



互动装置

THE
HITCHHIKER'S
GUIDE

搭车漫游指南

**DON'T
PANIC**

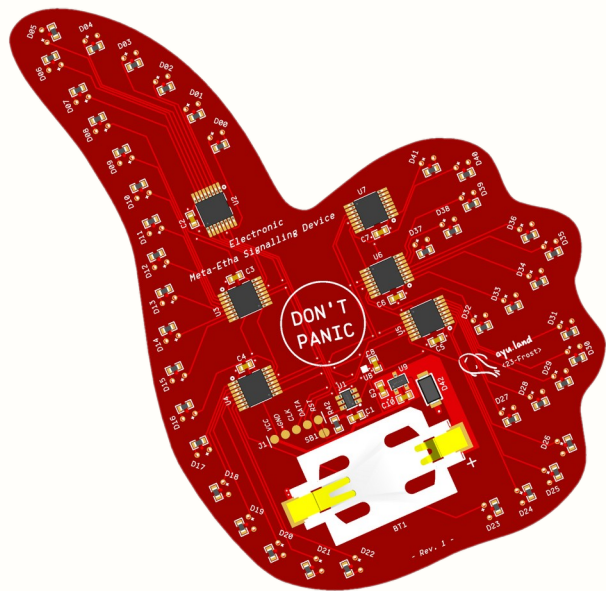
TO
ELECTRONIC
INTERACTIVES

Ayu

2023.10.26 · MI Lab



搭车漫游……？



THE
HITCHHIKER'S
GUIDE
TO
ELECTRONIC
INTERACTIVES



目录

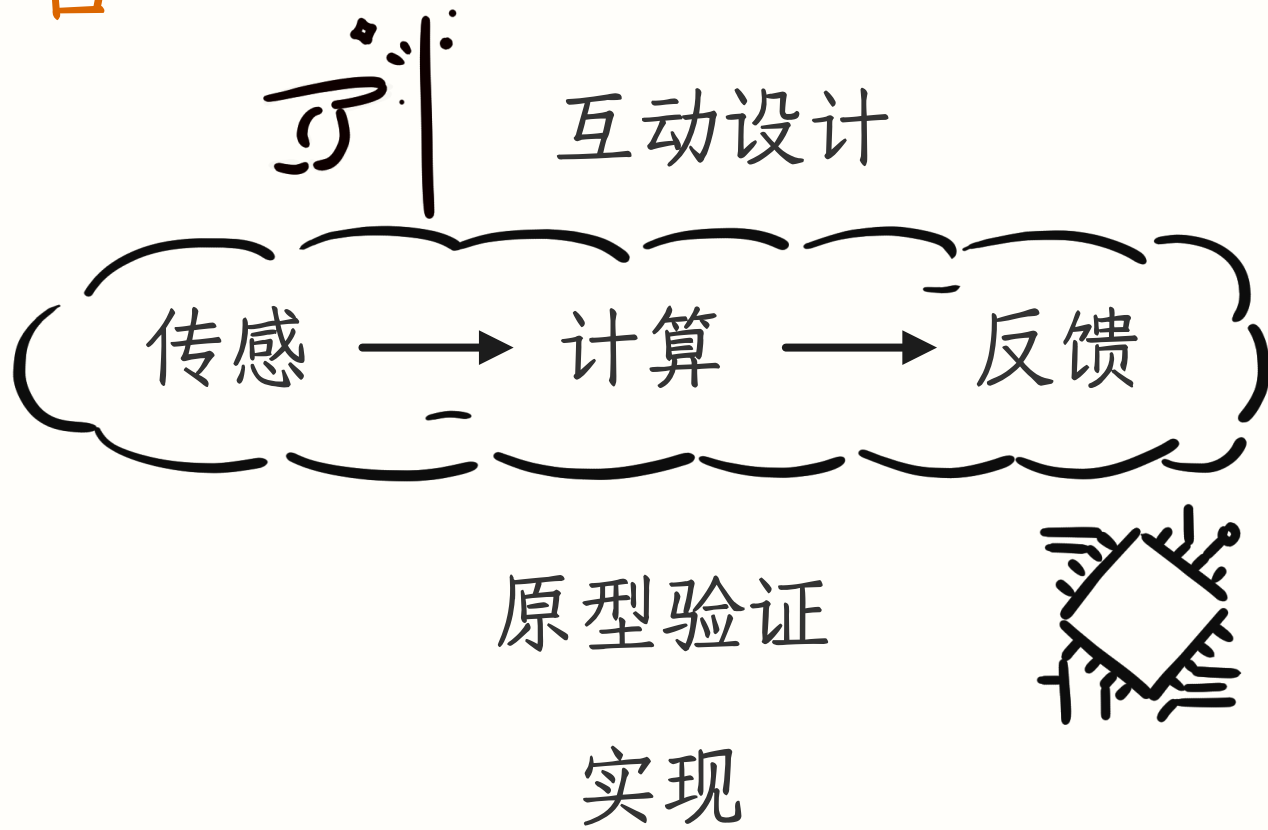




流程概览



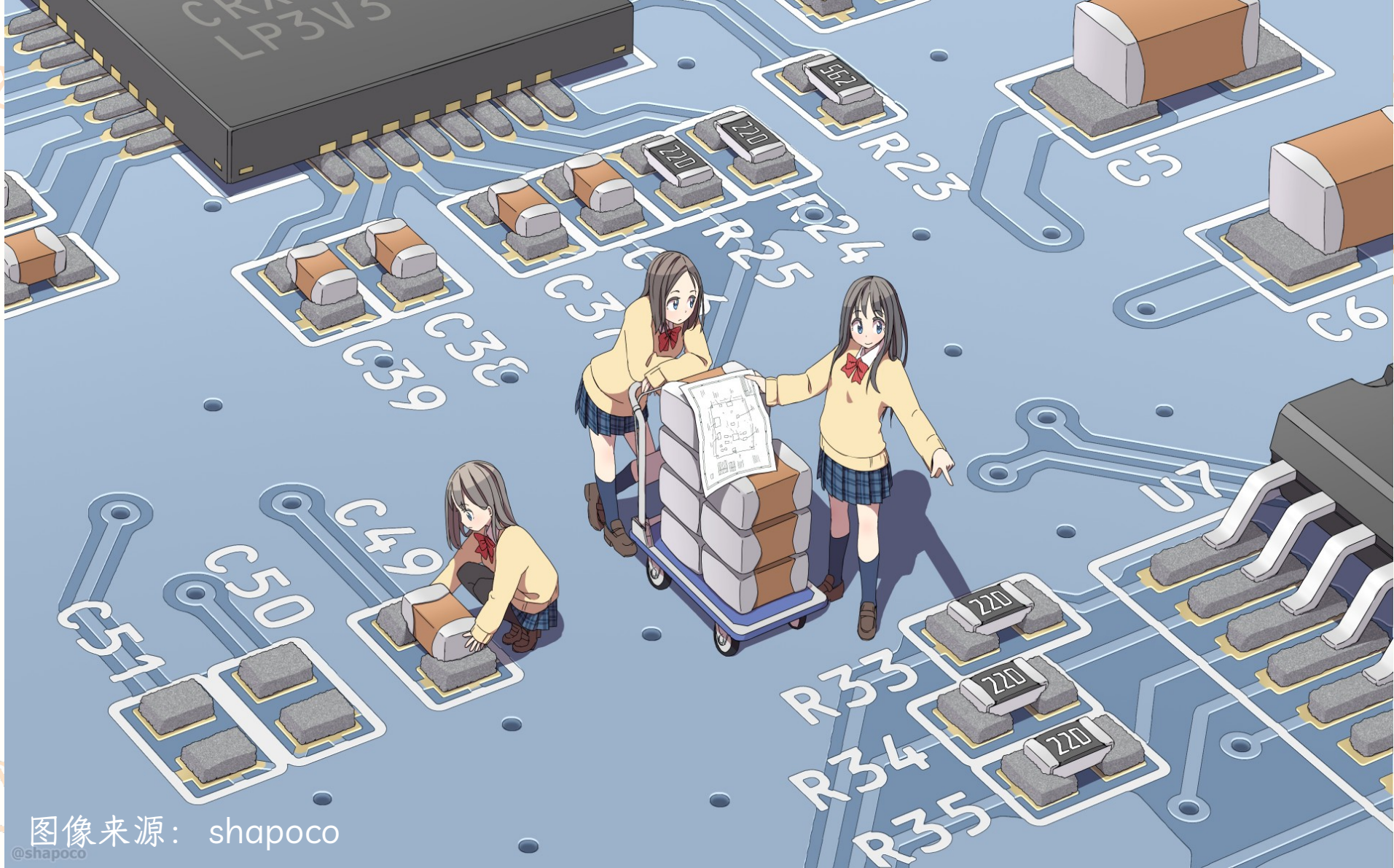
起承转合





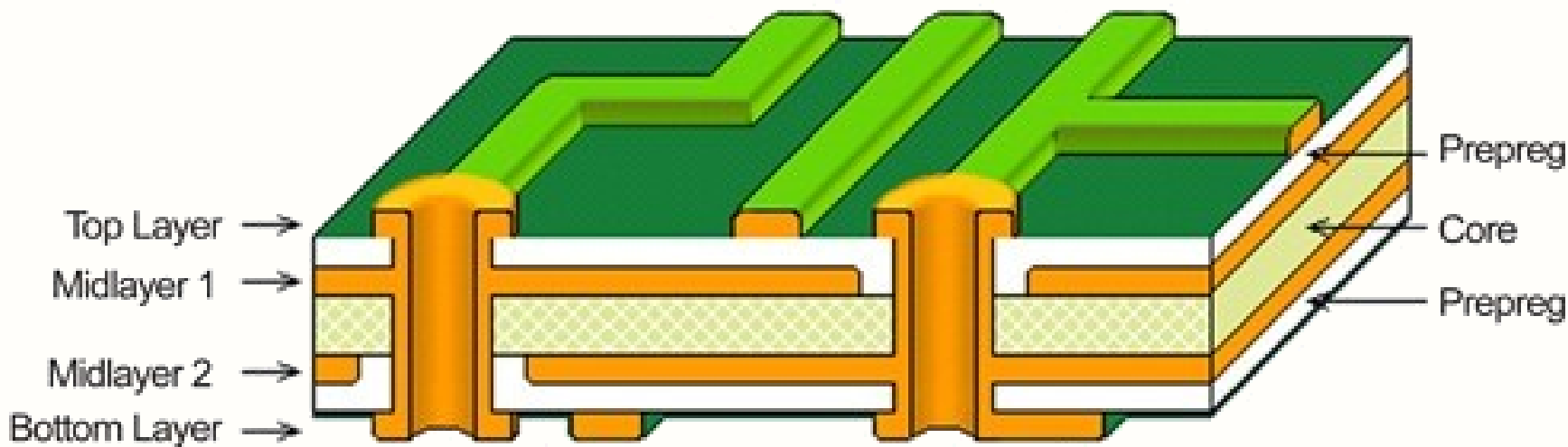
背景知识





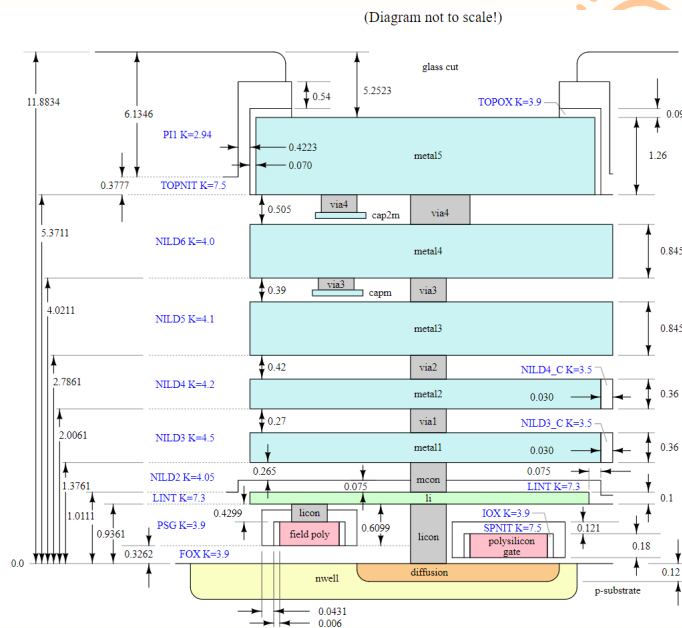
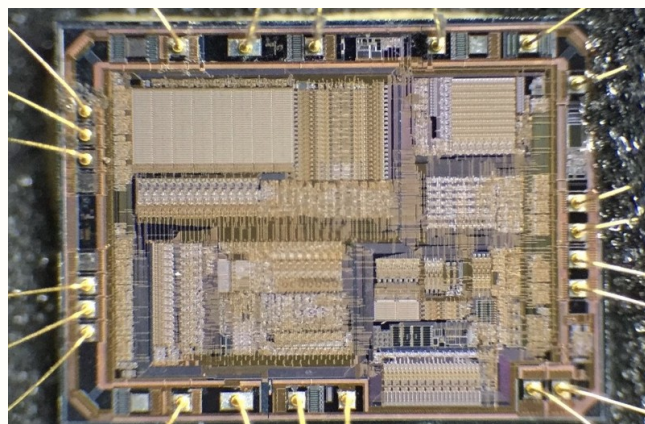
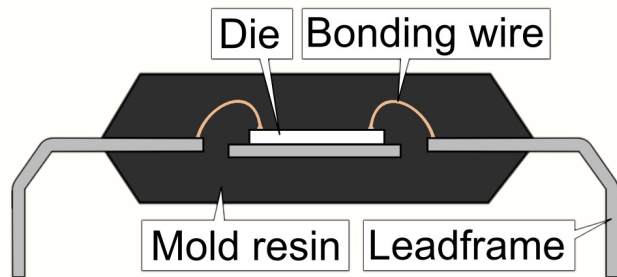
图像来源: shapoco
@shapoco

印刷电路板 PCB

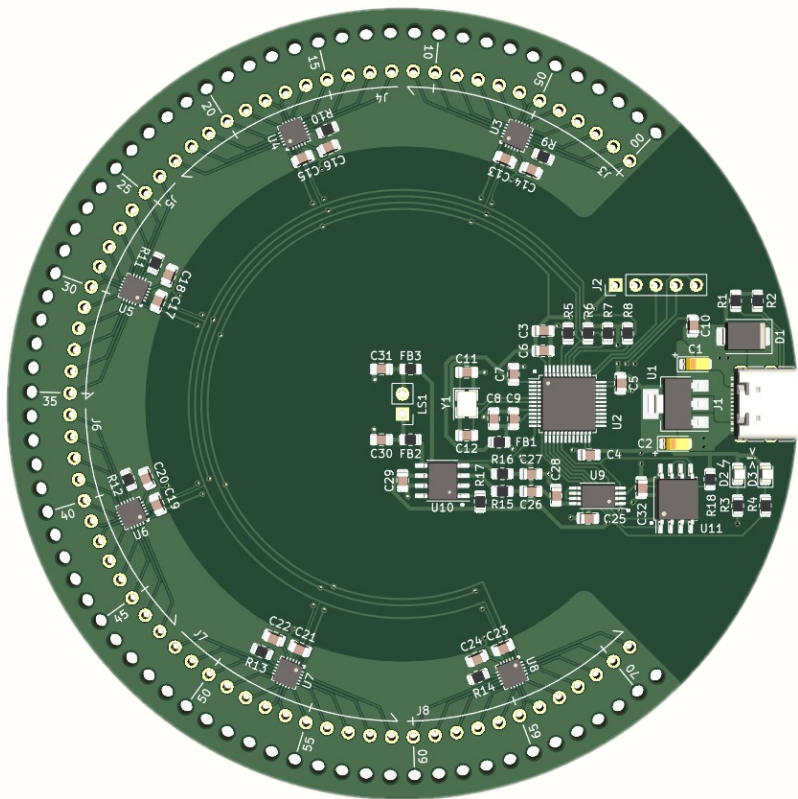


夹心卷 → 夹心千层饼

集成电路 IC



不过如此



=

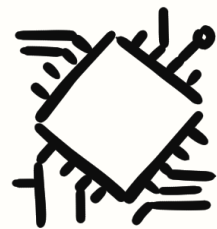
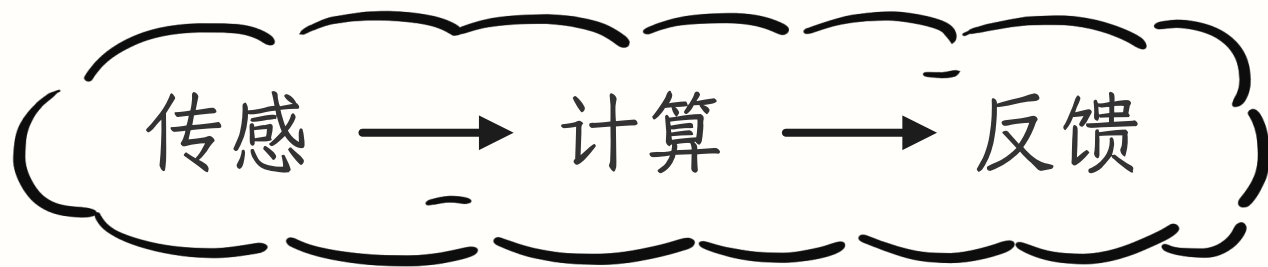




方案选择

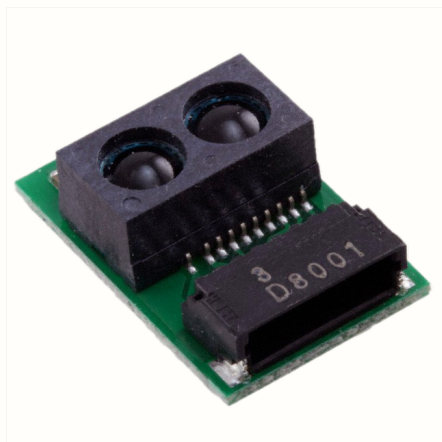


技术选型



技术选型：网络搜索

- 例：「距离 接近 传感器」



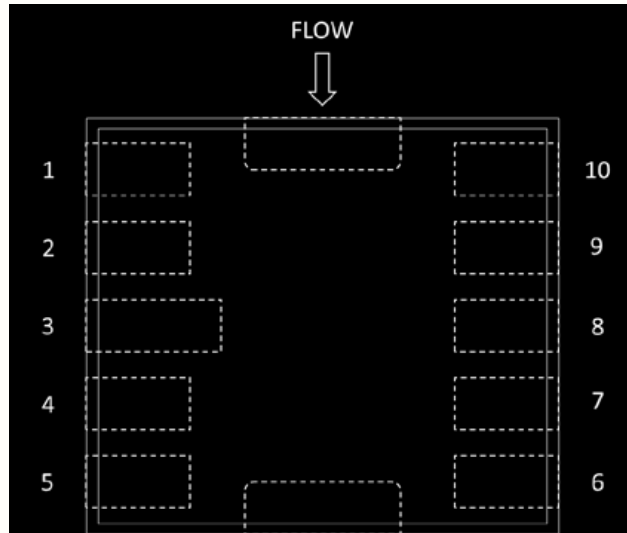
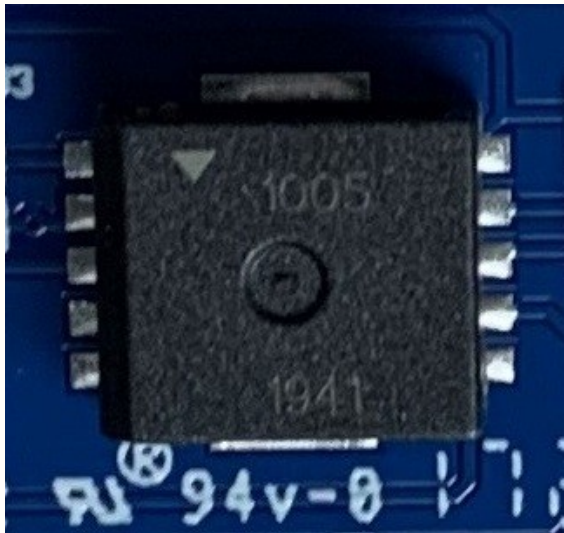
GP2Y0E03
4 ~ 50 cm



E2E-X20MD
2 cm

技术选型：网络搜索

- 例：「 Air velocity sensor IC 」



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

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

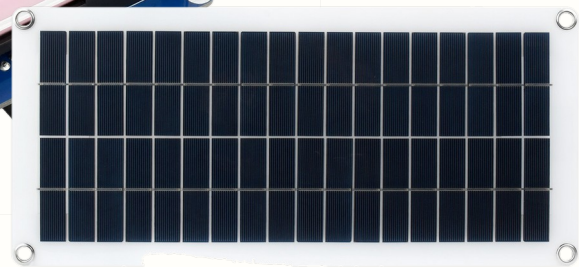
The effective, reliable range between Bluetooth devices is **anywhere from more than a kilometer down to less than a meter**. Use the Bluetooth Range Estimator.

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？

主动拓宽

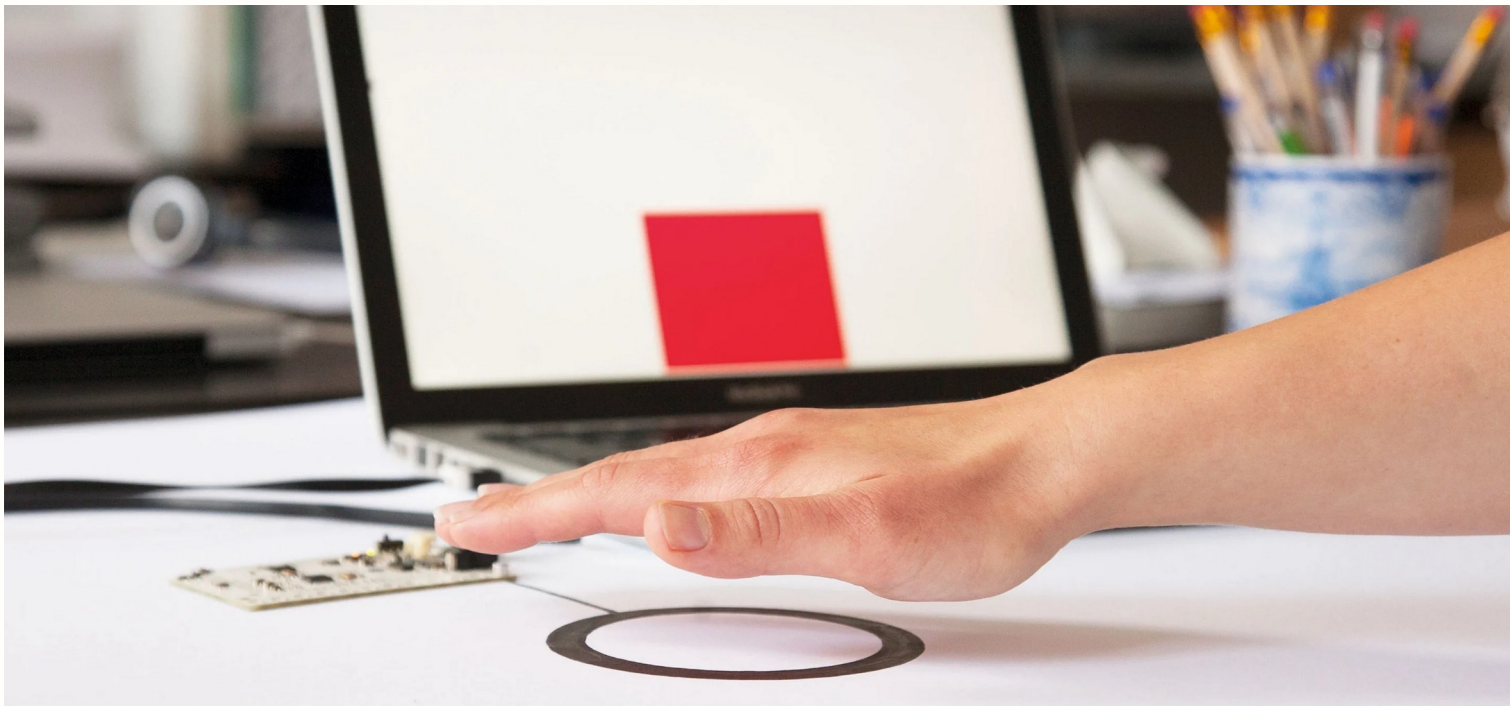


etc.

参考案例



参考案例



图像来源：Bare Conductive

参考案例



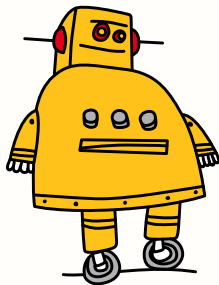
图像来源: Random International

参考案例

Bē

Dribbble

小红书



AUTODESK
Instructables



Hackaday.io





原型搭建

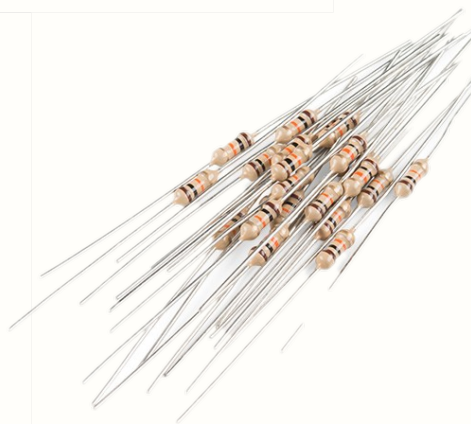
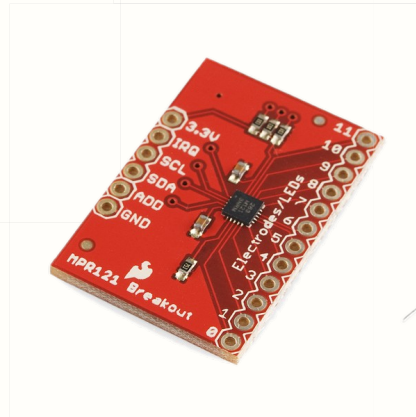
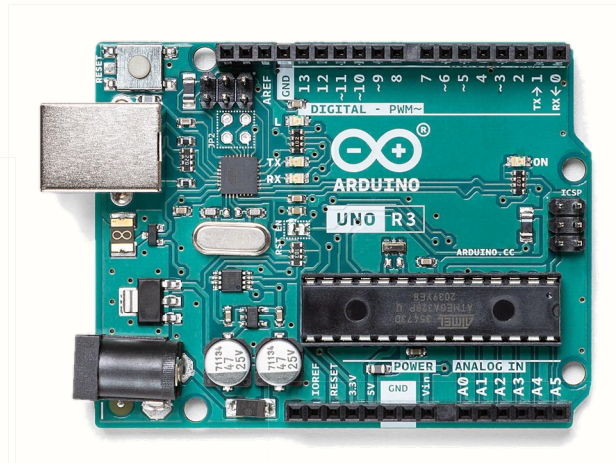
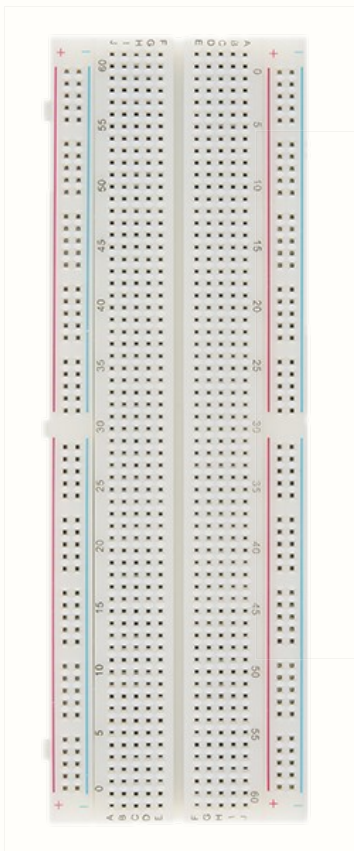


我能做得好吗？

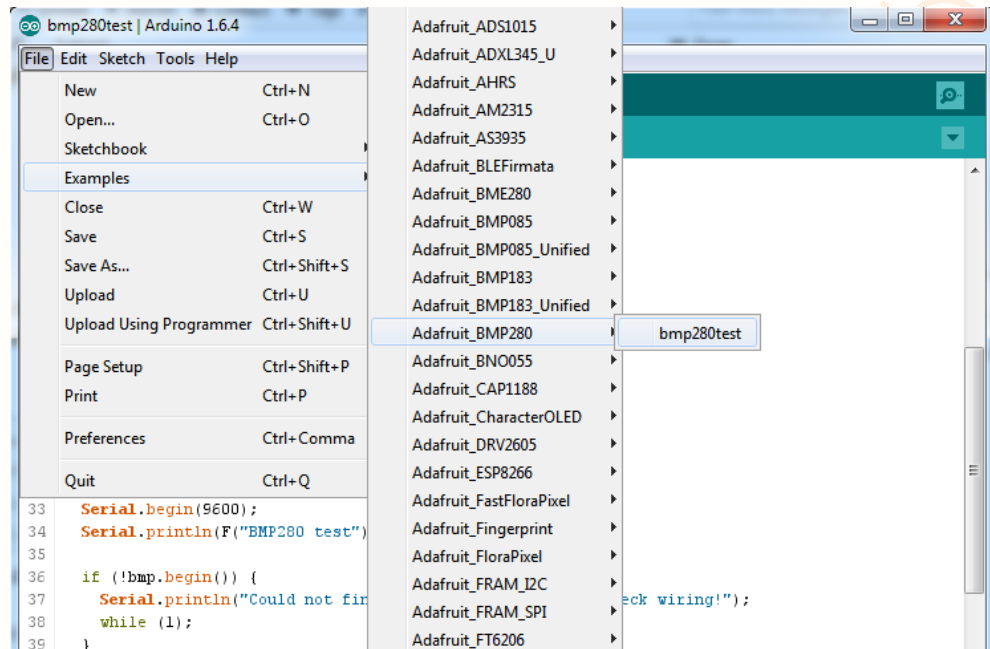
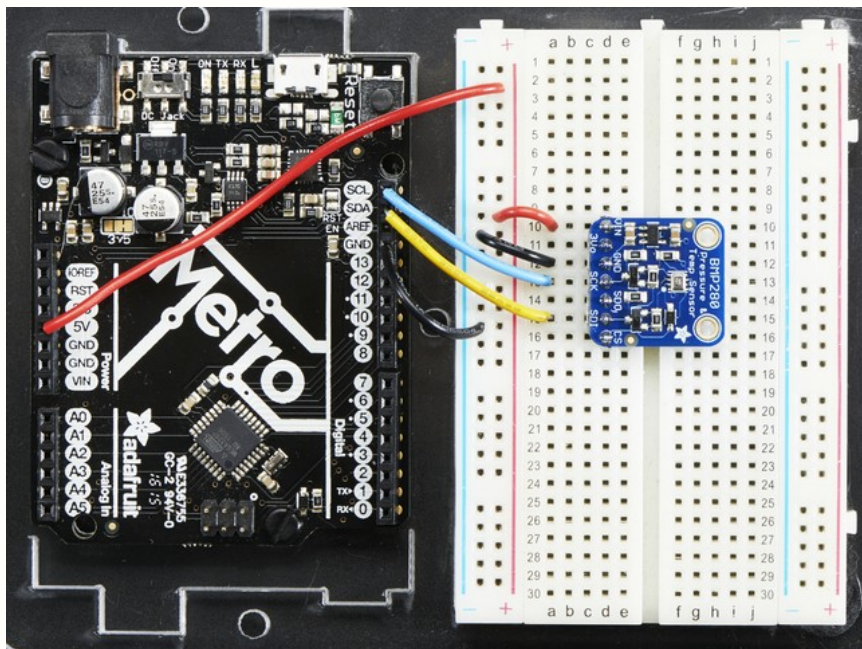
**DON'T
PANIC**



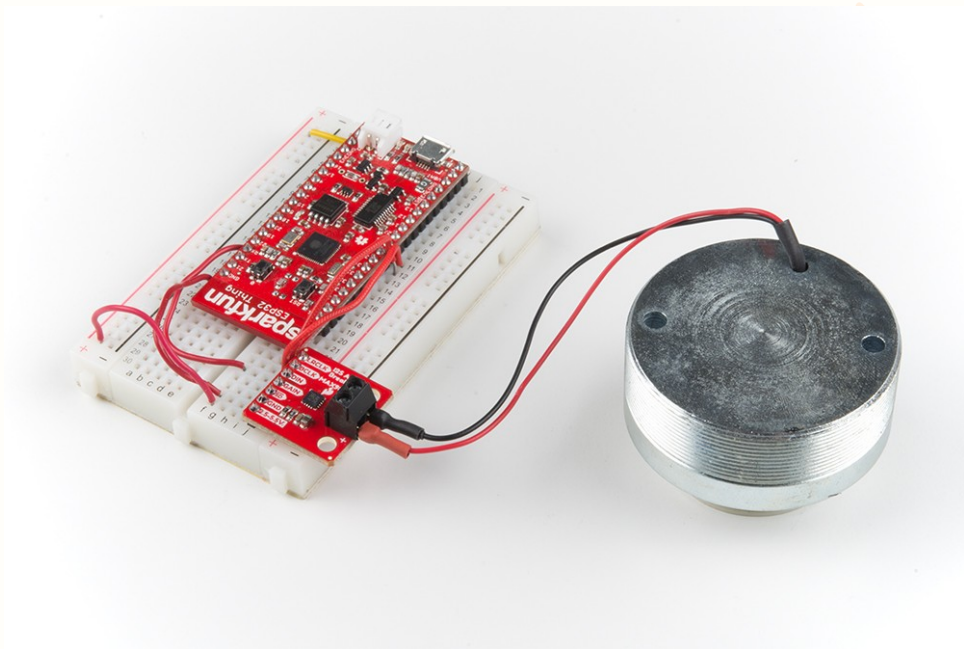
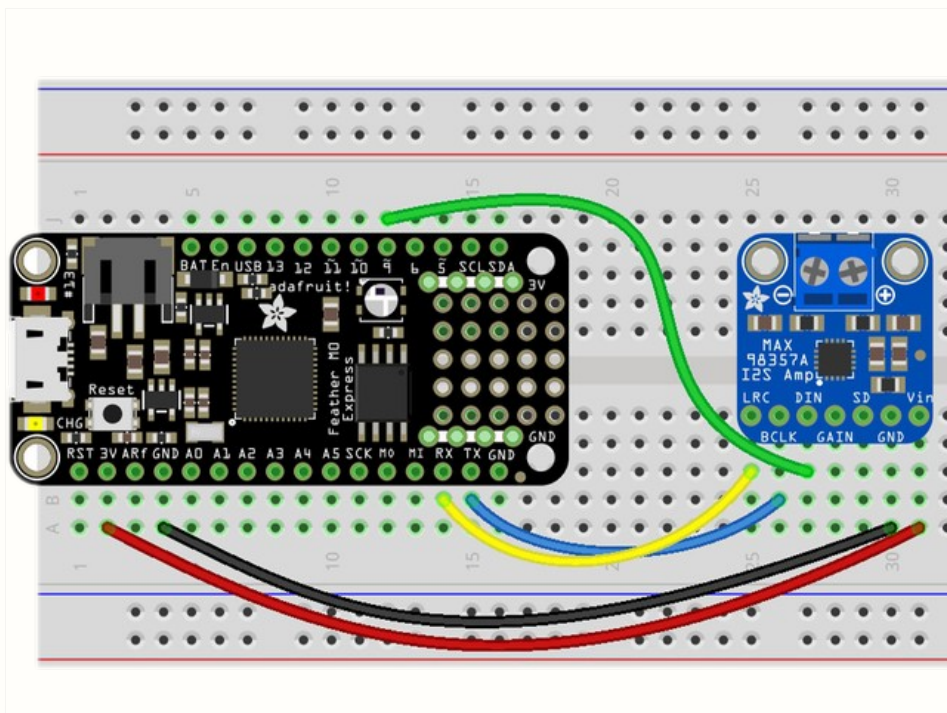
原型搭建



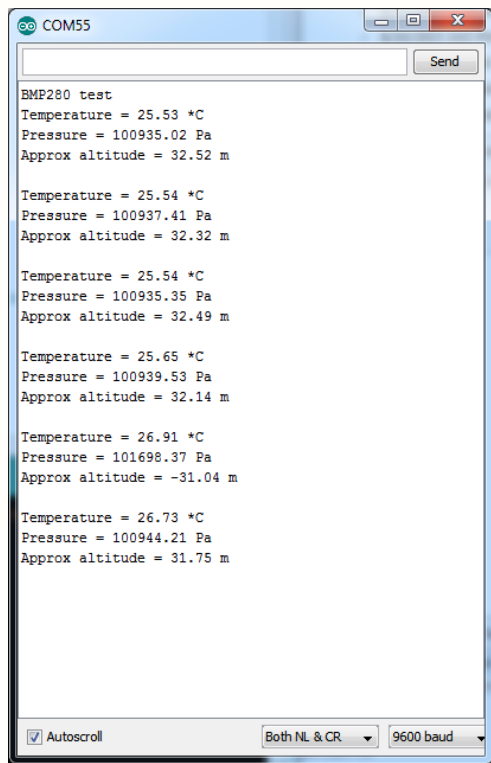
例：Adafruit BMP280 气压传感模块



例：MAX98357A 音频功放模块



原型，启动！



COM55

```
BMP280 test
Temperature = 25.53 *C
Pressure = 100935.02 Pa
Approx altitude = 32.52 m

Temperature = 25.54 *C
Pressure = 100937.41 Pa
Approx altitude = 32.32 m

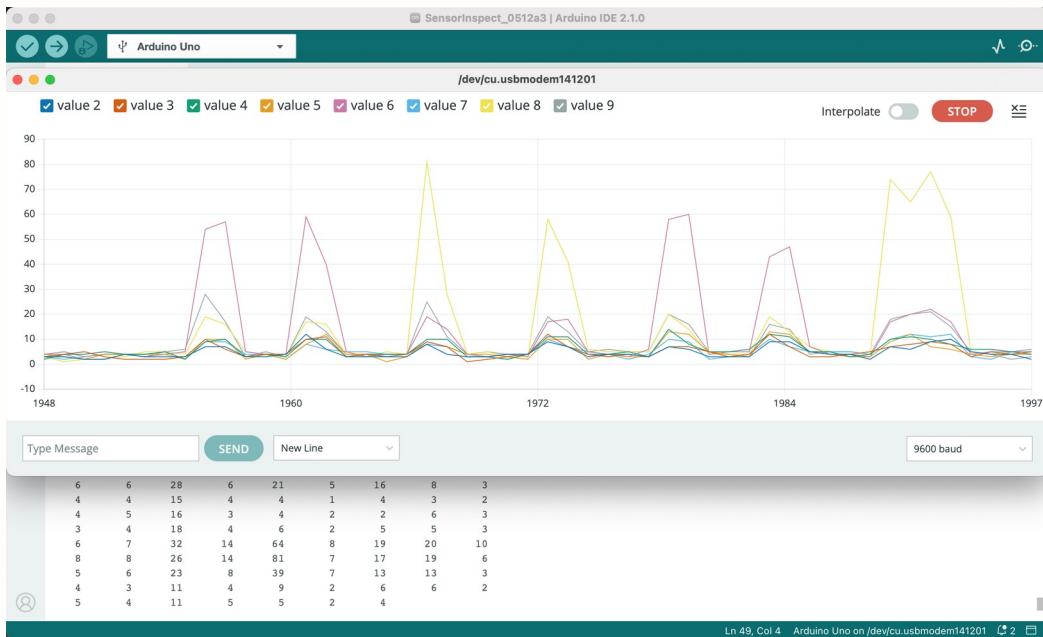
Temperature = 25.54 *C
Pressure = 100935.35 Pa
Approx altitude = 32.49 m

Temperature = 25.65 *C
Pressure = 100939.53 Pa
Approx altitude = 32.14 m

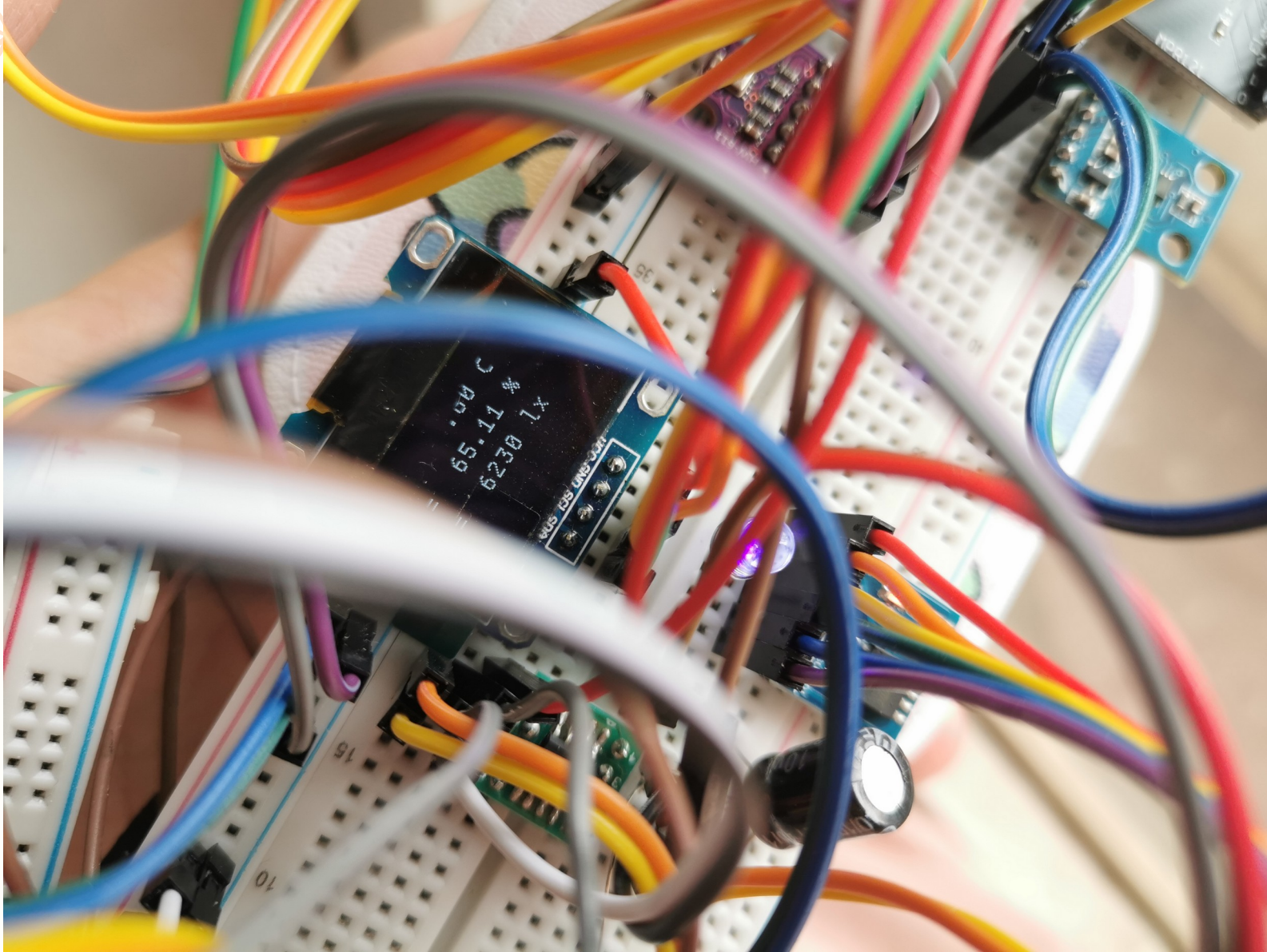
Temperature = 26.91 *C
Pressure = 101698.37 Pa
Approx altitude = -31.04 m

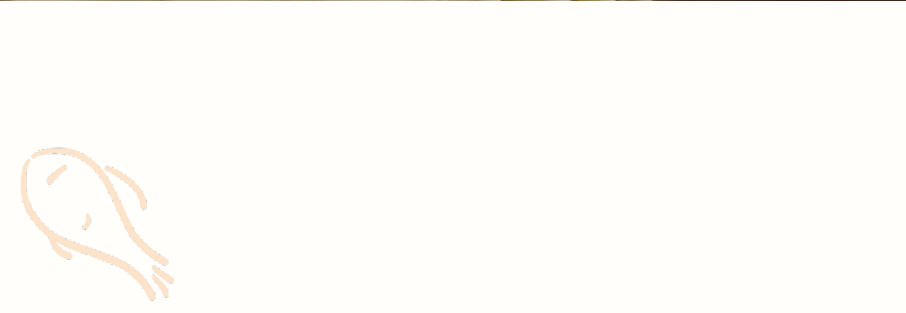
Temperature = 26.73 *C
Pressure = 100944.21 Pa
Approx altitude = 31.75 m
```

Autoscroll Both NL & CR 9600 baud



图像来源：Adafruit、自己项目中的截图









可

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



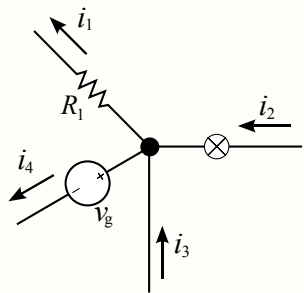
元件选型

DigiKey 得捷

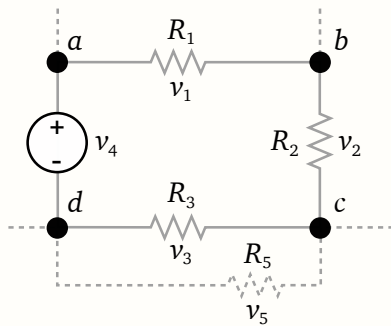
M 贸泽电子
MOUSER ELECTRONICS

LC@SC 立创商城
WWW.SZLCSC.COM

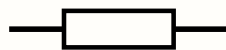
电路设计



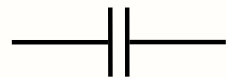
KCL



KVL



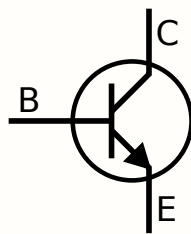
$$V = RI$$



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

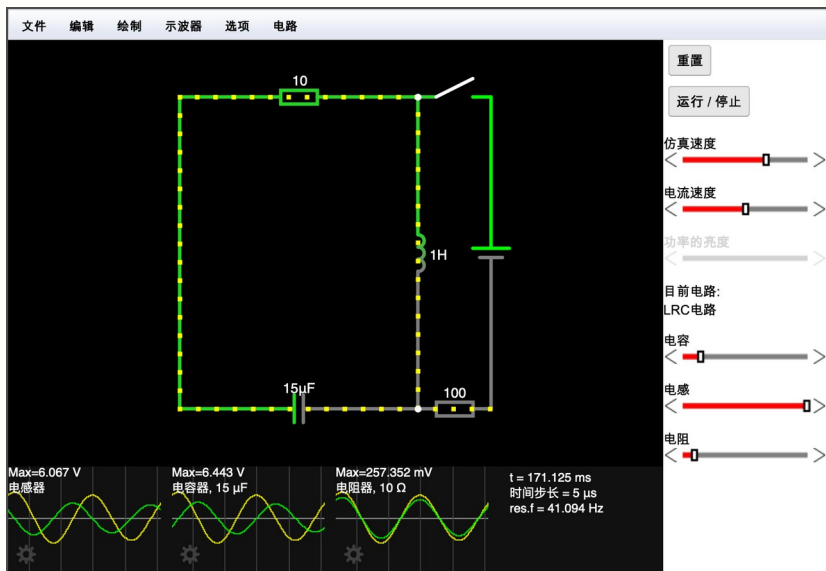


$$V = L \dot{I}$$

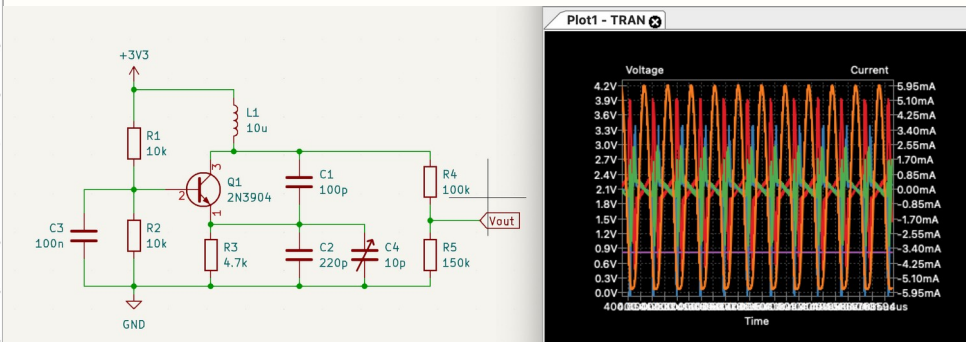


$$V_{BE} = \frac{kT}{q} \ln \left(\frac{I_C}{I_S(T)} + 1 \right)$$

仿真工具

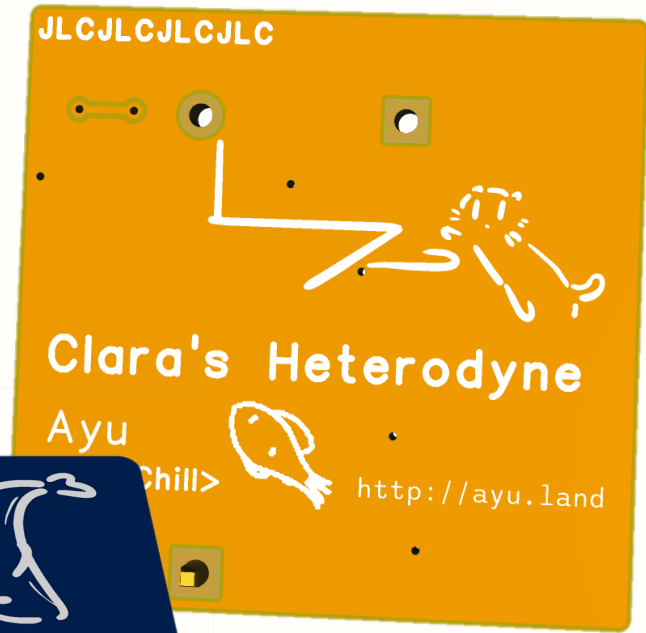
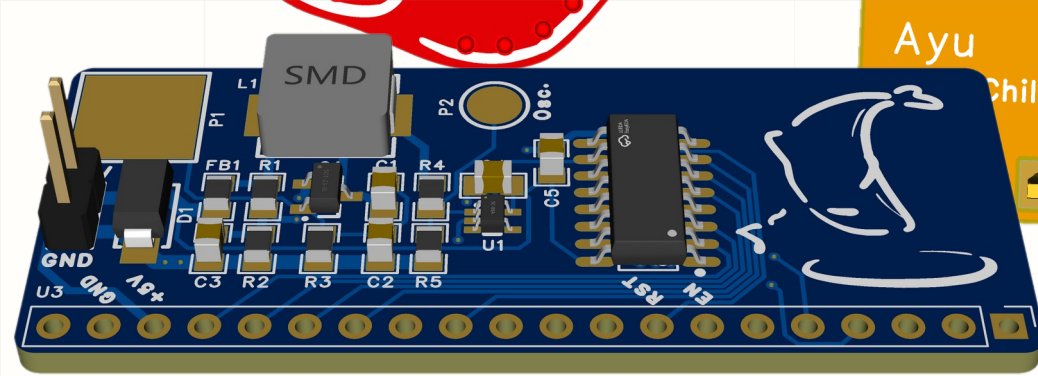


CircuitJS1

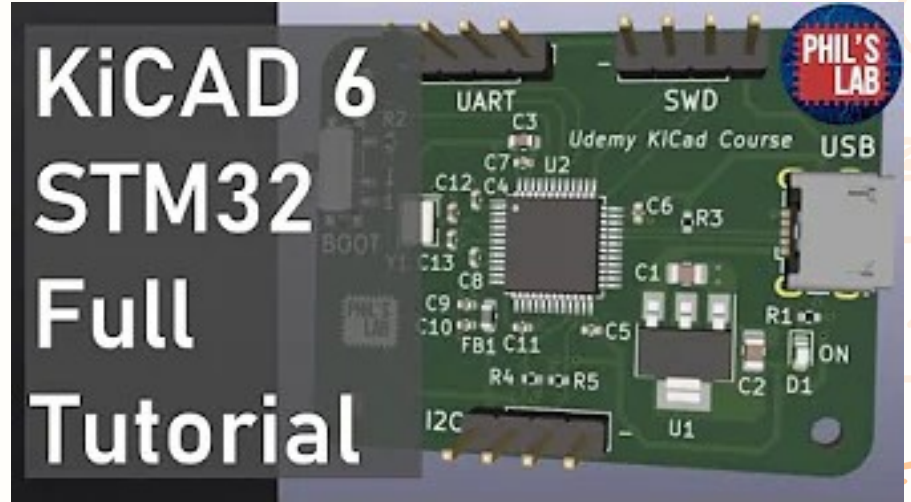
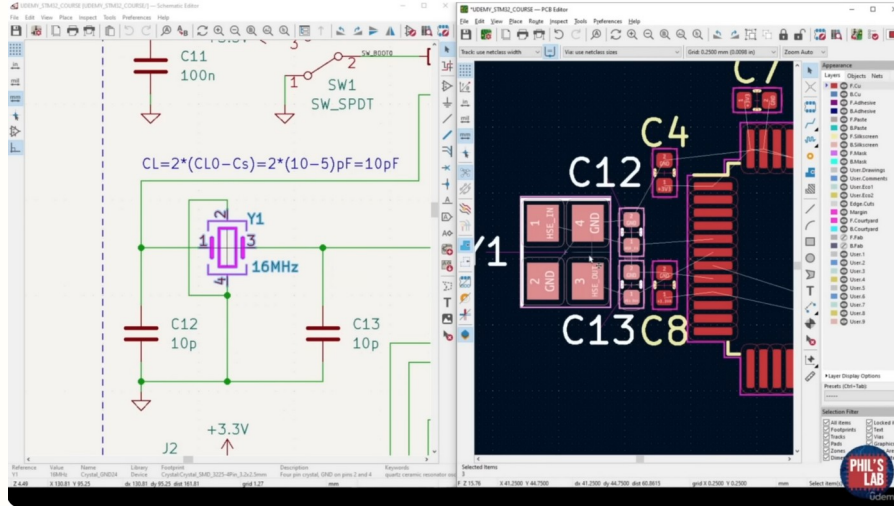


KiCad + SPICE

PCB

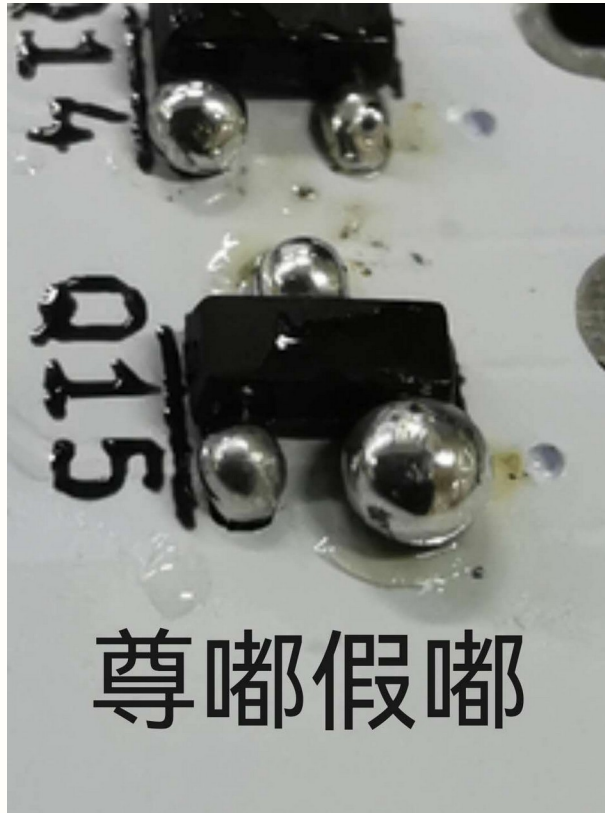


PCB



Phil's Lab

焊接：基本无害





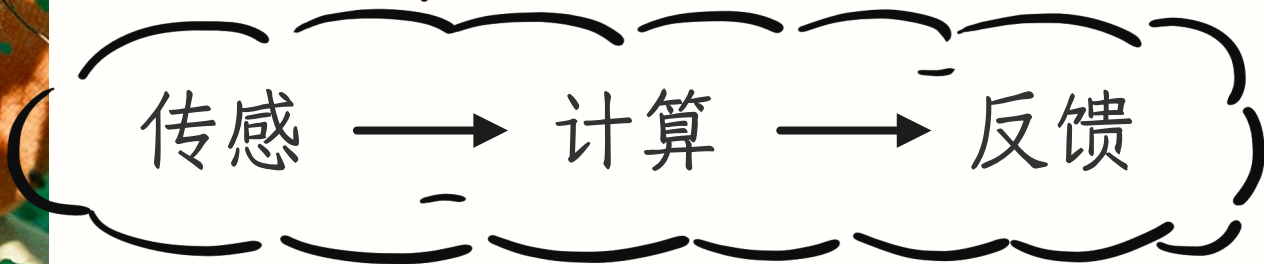
去最近的餐馆吃一顿！





搭车漫游：FUNgi

互动设计



原型验证



实现



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