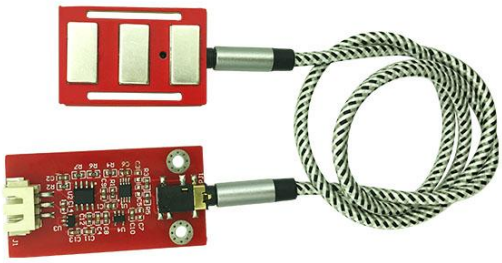
Dry Electrode muscle electrical control steering gear

- when this kit is shipped, the cable has been connected and the code has been burned. You can use it directly when you get it!



一、 INTRODUCTION

dry Electrode electromyography sensor detects the surface electromyography signal of human body (sEMG) , and then reflect the activity of human muscles and nerves. Dry Electrode electromyography the sensor integrates filtering and amplification circuits, amplifies the weak EMG signal on the human body surface within ± 1.5MV by 1000 times, and effectively suppresses noise (especially power frequency interference) through differential input and analog filter circuits. The output signal is in the form of analog quantity, with 1.5V as the reference voltage and 0~3.0V range output. The size of the output signal depends on the activity of the selected muscle, and the waveform of the output signal can significantly indicate the situation of the subcutaneous muscle at the observed position, which is convenient for analysis and research of myoelectric signals, if Arduino is used as the controller detect muscle activity, such as muscle tightness, strength, fatigue, etc.

Dry Electrode electromyography sensor it is an active sensor that can provide high-quality signal collection and is easy to use. Whether it is used in static or dynamic application fields, only some extremely simple preparations are needed.

This product uses dry electrodes lead, Good signal quality can be obtained without conductive gel, so it has the characteristics of long service life, simple and convenient use, and is more suitable for ordinary users. ; however, medical electrodes using gel probes are usually disposable, which is more troublesome to use.

The supply voltage is between 3.3 and 5.5V, the supply current is not less than 20mA, and the ripple and other noise are small. A regulated DC voltage is recommended.

The effective spectrum range of EMG signals is 20Hz ~ 500Hz, and it is recommended to use an analog-to-digital converter (ADC) with a resolution of not less than 8bit and an effective sampling frequency of not less than 1KHz for sampling and digitization to retain as much original information as possible.

The supporting metal dry electrode plate should be kept in the same direction as the muscle.

This product is not a professional medical instrument, can not be used as an auxiliary accessories to participate in diagnosis and treatment.

二、Technical specification

1. Dry electrode myoelectric sensor

- supply Voltage: +3.3V ~ 5.5V
- output voltage: 0~3.0V
- detection range: +/-1.5MV
- electrode interface: PJ-342
- module interface: XH2.54 -3P
- output range: 0~3.0V
- operating temperature: 0 ~ 50℃
- board size: 25*48mm

2. Dry electrode guide plate

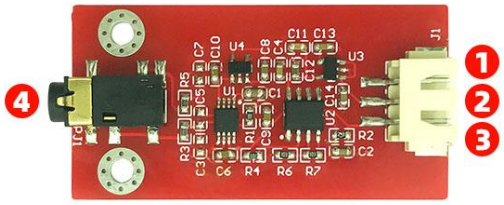
●electrode interface: PJ-342

●electrode line length: 50cm

●board size: 23*35mm

三、description

1. Dry electrode myoelectric sensor



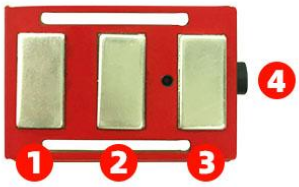
●1 --> power input negative pole

●2 --> power input positive pole (3.3~5.5V)

●3 --> analog signal output (0~3.0V)

●4 --> PJ-342 dry electrode interface

2. Dry electrode guide plate



- 1 --> DRY electrode DRY+
- 2 --> Reference electrode GND
- 3 --> DRY electrode dry --
- 4 --> PJ-342 Dry electrode port

四、Use process

1.Hardware configuration

●1 x Arduino UNO control panel (or similar)

●1 x EMG sensor signal processing board

●1 x myoelectric sensor dry electrode

●1 x dry electrode connecting line

●1 x 3p analog signal line

●1x steering gear

2.Software configuration

Arduino IDE(recommend 1.8.2 and above)

（A file named 2.How do I install Arduino IDE correctly.pdf can be found in the zip package）

3.Wiring

sensor-Single Chip Microcomputer

- GND-GND
- 5V-5V
- sig-A0

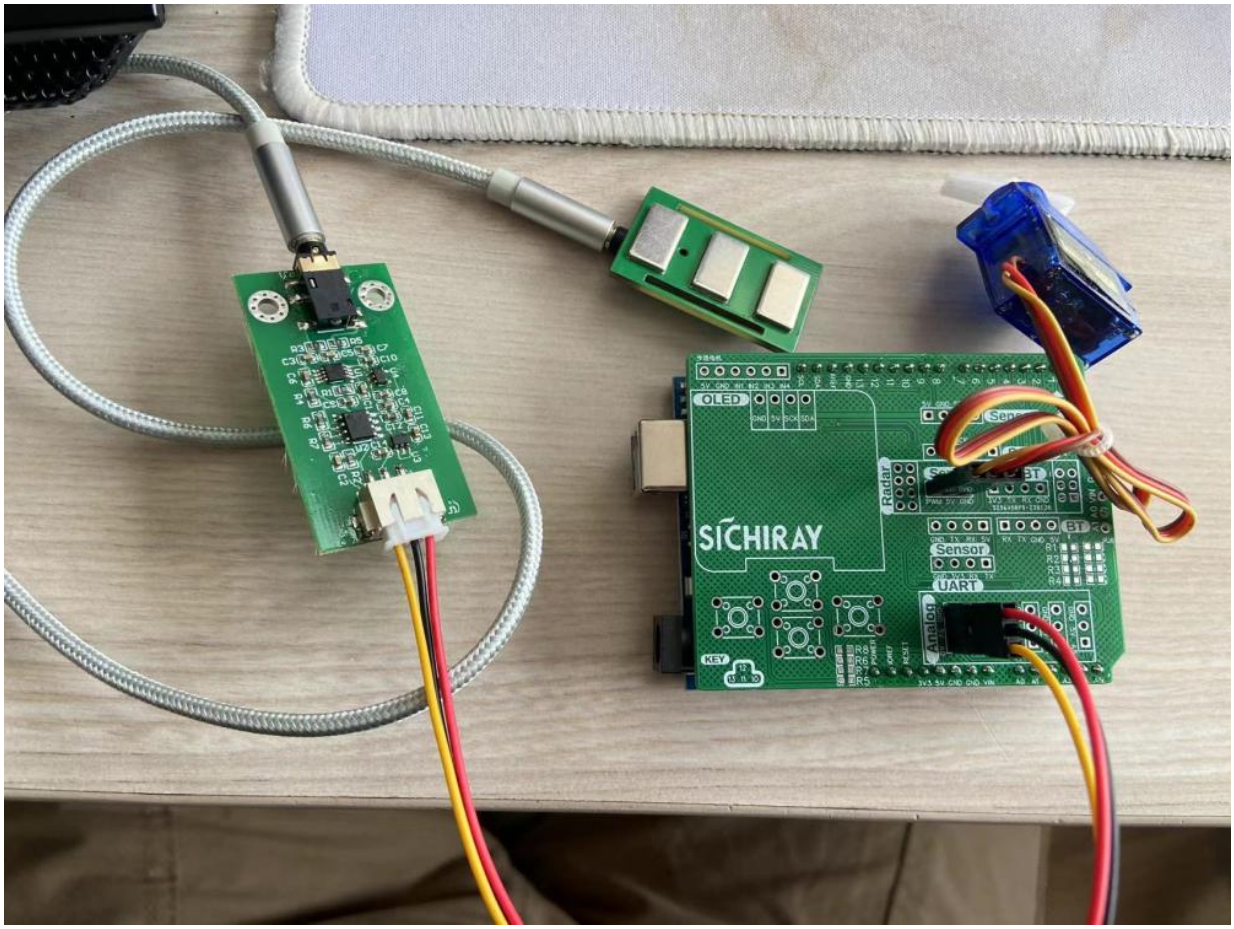
steering gear-Single Chip Microcomputer

●GND Brown-GND

●5v Red -5V

●sig yellow-D9

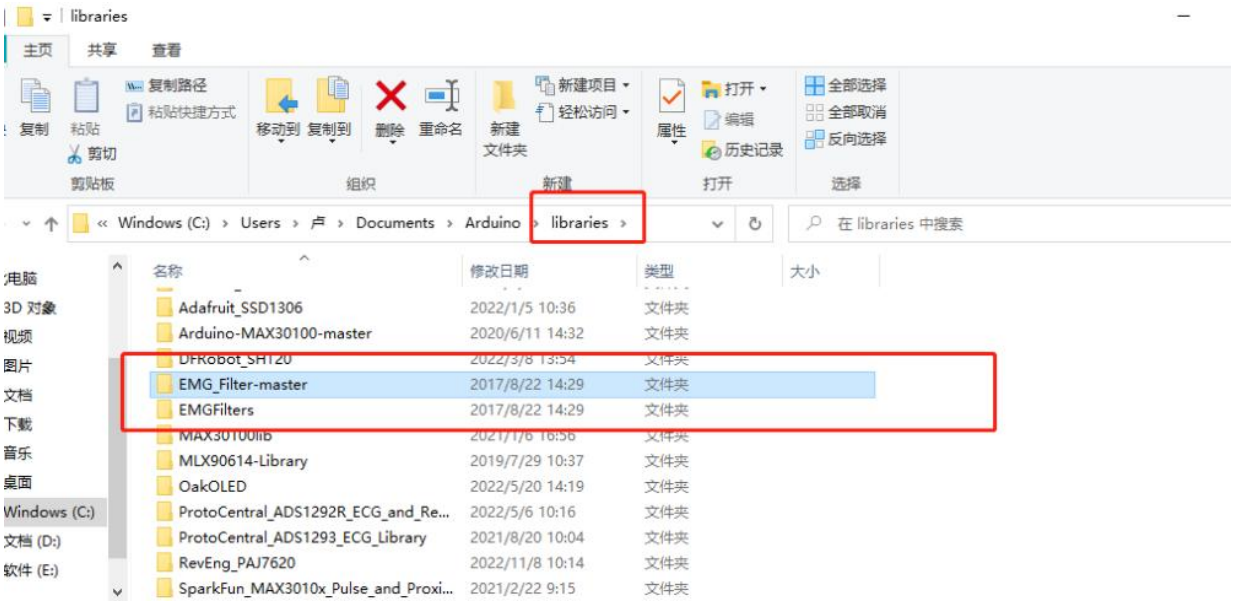
upgrade shield , directly connect and plug, effectively avoiding the situation that the DuPont line will be connected to the wrong line.



3. **Download the library file (the library file must be placed in the libraries after downloading)**

（A file named EMG_Filter-master (1).zip can be found in the zip package）

(Click download)



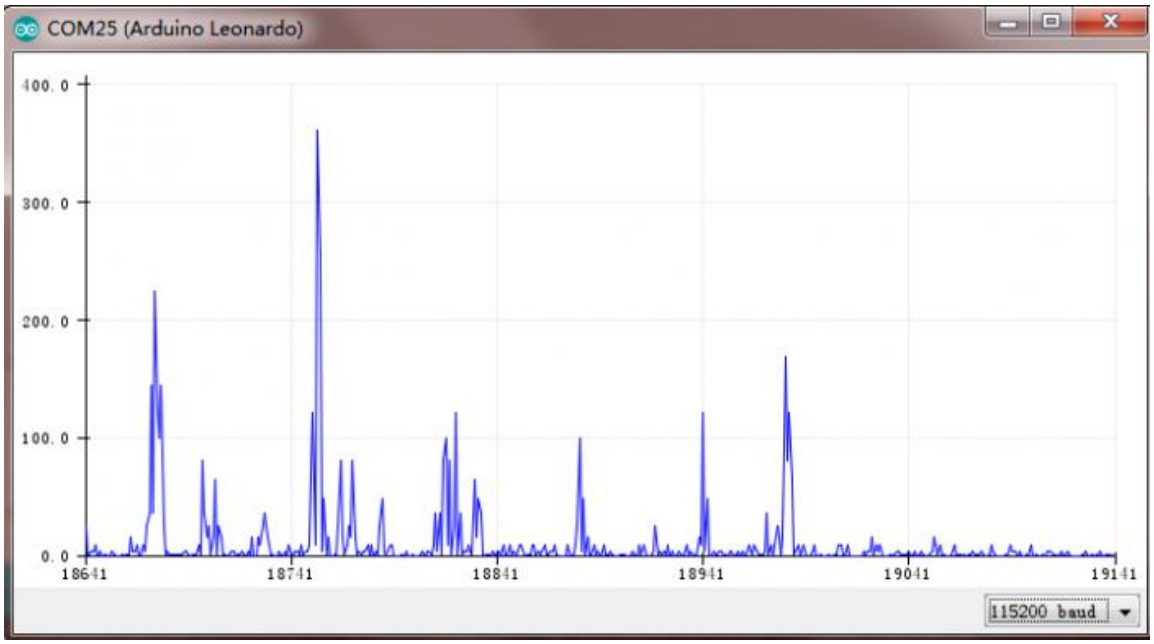
5.Demo code (complex the following code to arduino)

key point: when using it, you must disconnect the power supply of the notebook computer to produce the correct waveform.

```
/*
 * Wuxi Sichiray Co.,Ltd
 * The AliExpress store：Sichiray Store
 * Shop website：https://sichiray.aliexpress.com/store/1100735731
 * Mailbox：sichiraywuxi@gmail.com
 */
/*
Steering gear pin A1

Electrode pin A0

Turn the steering engine 90 degrees each time you make a fist

Return to zero at 180 degrees
*/


#include "EMGFilters.h"
#include <Servo.h>
```

```
#define servo_pin 9
#define SensorInputPin A0

#define servo_ag 90  //Turn the steering gear Angle each time you make a fist
#define servo_tm 180 / servo_ag

unsigned long ServoThreshold =10000;//Steering gear threshold
unsigned long threshold = 70;  // filtering threshold
unsigned long EMG_num = 0;
Servo sg90;
EMGFilters myFilter;
/*
 * Wuxi Sichiray Co.,Ltd
 * The AliExpress store: Sichiray Store
 * Shop website: https://sichiray.aliexpress.com/store/1100735731
 * Mailbox: sichiraywuxi@gmail.com
 */
SAMPLE_FREQUENCY sampleRate = SAMPLE_FREQ_500HZ;
NOTCH_FREQUENCY humFreq = NOTCH_FREQ_50HZ;
void setup() {
  myFilter.init(sampleRate, humFreq, true, true, true);
  sg90.attach(servo_pin);
  Serial.begin(115200);
}
void loop() {
  int data = analogRead(SensorInputPin);
  int dataAfterFilter = myFilter.update(data);
  int envelope = sq(dataAfterFilter);
  envelope = (envelope > threshold) ? envelope : 0;
  if (threshold > 0) {
//    if (myFilter.getEMGCount(envelope)) {
  if (envelope>ServoThreshold) {
      if (EMG_num > servo_tm - 1) {
        EMG_num = 0;
        sg90.write(0);
        delay(500);
```

```
      } else {
        EMG_num++;
        sg90.write(servo_ag * EMG_num);
        delay(500);
      }
    }
  }
  Serial.println(envelope);
  //Serial.println(data);
  delayMicroseconds(500);
}
/*
 * Wuxi Sichiray Co.,Ltd
 * The AliExpress store: Sichiray Store
 * Shop website: https://sichiray.aliexpress.com/store/1100735731
 * Mailbox: sichiraywuxi@gmail.com
 */
```



Operation video

(A file named video1.mp4 can be found in the zip package)

> 1. Why doesn't the steering gear turn?
>
> Check whether the cable connection is correct, whether the laptop is unplugged, and wet your skin with water
>
> 2. Why do you keep moving
>
> Check whether the steering gear is broken, whether the code is burned correctly, re-burn one side of the code, power off and restart