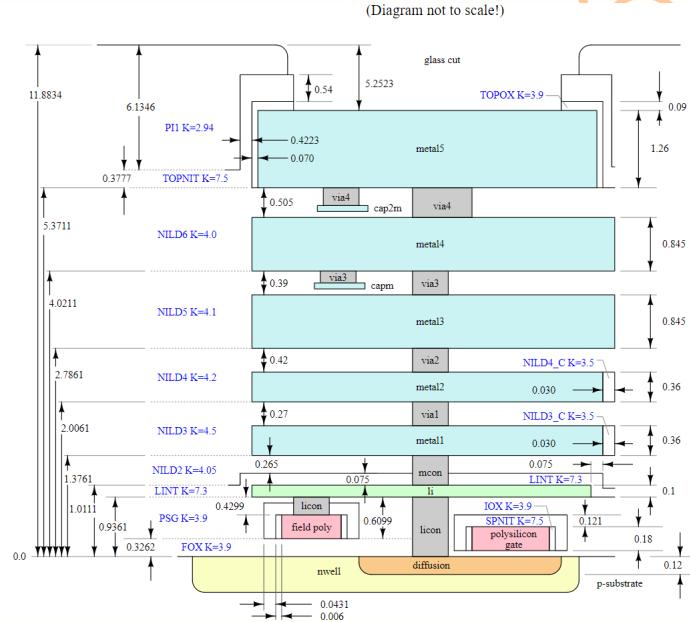
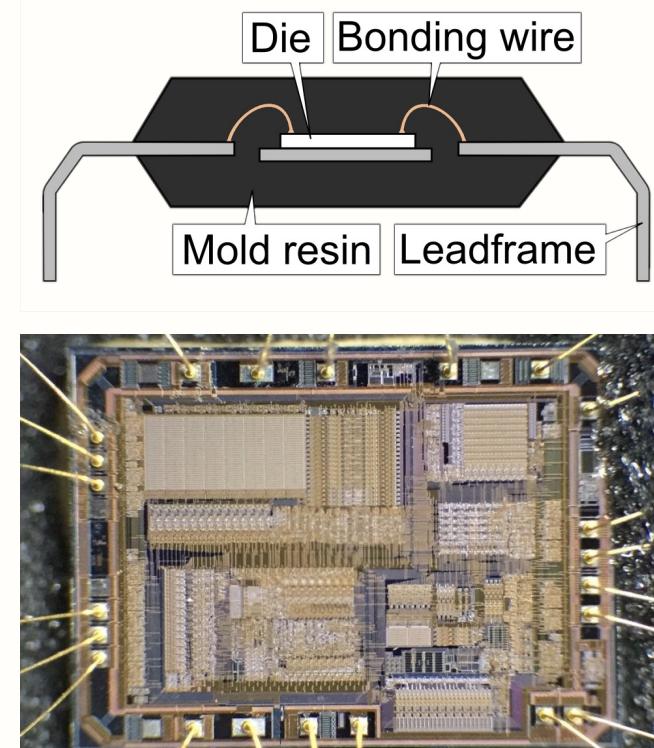
印刷电路板 PCB



夹心卷 → 夹心千层饼



集成芯片 IC



图像来源: HenkeB 、 Tosaka 、 Juan Carlos Jimenez 、 Tiny Tapeout

不过如此

电阻 / 电容 /

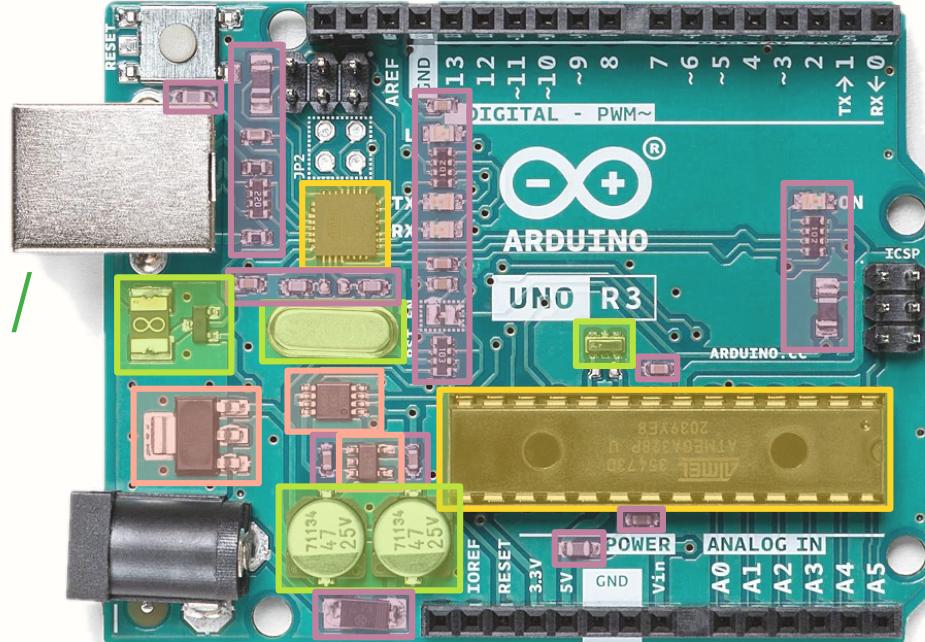
电感 / 二极管

保险丝 / MOSFET /

高频晶振

芯片 (计算)

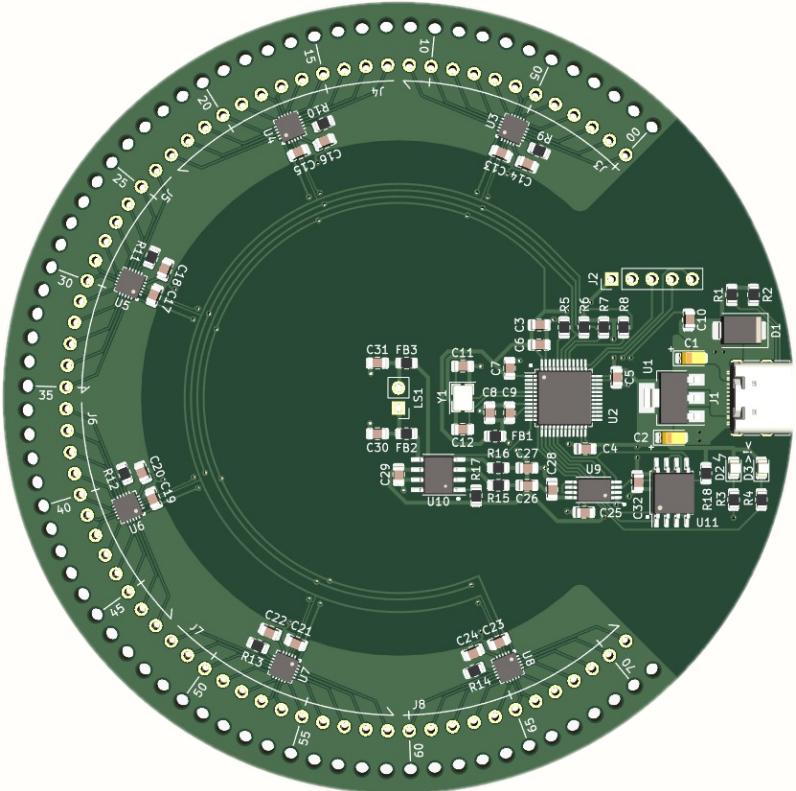
芯片 (稳压 / 运放)



电解电容

低频晶振

不过如此



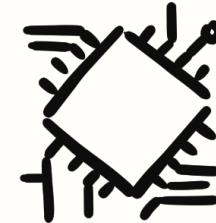
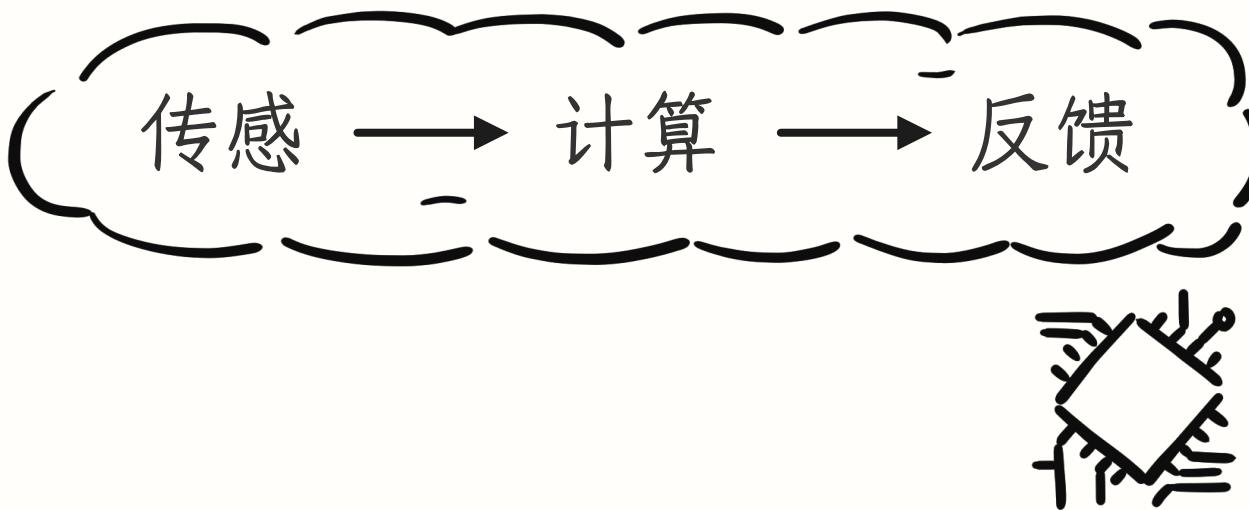
DON'T
PANIC



方案选择



技术选型



技术选型：网络搜索

- 例：「距离 接近 传感器」



GP2Y0E03

4 ~ 50 cm



E2E-X20MD

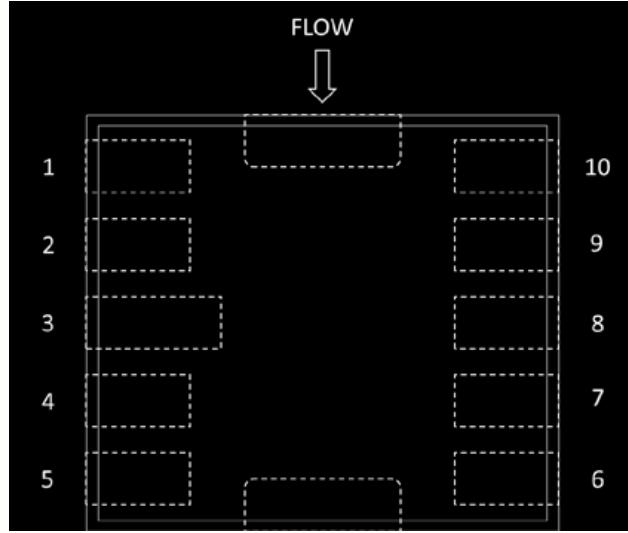
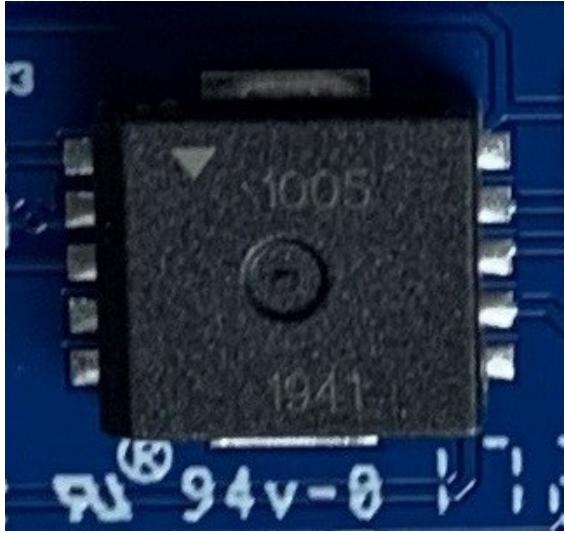
2 cm



图像来源：SHARP、OMRON

技术选型：网络搜索

- 例：「Air velocity sensor IC」



FS3000-1005
0 ~ 7.2 m/s
 $\pm 5\%$ full scale



图像来源：Renesas

技术选型：网络搜索

- 例：「蓝牙 覆盖距离」



bluetooth.com

<https://www.bluetooth.com> › key-attributes

⋮

Understanding Bluetooth Range

The effective, reliable range between Bluetooth devices is **anywhere from more than a kilometer down to less than a meter**. Use the Bluetooth Range Estimator.



技术选型：网络搜索

- 其他各类器件



刷新速率？



电池容量？电路功耗？



图像来源：微雪电子

主动拓宽



etc.

参考案例



参考案例



图像来源：Bare Conductive

参考案例

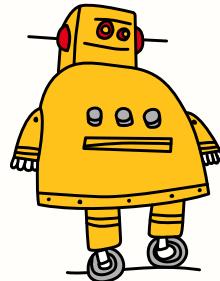


图像来源：Random International

参考案例

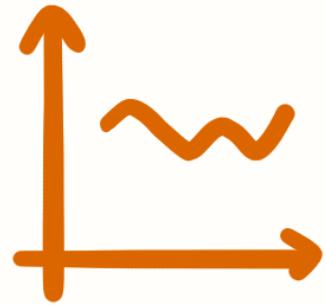
Bē
Dribbble

小红书



AUTODESK
Instructables





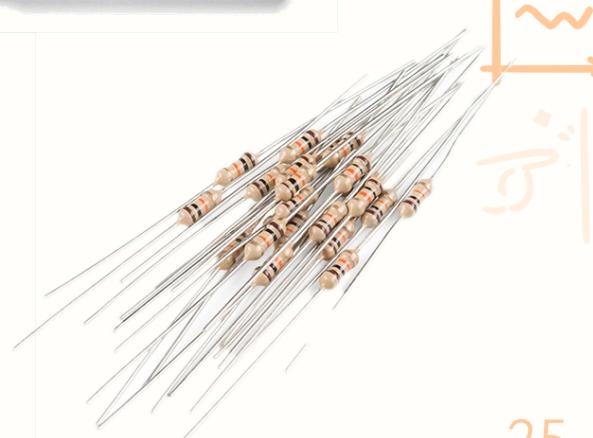
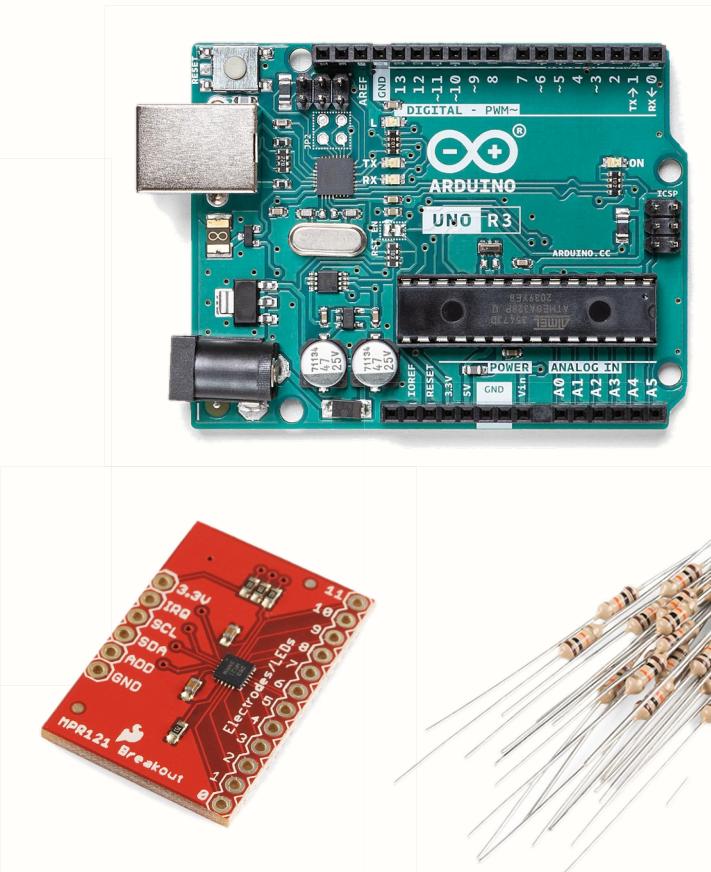
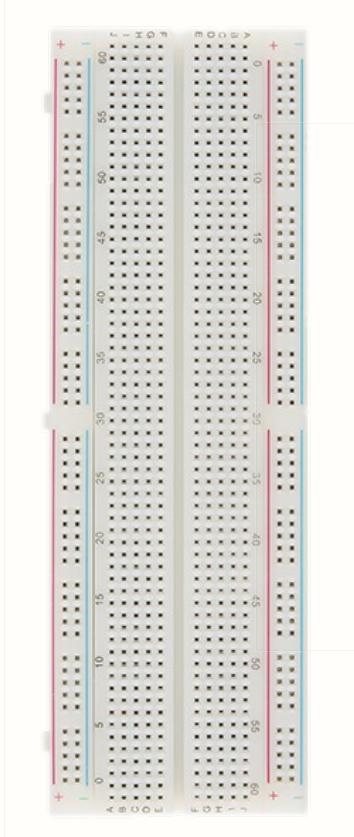
原型搭建



我能做得好吗？

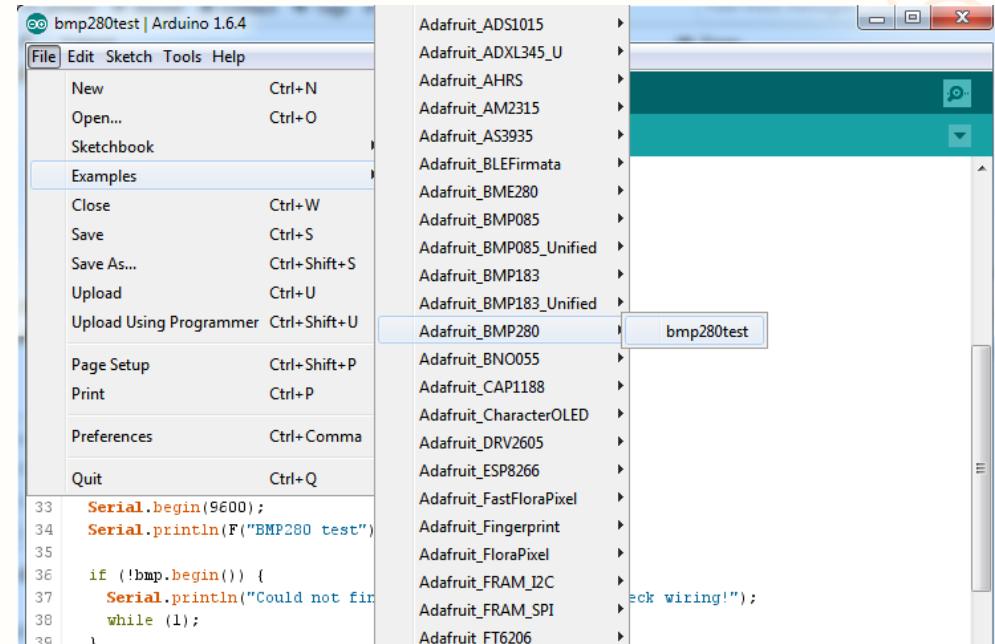
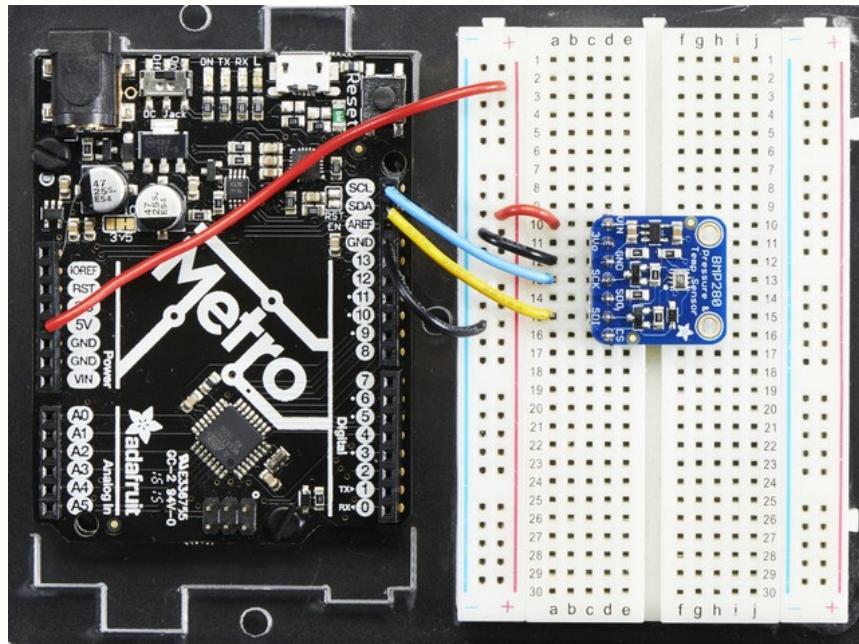
DON'T
PANIC

原型搭建



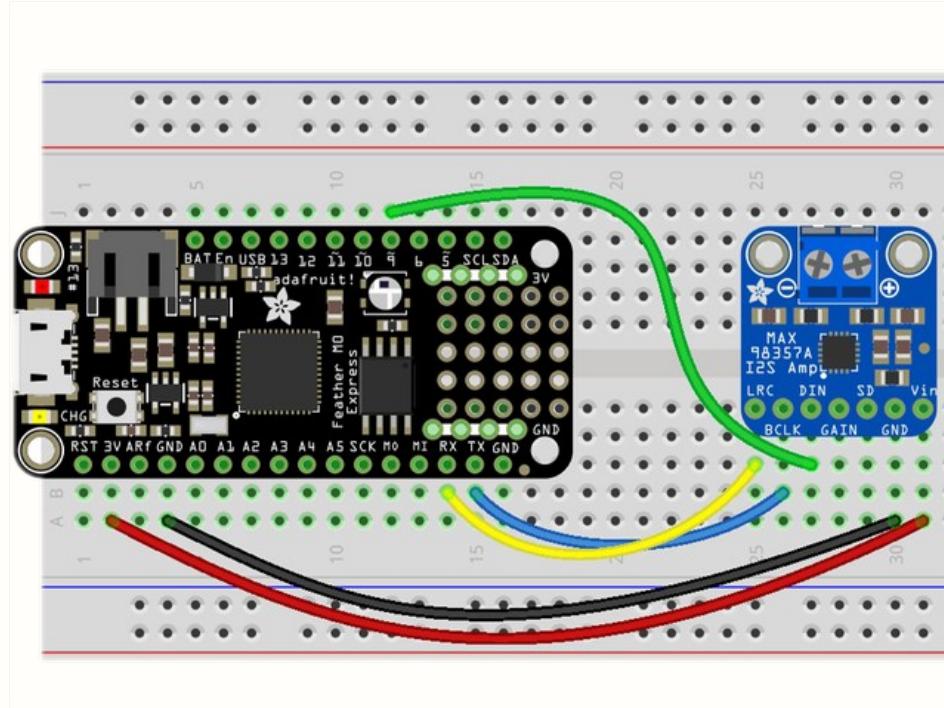
图像来源：SparkFun、Arduino.cc

例：Adafruit BMP280 气压传感模块



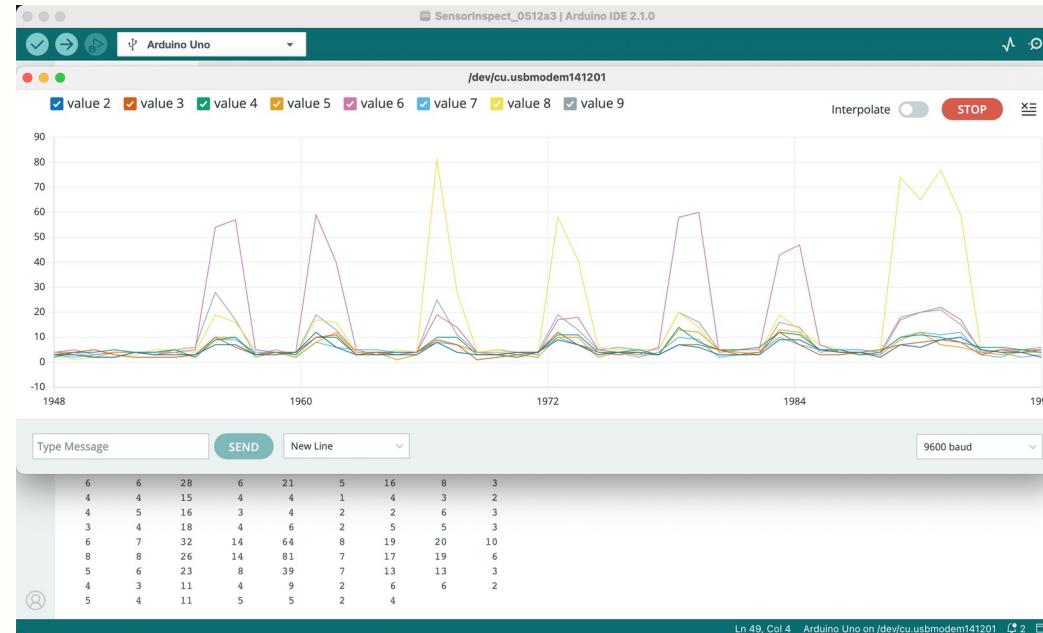
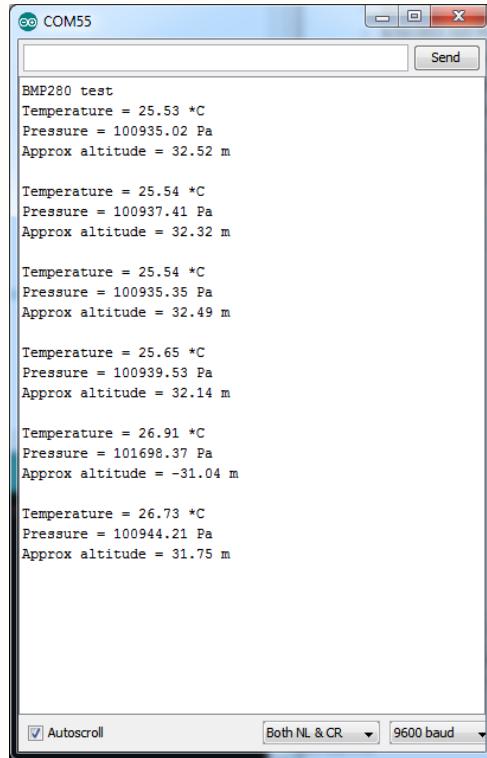
图像来源：Adafruit

例：MAX98357A 音频功放模块

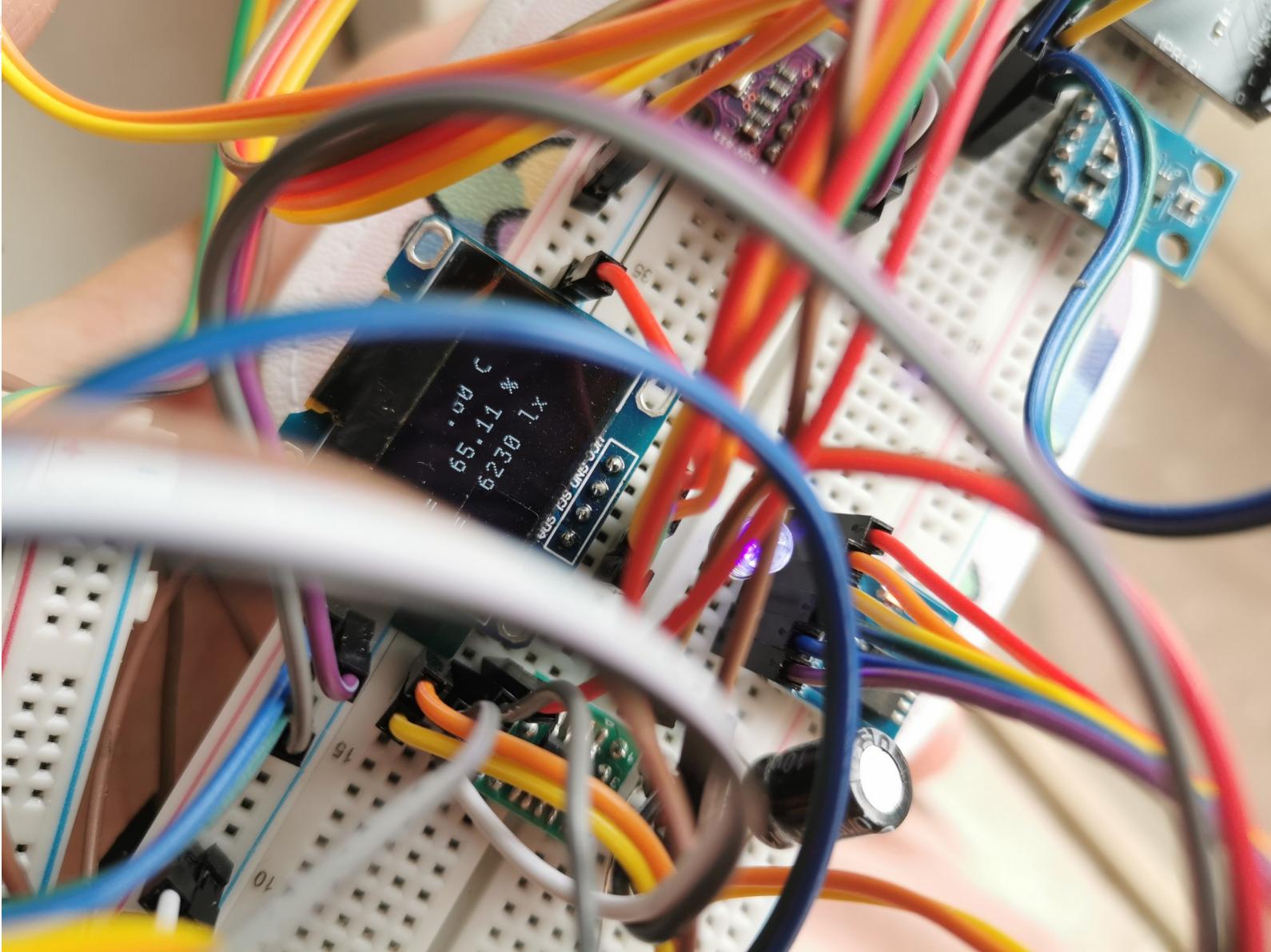


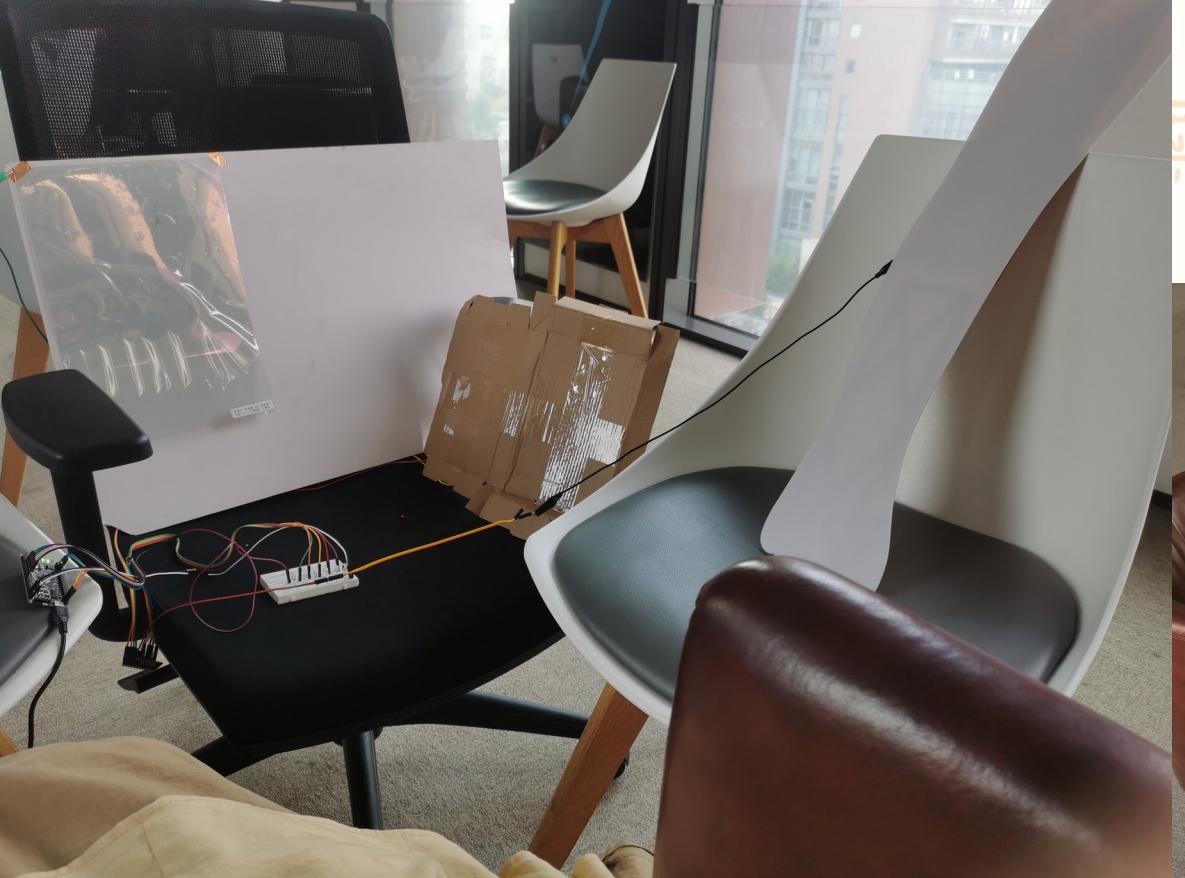
图像来源：Adafruit 、 SparkFun

原型，启动！



图像来源：Adafruit、自己项目中的截图









了

最终实现



工作概览

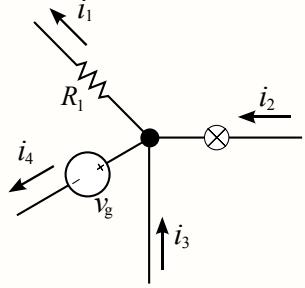
- 元件选型、购置
- 电路设计
- 电路板设计
- 软件开发
- 组装

元件选型

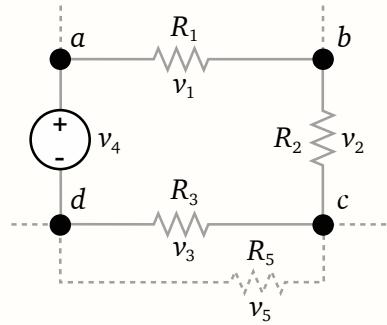
DigiKey 得捷



电路设计



KCL



KVL



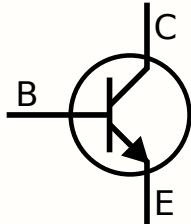
$$V = RI$$



$$I = C \dot{V}$$

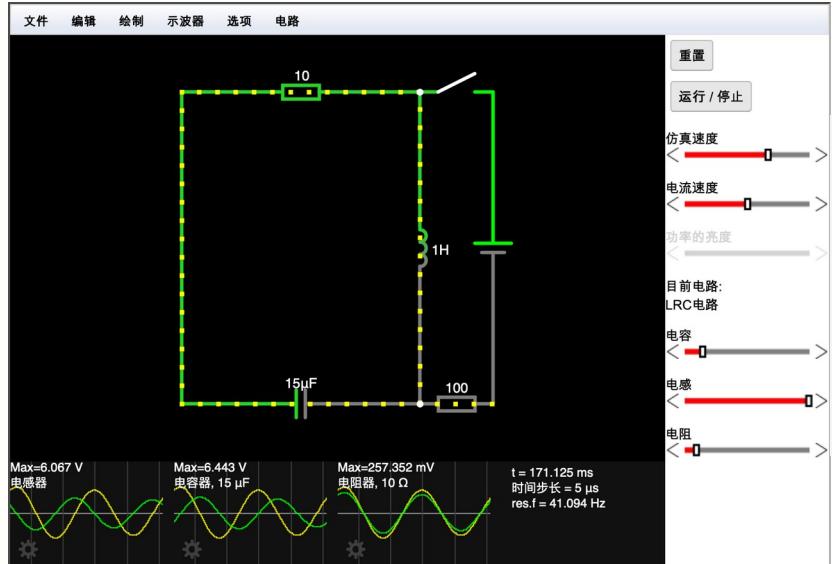


$$V = L \dot{I}$$

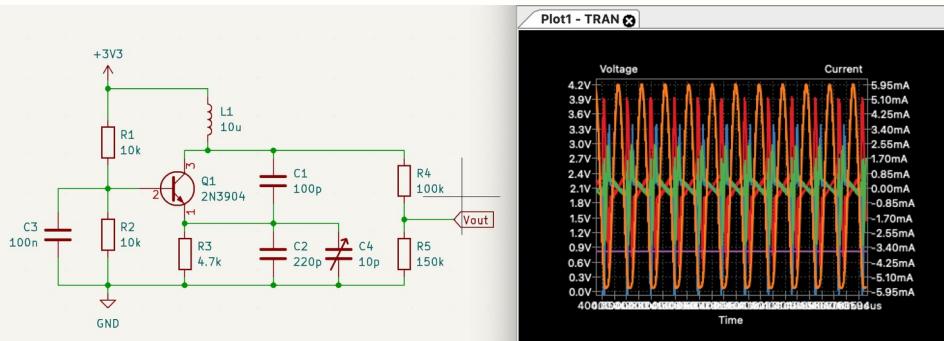


$$V_{BE} = \frac{kT}{q} \ln \left(\frac{I_C}{I_S(T)} + 1 \right)$$

仿真工具

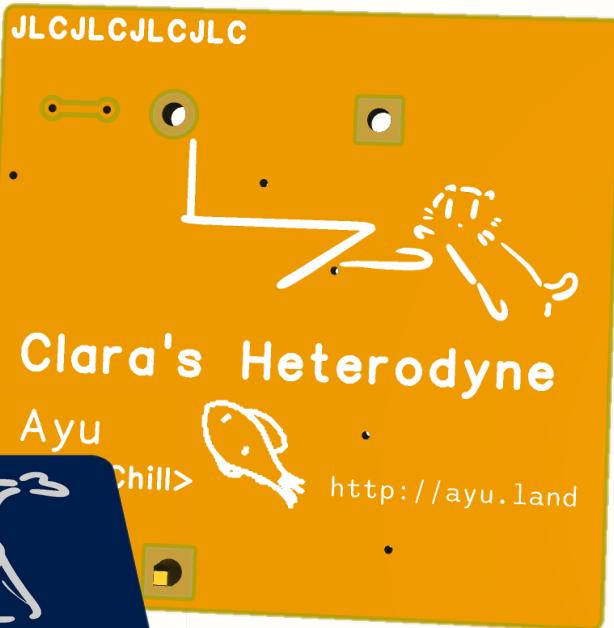
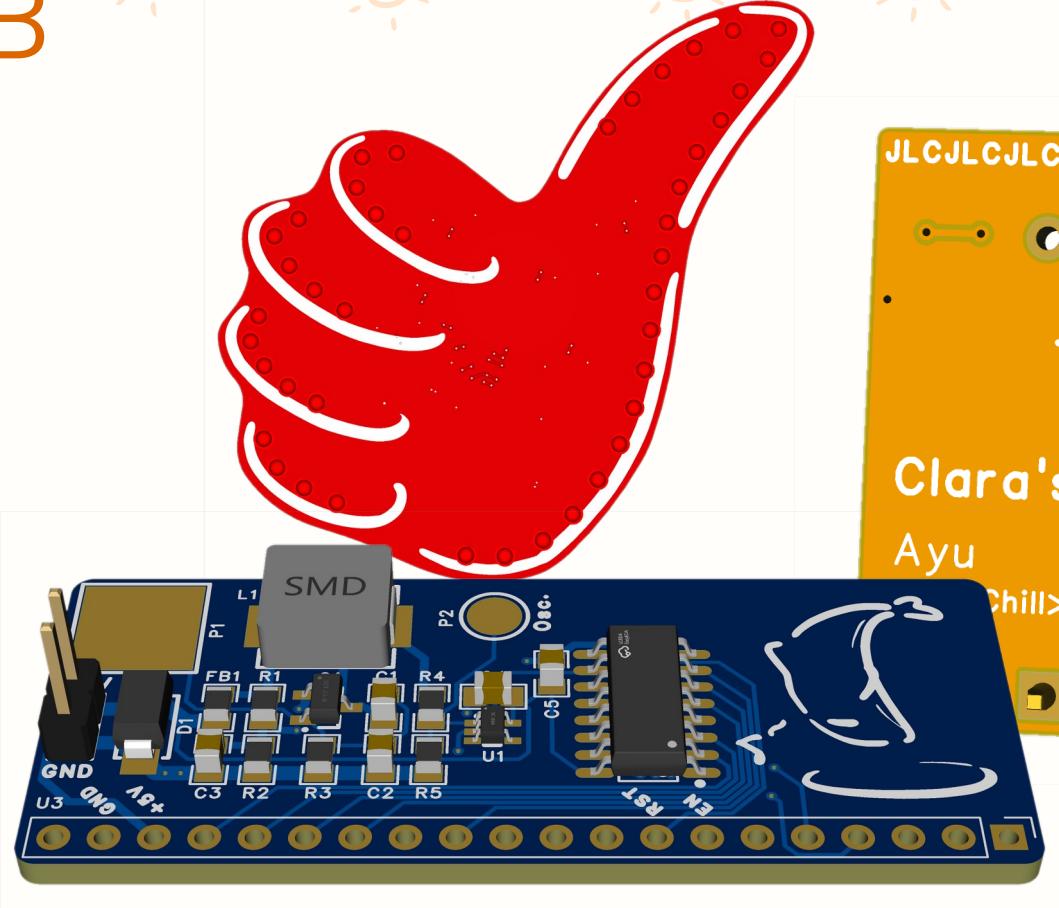


CircuitJS1

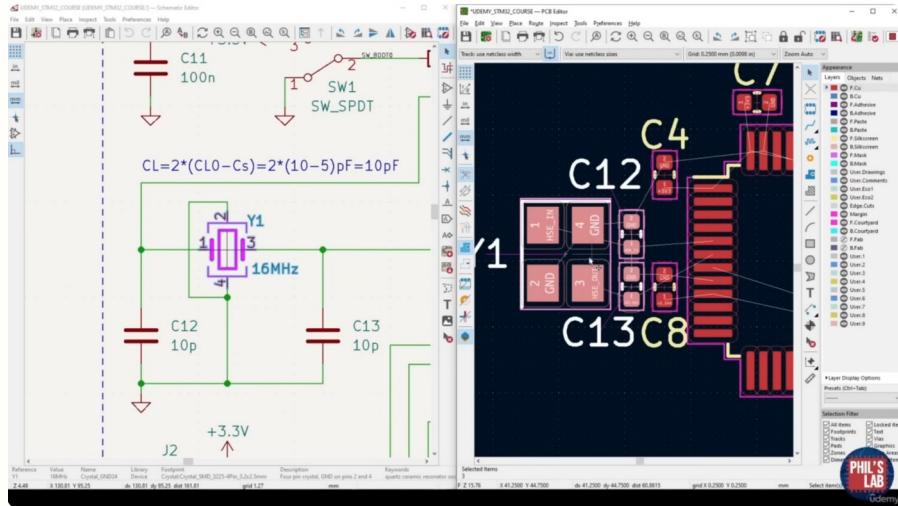


KiCad + SPICE

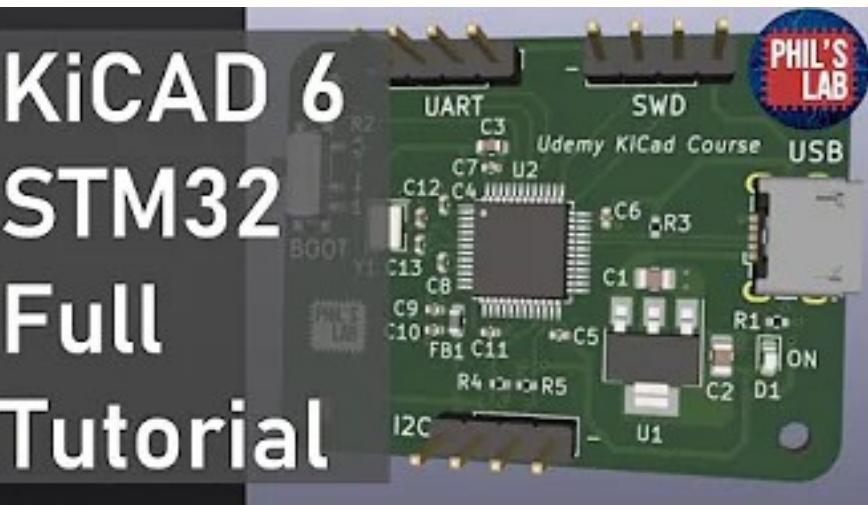
PCB



PCB

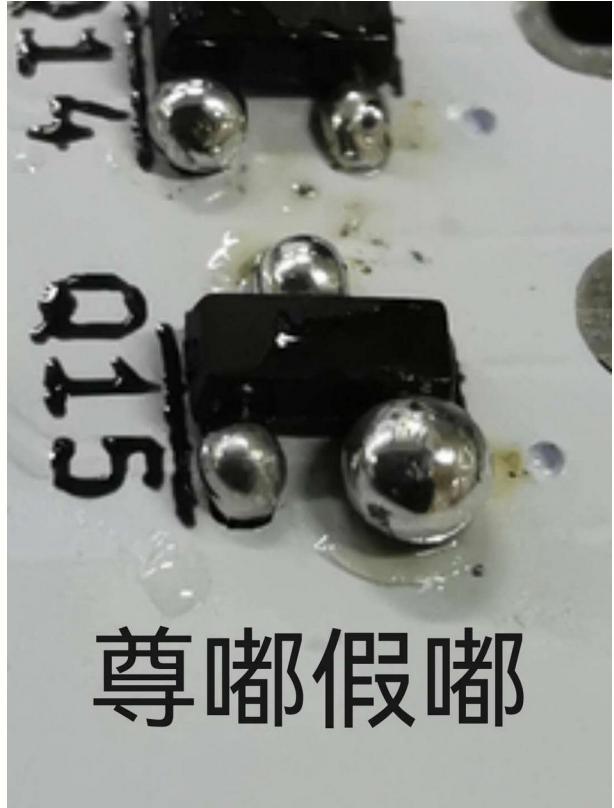


KiCAD 6 STM32 Full Tutorial

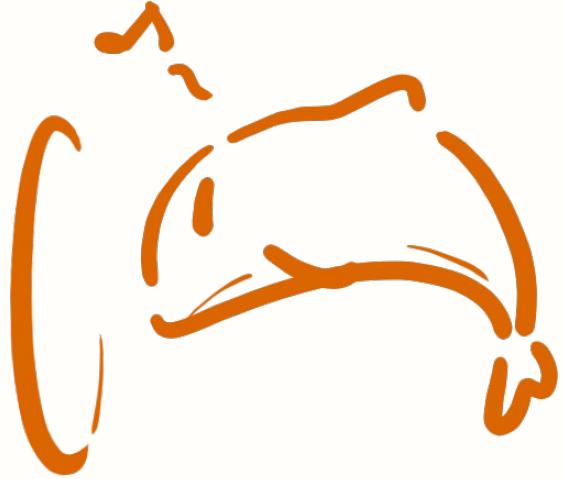


Phil's Lab

焊接：基本无害



尊嘟假嘟



去最近的餐馆吃一顿！







互动装置

搭车漫游指南

Ayu

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