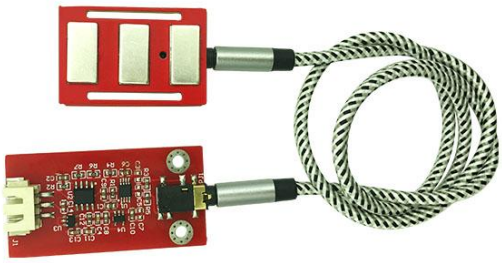
Sample code of dry electrode electromyography STM32



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 measurement of dry electrode myoelectric sensor has the advantages of non-invasive, non-invasive, simple operation and so on, and can be used for human-computer interaction and other related applications. Although measuring muscle activity has always been used in medical research, with the improvement of microcontrollers and integrated circuits that are shrinking but more powerful, electromyography circuits and sensors are gradually applied to various control systems.

●the power supply voltage is between 3.3 and 5.5V, the power supply current is not less than 20mA, and the ripple and other noises are smaller. Recommend use a regulated DC voltage.
●the effective spectrum range of EMG signals is 20Hz ~ 500Hz. Recommend, analog-to-digital converter (ADC) with a resolution of not less than 8bit and an effective sampling frequency of not less than 1kHz is used for sampling and digitization to retain as much original information as possible.
●the matching metal dry electrode plate should be adopted, and the electrode plate should be kept consistent with the muscle direction.
●this product is not a professional medical instrument and cannot be used as an auxiliary accessory to participate in diagnosis and treatment.

二、Technical specifications

1. Dry electrode myoelectric sensor

- Supply voltage: +3.3V ~ 5.5V
- Output voltage: 0~3.0V
- Detection range: +/-1.5mV
- Electrode interface: PJ-342
- Interface to the module: XH2.54-3P

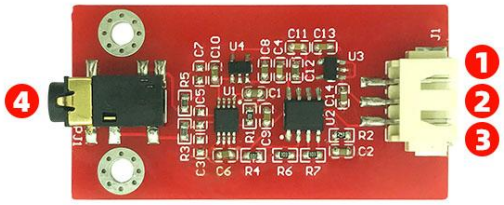
- Output range: 0 to 3.0V
- Operating temperature: 0 ~ 50℃
- Board size: 25* 48mm

2. Dry electrode lead plate

- Electrode interface: PJ-342
- Electrode length: 50cm
- Board size: 23 * 35 mm

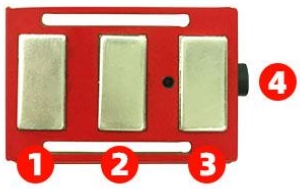
三、Interface description

1. Dry electrode myoelectric sensor



- 1 --> Negative power input
- 2 --> Power input positive (3.3 ~ 5.5V)
- 3 --> Analog signal output (0~3.0V)
- 4 --> PJ-342 Dry electrode port

2. Dry electrode lead plate



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

四、Operation procedure

1. Hardware configuration list

- stm32 Control board ×1;
- electromyography sensor signal processing board ×1;
- electromyography sensor dry electrode ×1;
- dry electrode connection cable ×1;
- 3P analog signal cable ×1;

2.Software configuration

① Install the Keil5 and Arduino IDE

- Keil5 is a paid software, please find your own online resources to download.

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

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> Why download and install Arduino IDE?
>
> Because Keil5 software itself does not have a plotter. Therefore, you need to use Arduino IDE serial port plotter to see the waveform.

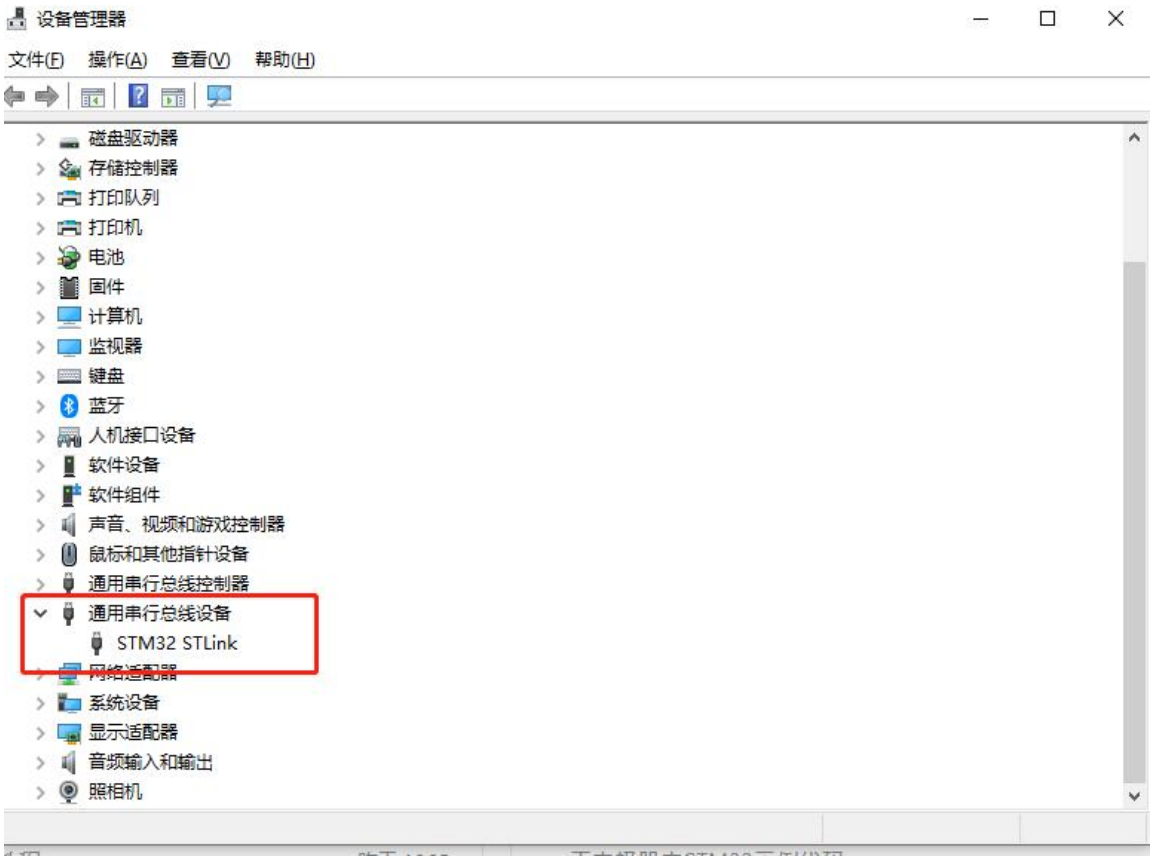
② install the stlink driver of the recorder

（A file named en.stsw-link009(1).zip can be found in the zip package）

Reference document：https://blog.csdn.net/fanchenzzz/article/details/107164822

③ view the port

（A file named how do I view the serial port.pdf can be found in the zip package）



④ wiring

GND-GND

5V-5V

sig-A0

stlink -stm32

gnd-gnd

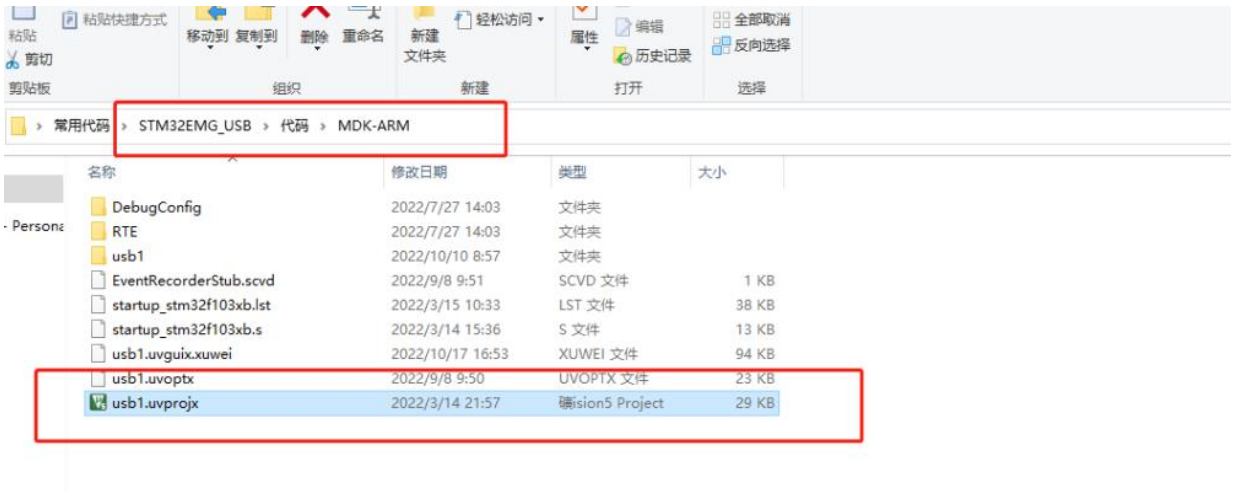
3.3-3.3

swclk-swcik

swdio-swdio

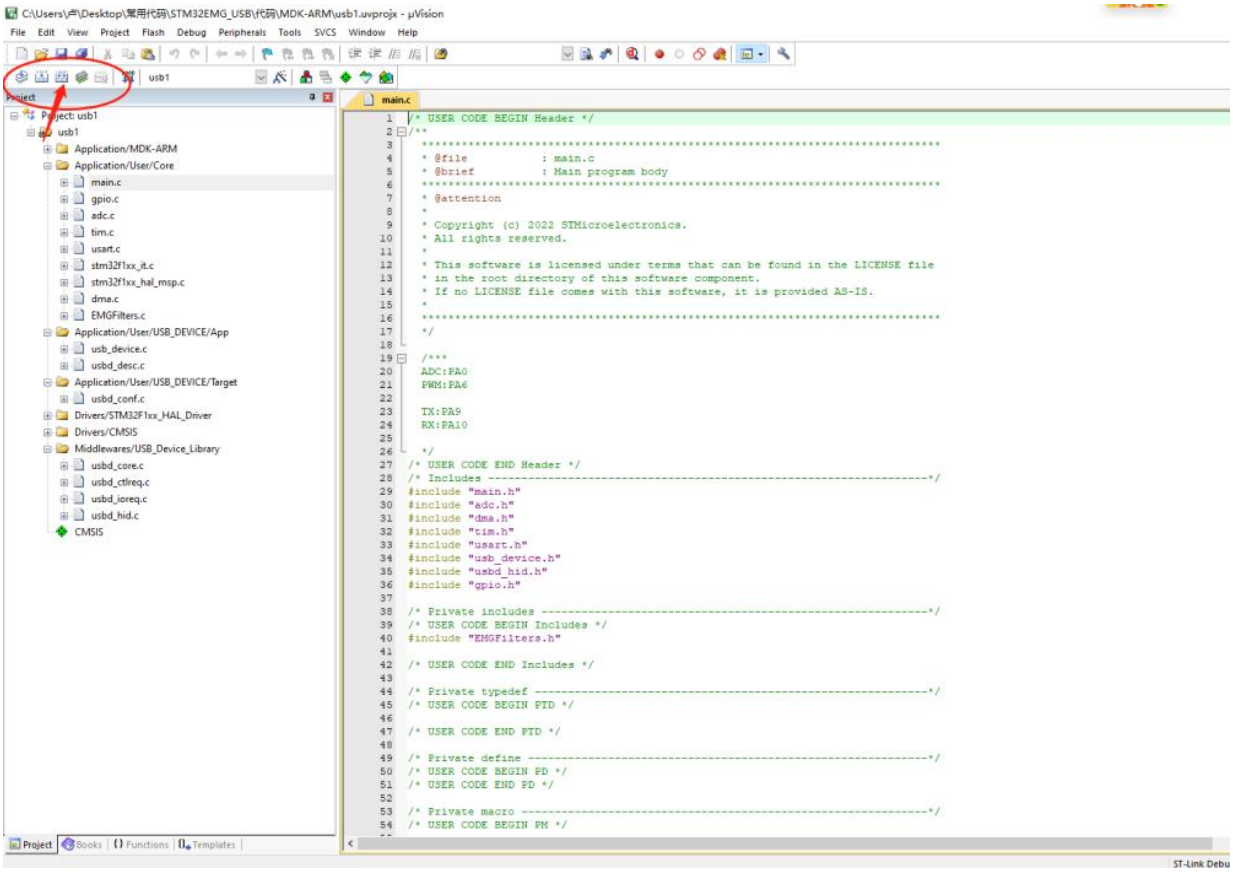
⑤ Open the code file

（A file named code(3).zip can be found in the zip package）



⑥ Upload code

> Important: When using the laptop must be disconnected from the power supply to produce the correct waveform

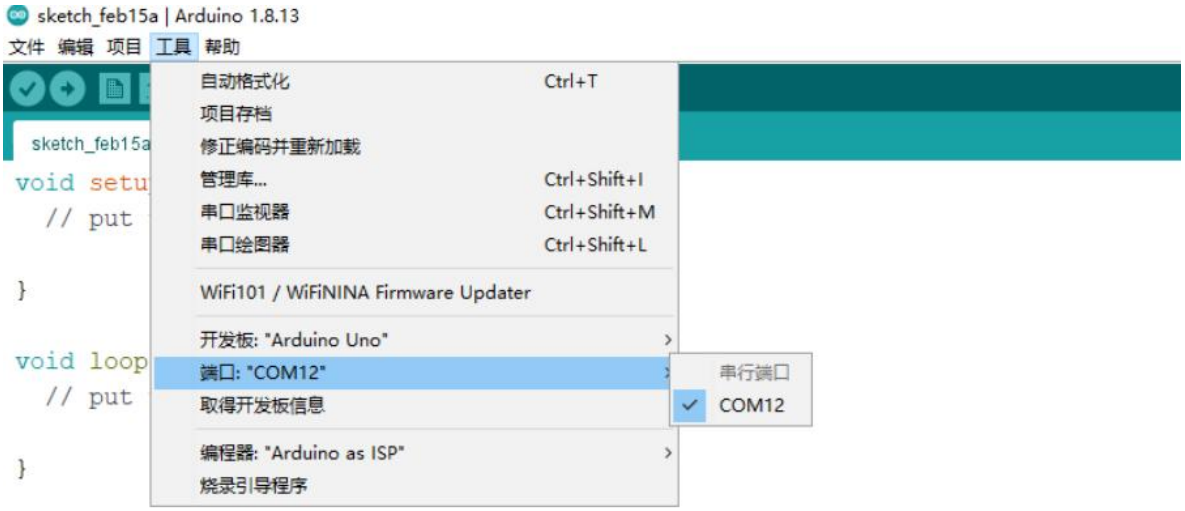


The code is uploaded successfully.

⑦ Double-click to open the Arduino IDE

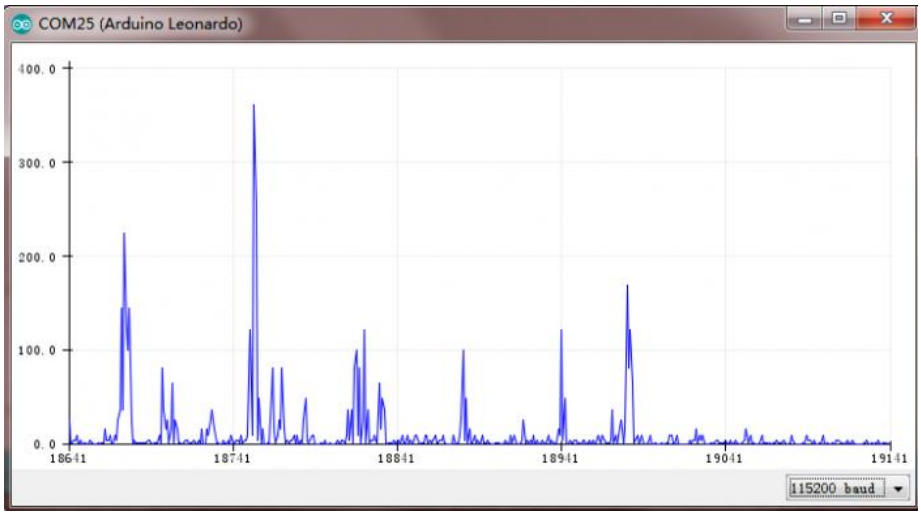
a Select port

Find "Port" first, Then select the corresponding "port" ("Tools" -- "Ports" -- Select "corresponding port number") 。



b Serial plotter

Select "Tools" - "Serial port Plotter", bottom right "baud rate 115200", you can display the waveform.



Why choose Arduino IDE Serial Plotter to view waveforms?

A: The Keil5 software itself does not come with a plotter. Therefore, to see the waveform, you need to use the serial port plotter of Arduino IDE.

⑧ Operation video

此处为语雀视频卡片，点击链接查看：stm32 干电极.mp4