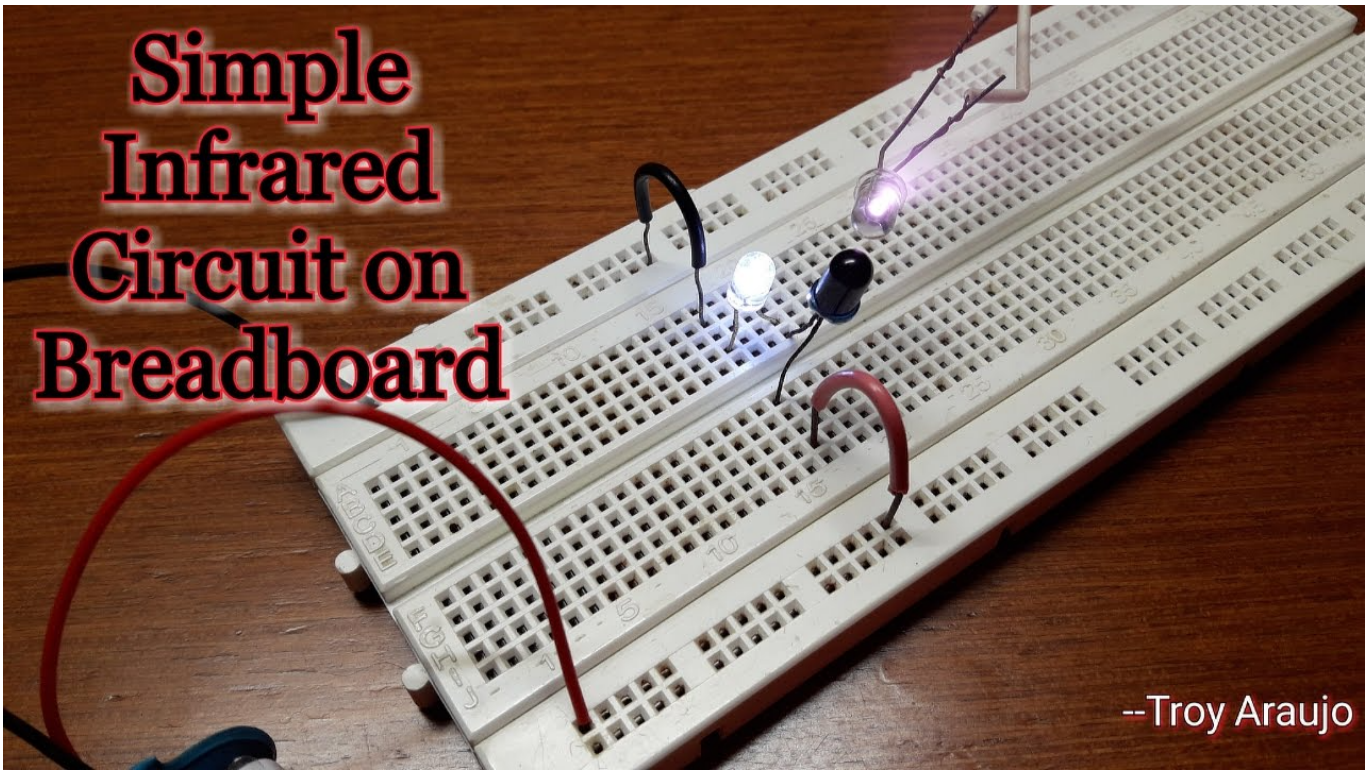
Pine

> A simple infrared controller



Components

- Microcontroller **ATMSAMD21G**
- IR RED emitter *940nm*
- IR Receiver
- Temperature / Humidity sensor

Input voltages

Components	Voltages
Mcu	`1.63v` to `3.42v`
Sensor	`1.9v` to `3.6v`

Flow chart

```
graph TD;
A(START)--> B(CHECK TEMPERATURE);
B--> C(IS THE ROOM HOT?);
C-->|YES|D(TURN ON AIRCON);
C-->|NO|E(TURN OFF AIRCON);
```

Wavelength equation

$$\lambda = \frac {v}{f}$$

Infrared range test

```
{
  "data": {
    "values": [
      {"resistance(ohm)": 10, "distance(cm)": 5},
      {"resistance(ohm)": 20, "distance(cm)": 15},
      {"resistance(ohm)": 30, "distance(cm)": 25}
    ]
  },
  "mark": "line",
  "encoding": {
    "x": {"field": "resistance(ohm)", "type": "quantitative"},
    "y": {"field": "distance(cm)", "type": "quantitative"}
  }
}
```

I2C Protocol

```
sequenceDiagram
MCU->>Sensor: Start
MCU->>Sensor: Slave address
Sensor-->>MCU: Ack
MCU->>Sensor: Data
Sensor-->>MCU: Ack
MCU->>Sensor: Stop
```

I2C Timing diagram

```
{signal: [
   {
       name: 'SCL',
       wave: '1.010101010101'
   },
   {
      name: 'SDA',
      wave: '103.4.5.6.7.8,01',
      data: ['D6','D5','D4','D0','R/W','ACK']
   }
]}
```