Interactive Electro-acoustic Music

硬核之声

Hack without Acoustic

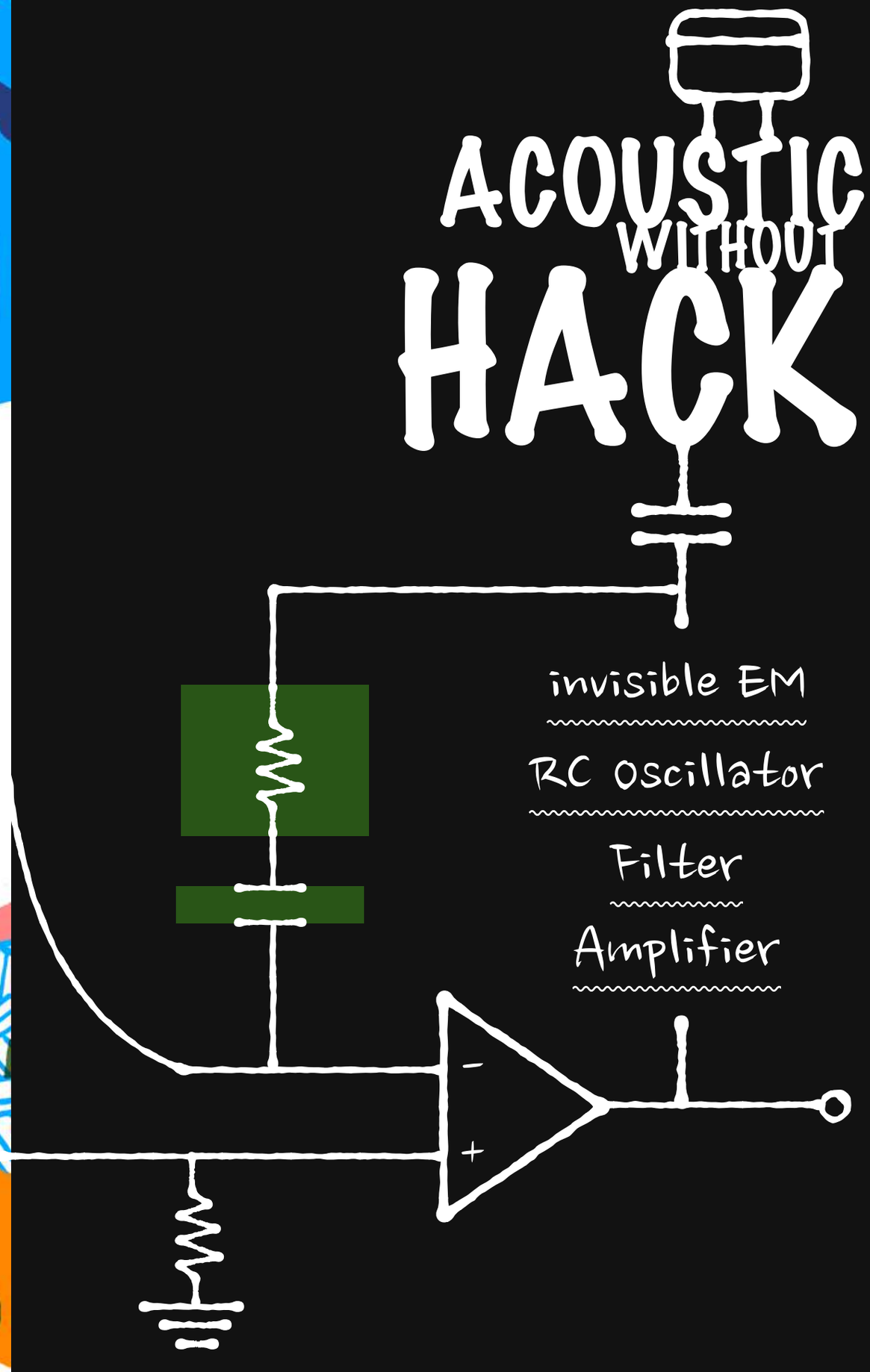
Audio Analyzer

Voice Recognition

MP3 Shield

Invisible EM Field

ACOUSTIC WITHOUT HACK

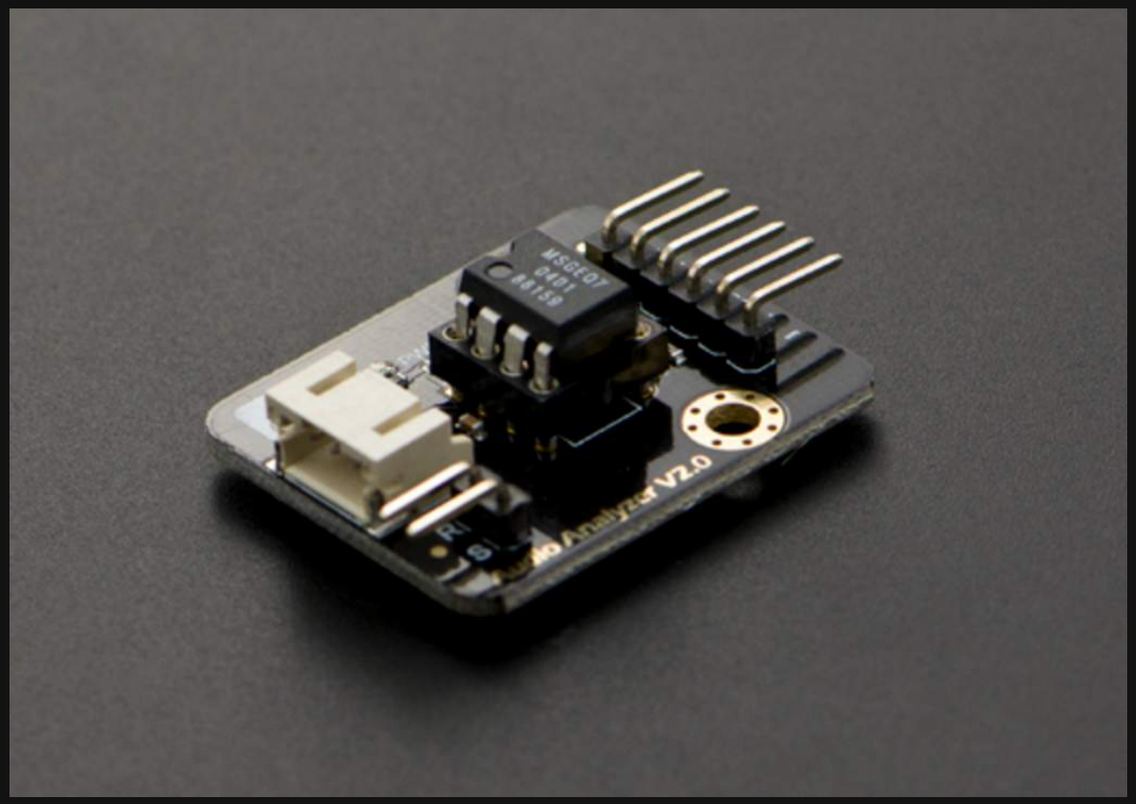


Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

声音分析器



音频信号通过该模块会被过滤成7个波段，并且能够输出每一个频段的幅值

这七个频段分别是：63Hz，160Hz，400Hz，1KHz，2.5kHz，6.25kHz 和 16kHz

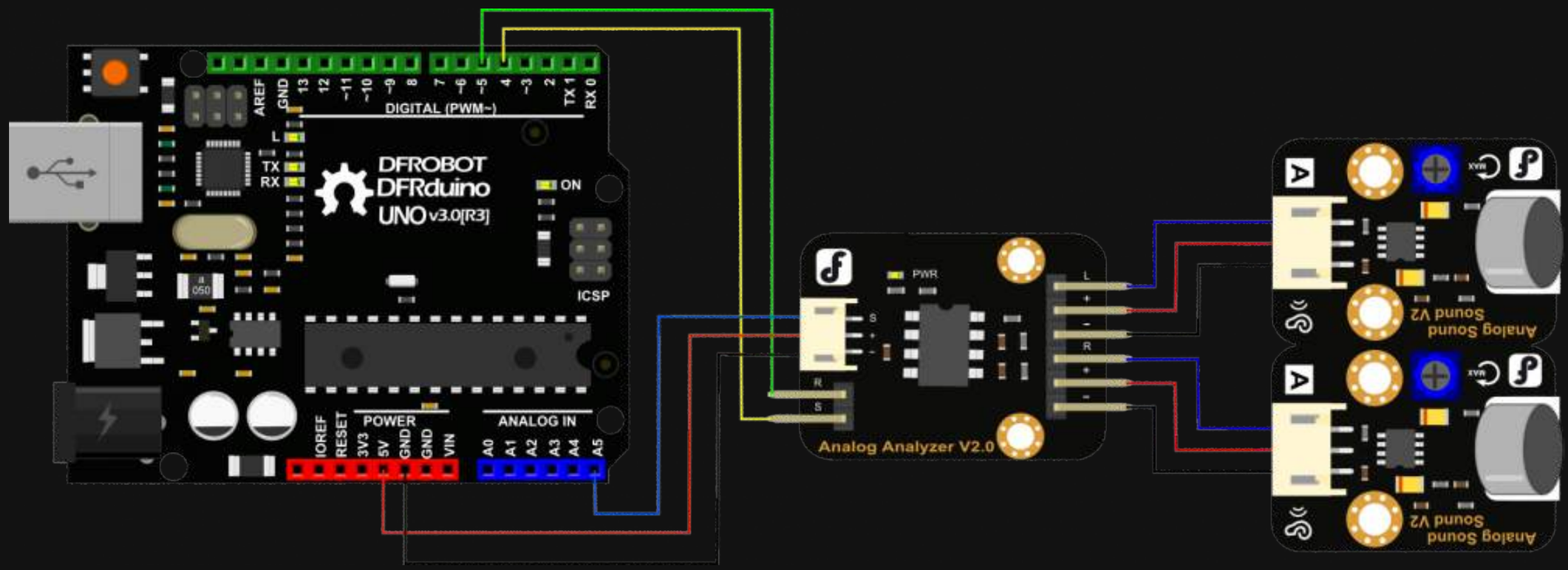
追踪音乐的频率信息让你的 Arduino 和音乐一起互动

和模拟声音传感器配套使用，完成与 Arduino 的音频采集

Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer



Arduino IDE 样例代码

参考 DF Wiki

样例代码

Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

```
#include <AudioAnalyzer.h>
Analyzer Audio = Analyzer(4,5,5);   //Strobe pin ->4  RST pin ->5 Analog Pin ->5
//Analyzer Audio = Analyzer();   //Strobe->4 RST->5 Analog->5
int FreqVal[7];    // define an array containing 7 values
int pitch;
int amplitude;
int velocity = 100;
int noteON = 144;
int cr = 13;
void setup()
{
  Serial.begin(9600);            //Init the baudrate
  Audio.Init();   //Init module
  delay(8000);
}
void loop()
{
  Audio.ReadFreq(FreqVal);   //return 7 value of 7 bands pass filiter Frequency(Hz):63  160  400  1K  2.5K  6.25K  16K   FreqVal[]:     0    1    2    3    4    5    6
  for(int i=0;i<7;i++)
  {
    amplitude = max((FreqVal[i]-100),0);
    pitch = map(amplitude,0,1024,0,127);
    MIDImessage(noteON, pitch, velocity);
    delay(50);
  }
  delay(200);
}
//send MIDI message
void MIDImessage(int command, int MIDInote, int MIDIvelocity) {
  Serial.write(command);//send note on or note off command
  Serial.write(MIDInote);//send pitch data
  Serial.write(MIDIvelocity);//send velocity data
}
```

Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

Highlight

DF Wiki 下载
.h 文件

```
#include <AudioAnalyzer.h>
```

导入库文件 放在 arduino/libraries

```
amplitude = max((FreqVal[i]-100),0);
```

读出对应频率的幅度值

```
pitch = map(amplitude,0,1024,0,127);
```

把范围缩小的 MIDI 的 range

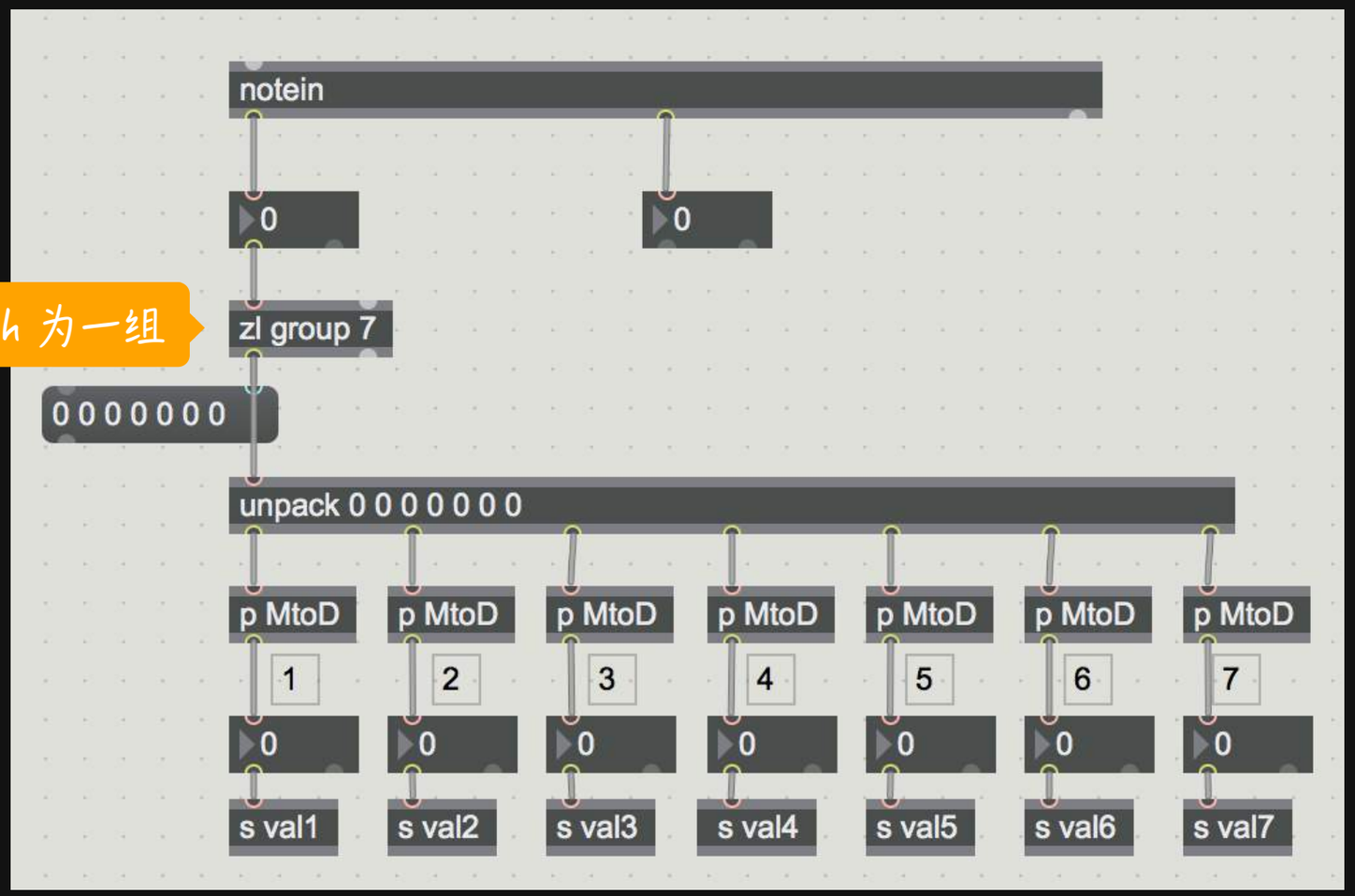
Interactive Electro-acoustic Music

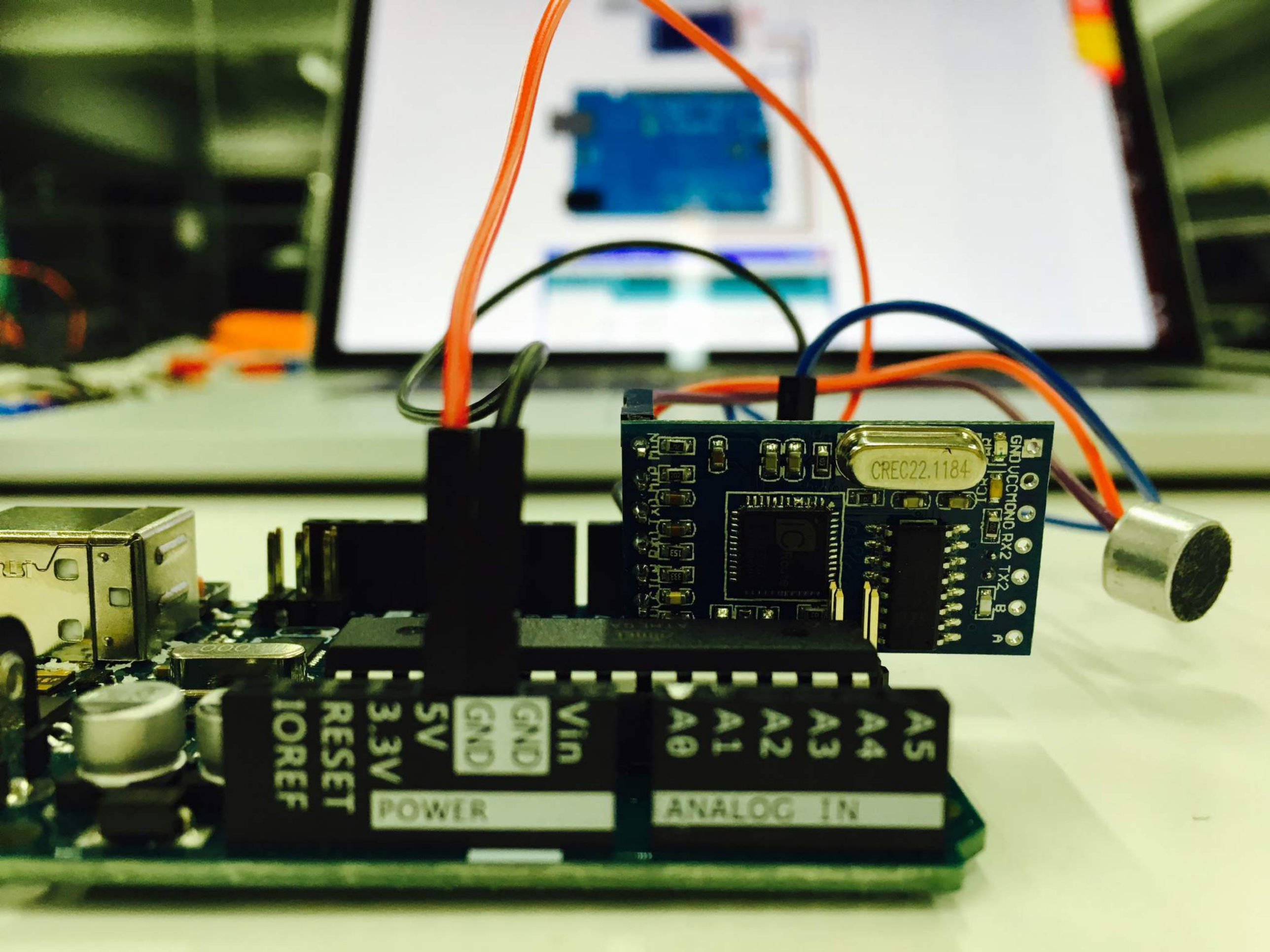
Hack without Acoustic

Audio Analyzer

Max Patch

接收七个连续的 pitch 为一组




CREC22.1184
GND VCC TX2 RX2
IOREF
RESET
3.3V
5V
GND
GND
Vin
A0
A1
A2
A3
A4
A5
POWER
ANALOG IN

Interactive Electro-acoustic Music

Hack without Acoustic

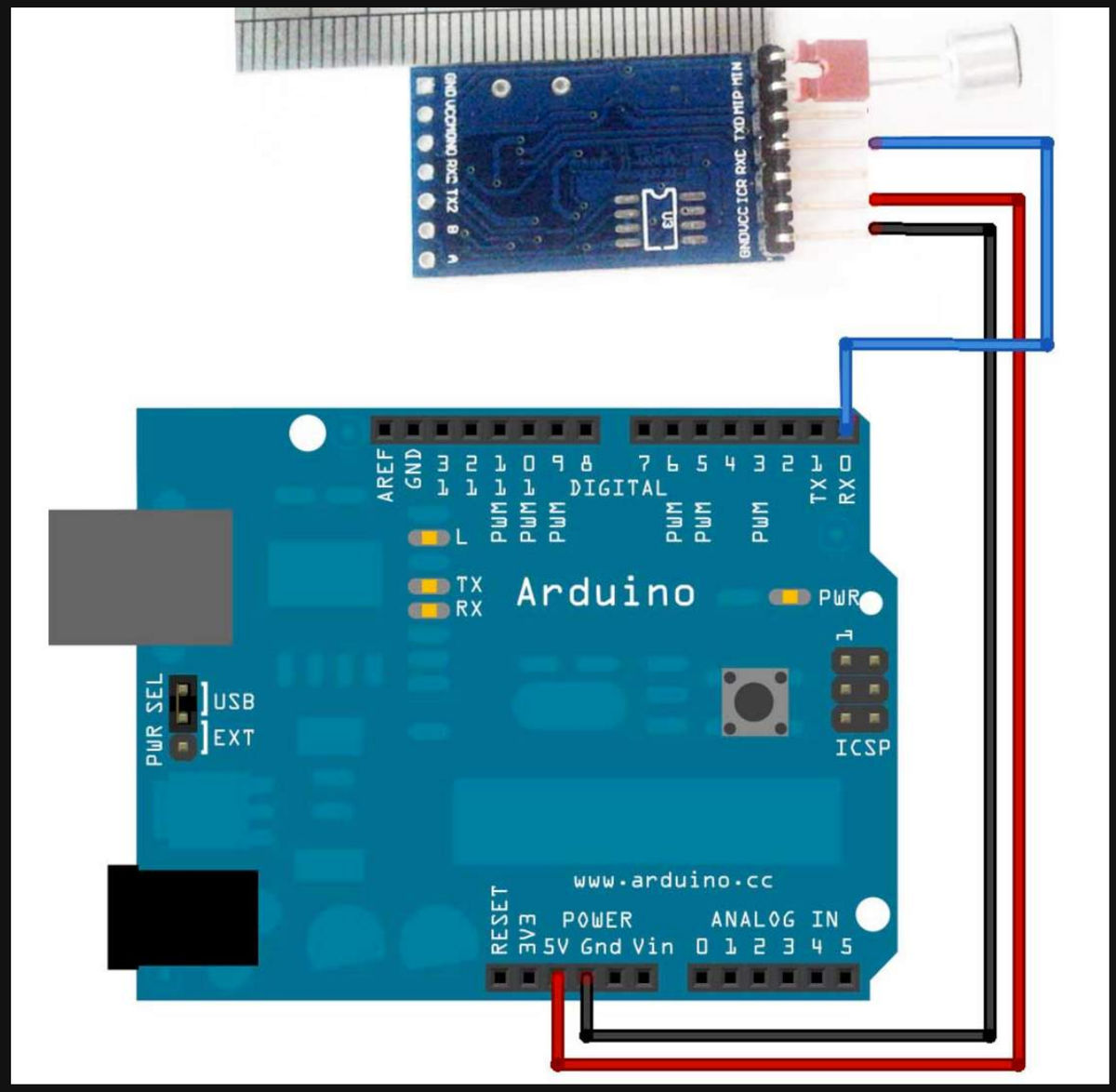
Voice Recognition

语音识别模块

兼容 Arduino

非特定人语音识别

自定义识别内容



Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

样例代码

```
void setup() {
  Serial.begin(9600);  //初始化串口0，用来连接上位机串口助手程序观察识别结果
  Serial1.begin(9600); //初始化串口1，用来连接LD3320模块用来接收识别结果
  pinMode(13, OUTPUT);  //定义IO13用来连接LED灯，产生开关灯效果
}

void loop() {
  //从串口1接收LD3320的识别结果，再发送到串口0
  if (Serial1.available()) {
    int inByte = Serial1.read();
    switch(inByte)
    {
    case 0x00:  //对LD3320模块说：“左转”时，模块返回0x00
      digitalWrite(13, HIGH);   //点亮LED灯
      break;
    case 0x01:  //对LD3320模块说：“右转”时，模块返回0x01
      digitalWrite(13, LOW);   //熄灭LED灯
      break;
    }
    Serial.write(inByte);     //把接收到的识别结果传给上位机串口助手程序
  }
}
```

Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

Highlight

```
switch(inByte) { case 0x00:
```

多条件判断，相当于多个 if 判断

```
digitalWrite(13, HIGH);
```

控制行为，可修改为自己想要的行为

upload 代码必须把模块与 Arduino 断开

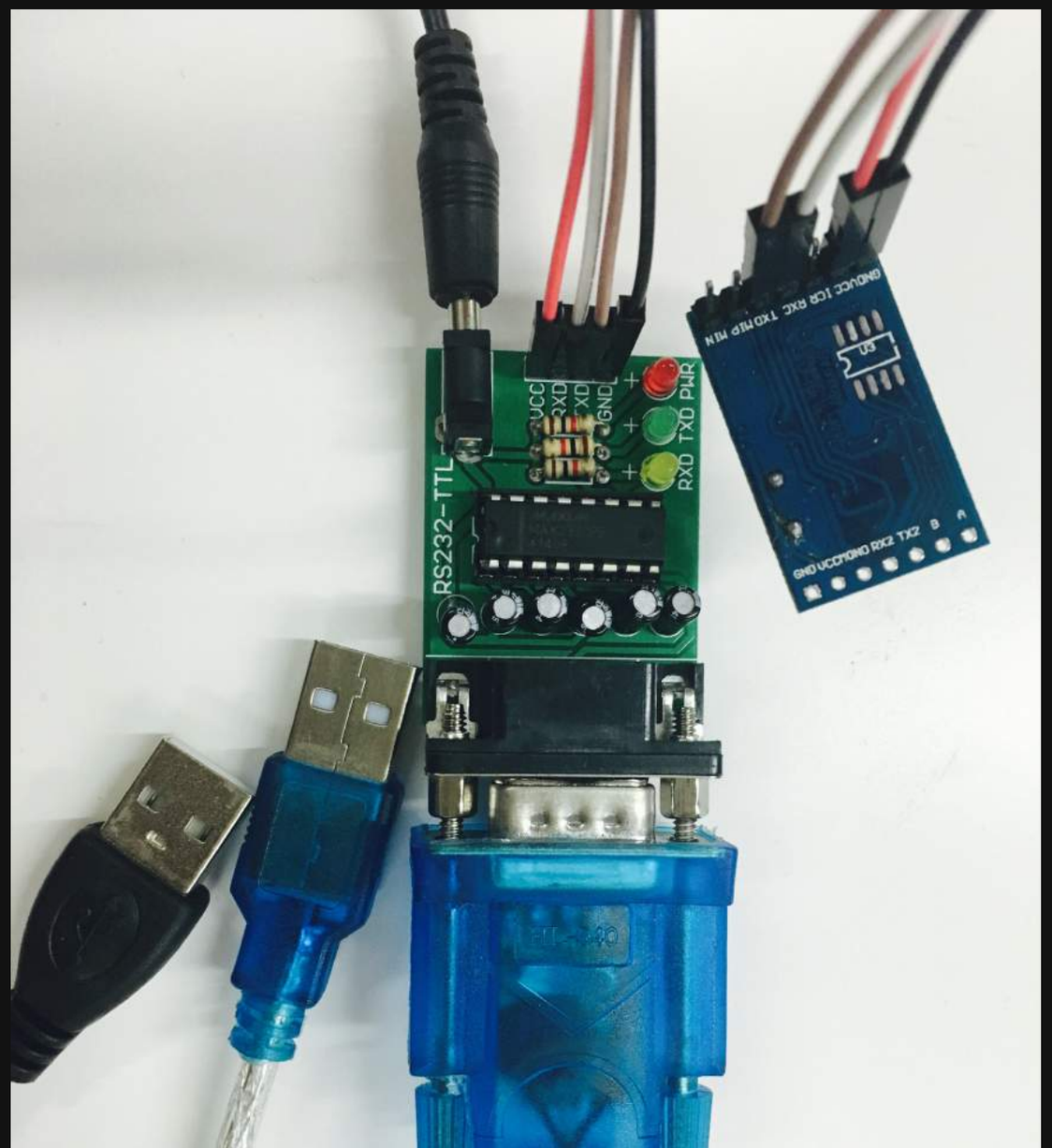
模块运行时不要用手触碰模块，离 mic 20cm

Interactive Electro-acoustic Music

Hack without Acoustic

Audio Analyzer

自定义语音指令



参考链接

Interactive Electro-acoustic Music

Hack without Acoustic

MP3 Shield

连接 Arduino Board

最多可播放 9 首 MP3

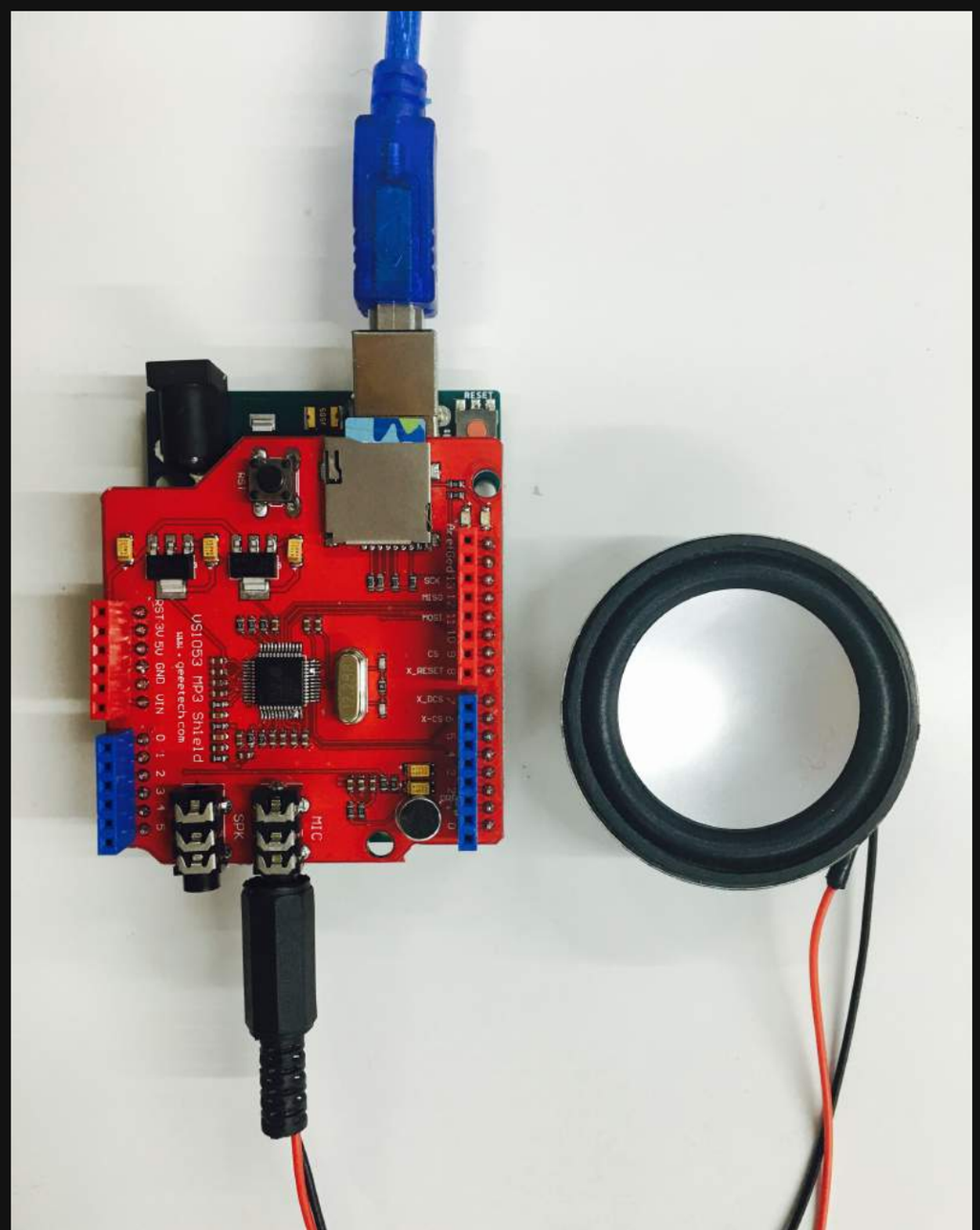
可外接喇叭和麦克风

MP3 文件存储在 TF 卡

需要使用读卡器

MP3 文件命名为
track00x.mp3

详细方法请参考《VS1053 MP3 模块使用说明》



Hack without Acoustic

Audio Analyzer

样例代码

```
// libraries  库文件都放在 Arduino / libraries 下
#include <SPI.h>
#include <SdFat.h>
#include <SdFatUtil.h>
#include <SFEMP3Shield.h>

SFEMP3Shield MP3player;
int8_t current_track = 4;    // filename of "track00x.mp3" for track004.mp3

void setup() {
  Serial.begin(115200);
  MP3player.begin();
  MP3player.setVolume(2,2);  // 设定双声道的音量
}
void loop() {
  MP3player.available();
  MP3player.playTrack(current_track);   //播放某个 mp3 文件
  MP3player.stopTrack();   //停止播放
  MP3player.pauseMusic(); //暂停
  MP3player.resumeMusic(); //继续
  MP3player.setPlaySpeed(playspeed); //设定播放速度
}
```

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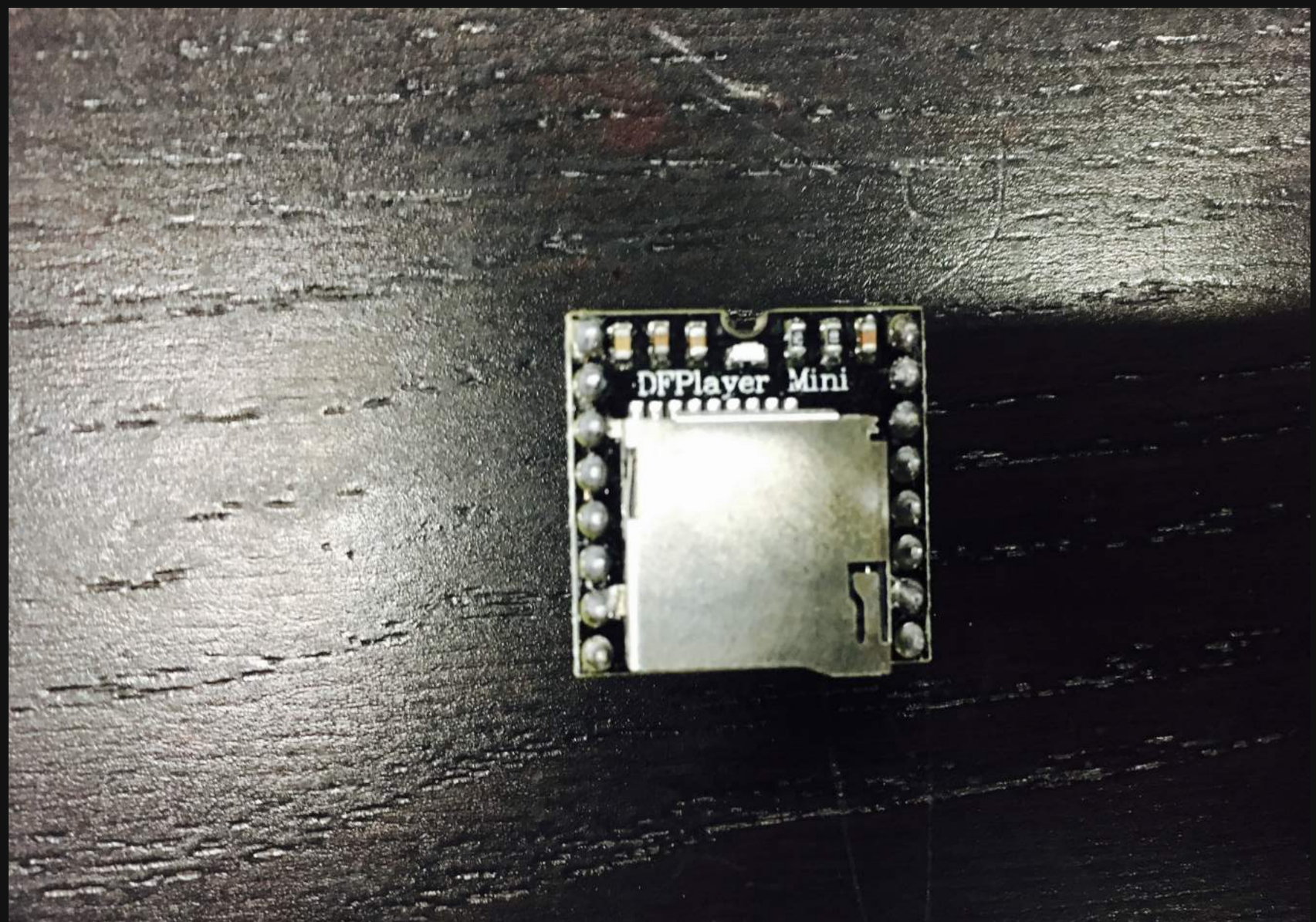
Hack without Acoustic

MINI MP3 Player

详细方法请参考 http://www.dfrobot.com.cn/goods-891.html



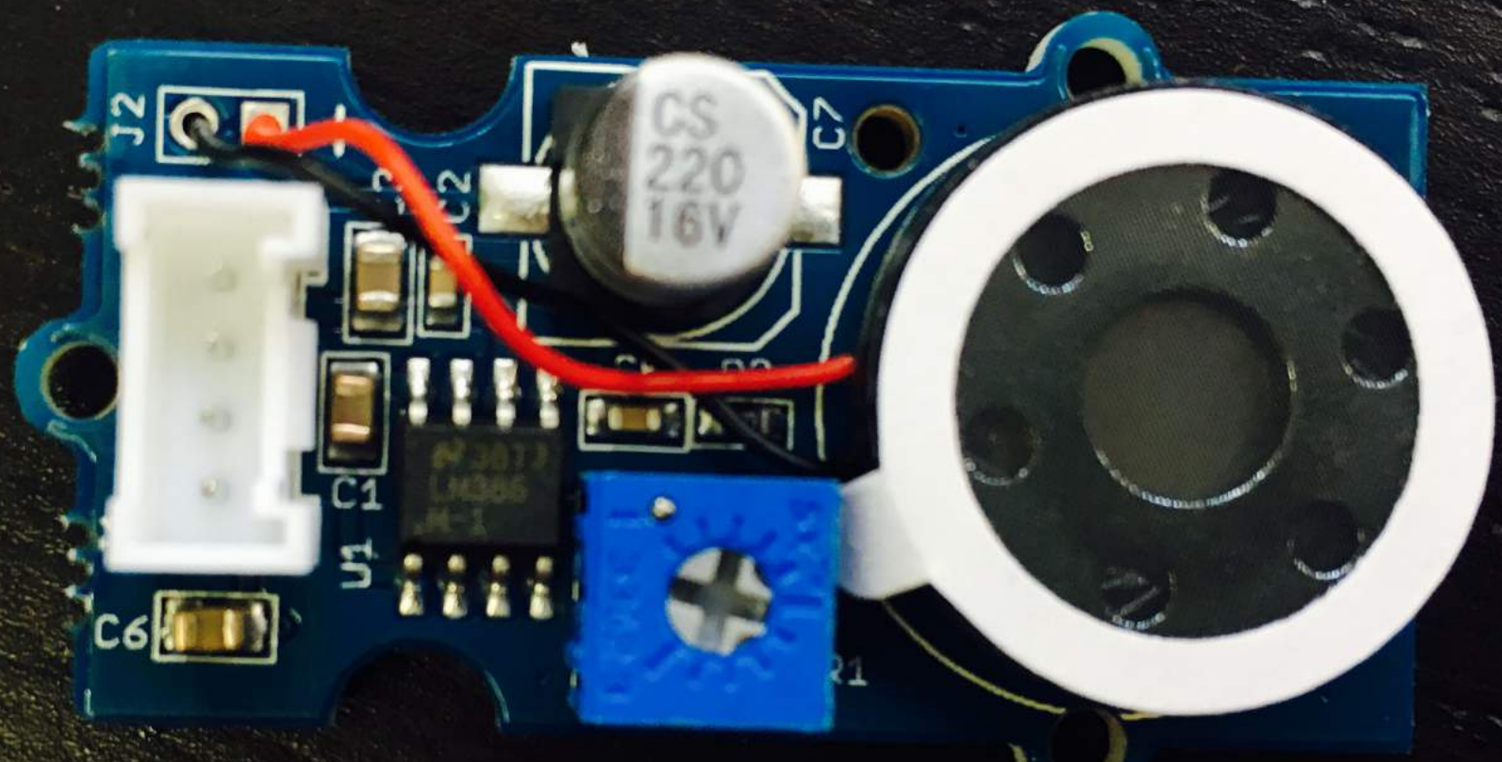
Interactive Electro-acoustic Music

Hack without Acoustic

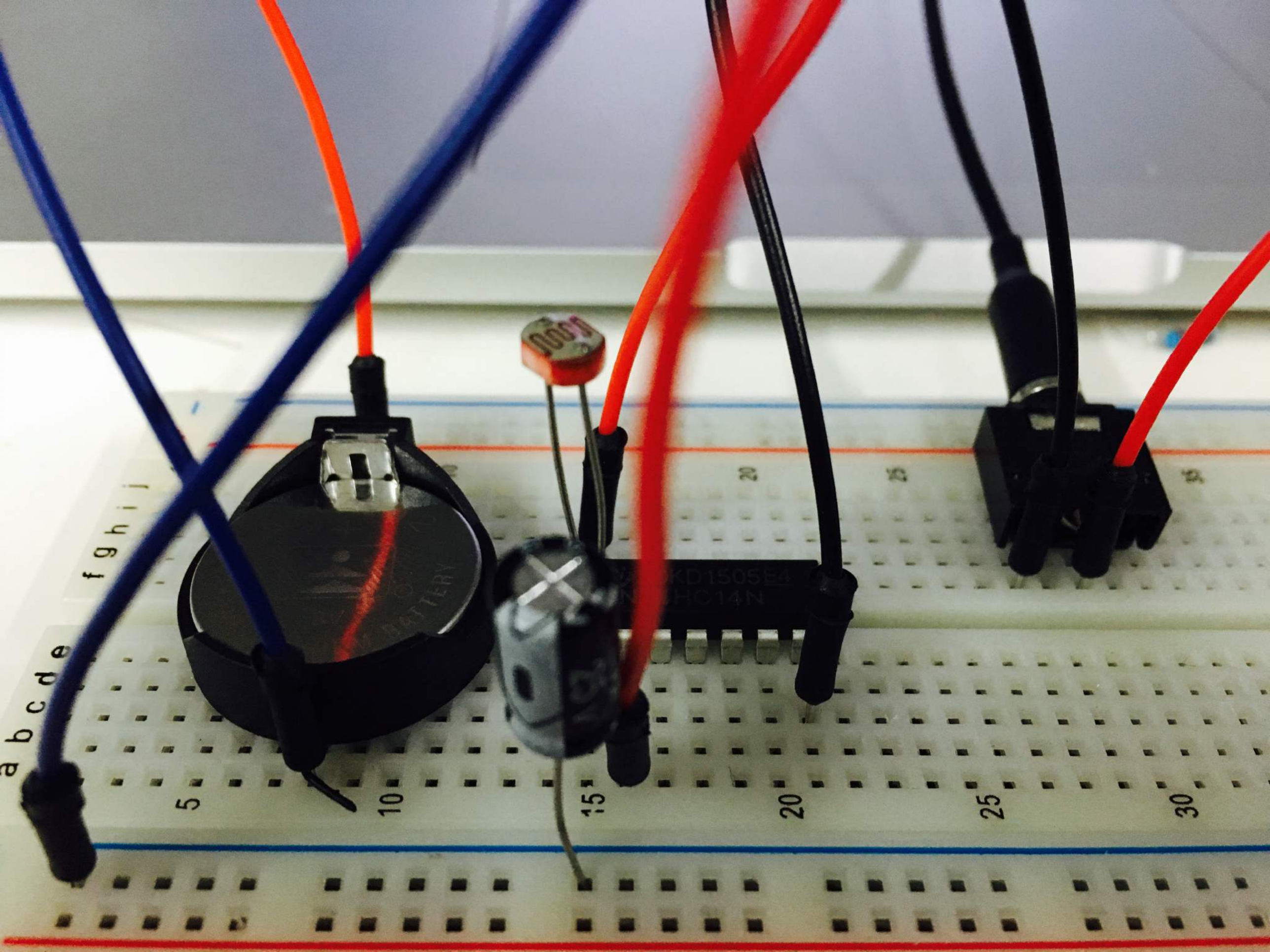
Speech Recognition and Synthesis

详细方法请参考 https://pan.baidu.com/s/1cojcsu#list/path=%2F

Recorder



Player

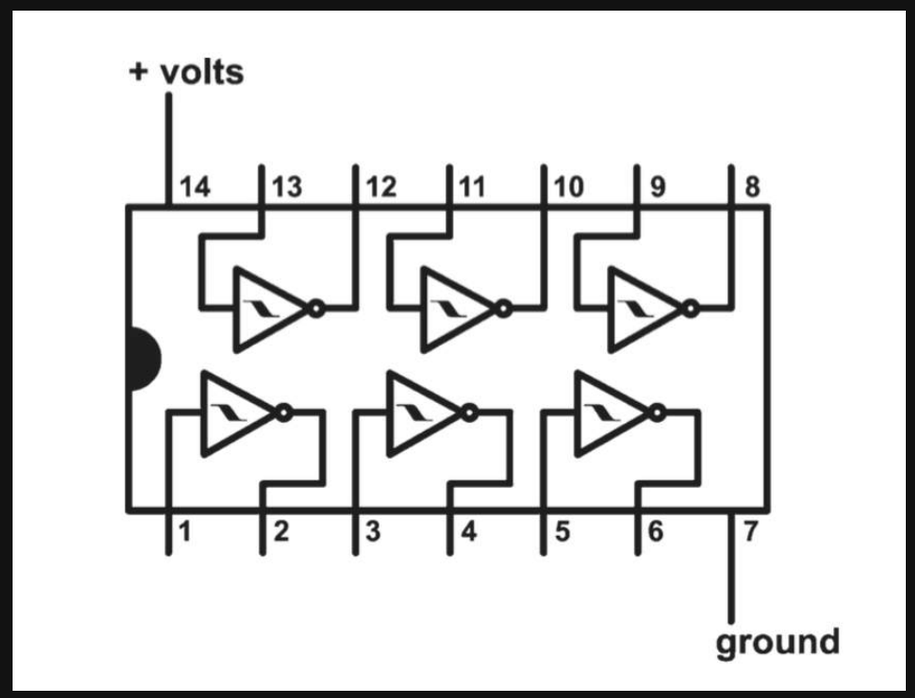

a b c d e
f g h i j
5
10
15
20
25
30
BATTERY

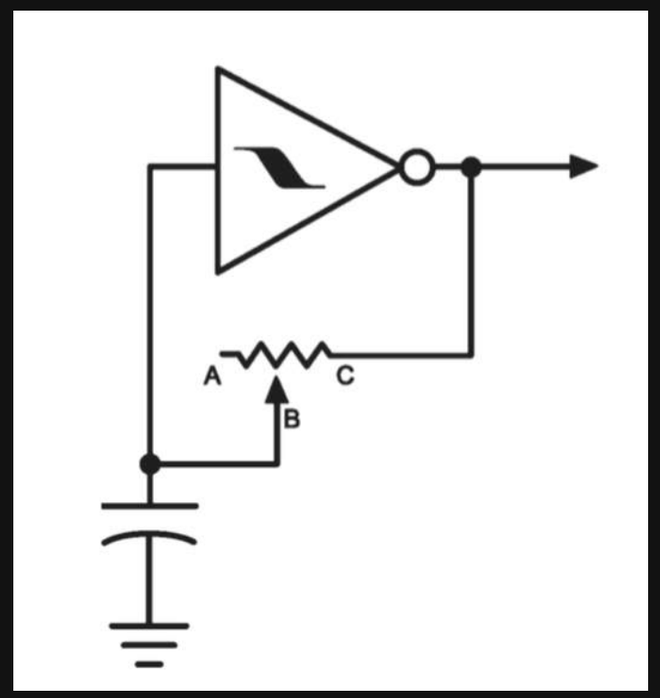
Interactive Electro-acoustic Music

Hack without Acoustic

Invisible EM Field

THE WORLD'S SIMPLEST RC OSCILLATOR





SN74HC14 反相施密特触发器

电容

电阻/光敏电阻

3V 纽扣电池

3.5mm 母头

3.5mm 公公头

吉他放大音箱

Interactive Electro-acoustic Music

Hack without Acoustic

Invisible EM Field

吉他拾音器 / Guitar Pick Up

磁铁和线圈可以感应电磁场，并将电磁反应通过放大电路发声

试着将连着放大音箱接近各种正在运行的电器，聆听隐藏于电磁感应中的声音

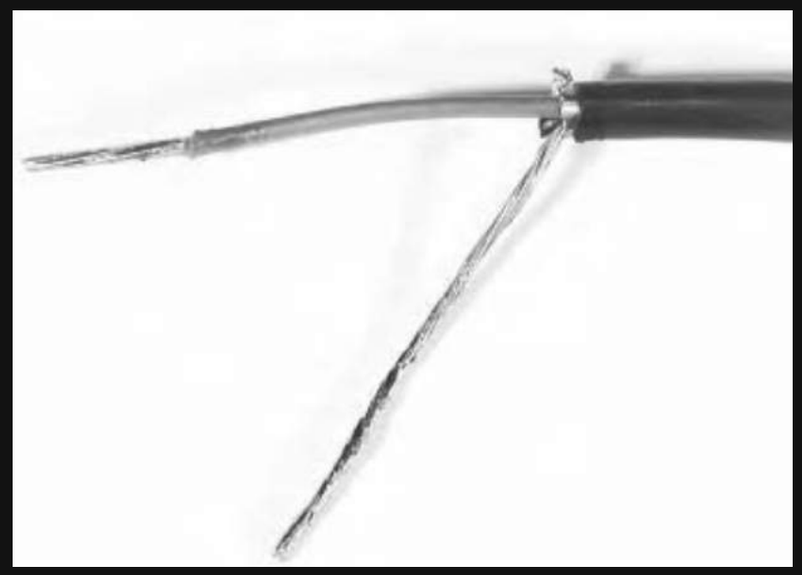
Interactive Electro-acoustic Music

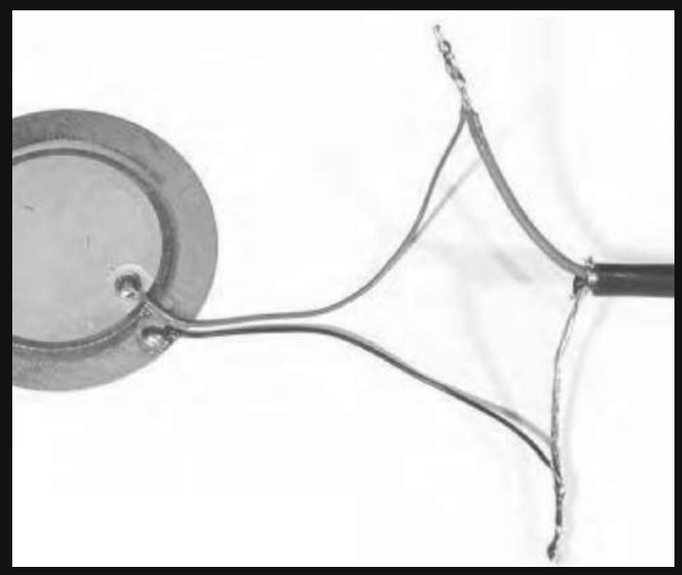
Hack without Acoustic

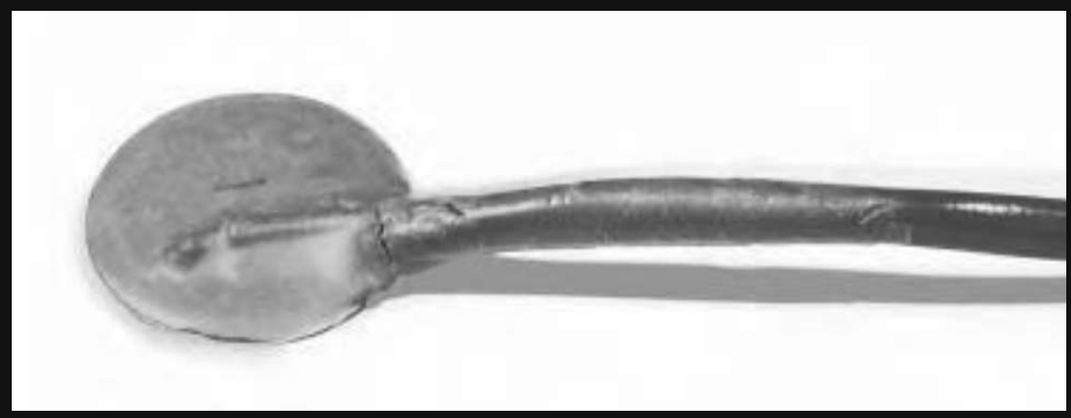
Invisible EM Field

接触式麦克风 / Contact Mike

接触式麦克是放大微小声音的利器，和震动的物体接触可以听到隐藏的声音







Interactive Electro-acoustic Music
EXAMPLE

We are Narcisses

Arduino + Sensor + MSP + Speaker

It is an interactive project with the help of a few simple materials : a mirror, some water, and a speaker. Deformations of water are physically created by a speaker that is alive with low-frequency sounds.

VIDEO

Mute Synth II

Analog circuit + Synthesizer

Mute Synth II is a hand-held synth and sequencer. At the core of the instrument is a versatile mini patchbay that encourages a particular interaction with the instrument and playfulness.

VIDEO