# USB TO UART/I2C/SPI/JTAG

## Specification

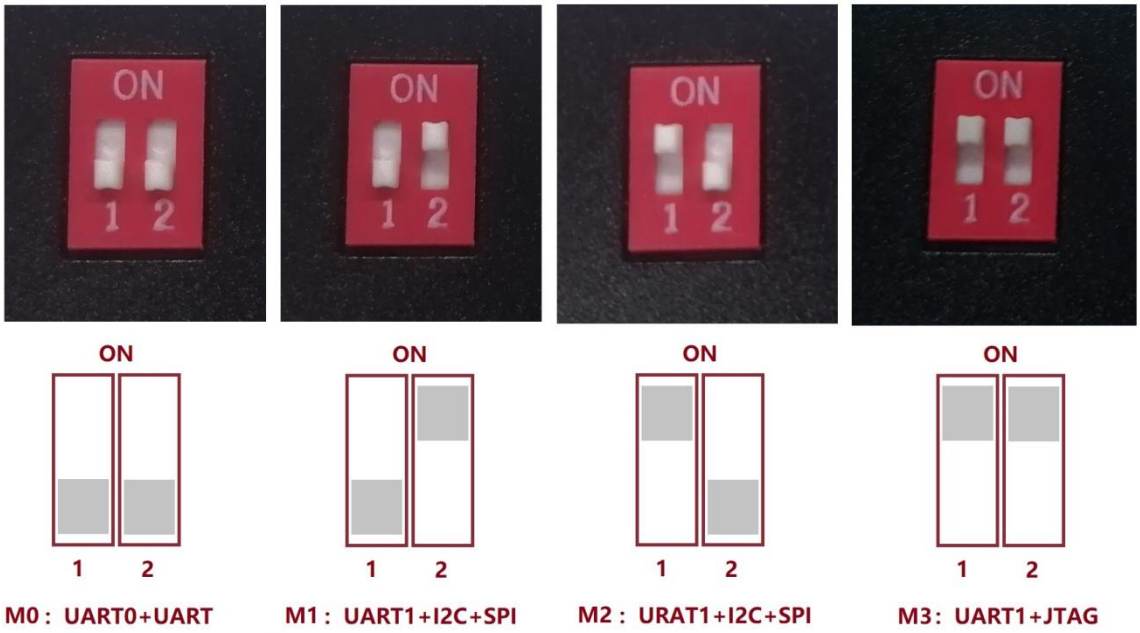
| Parameter Name | | Parameters |
|---|---|---|
| Product Type | | Industrial USB to UART/I2C/SPI/JTAG Converter |
| Power Supply | | USB port, 5V |
| Operating Current | | 55mA~65mA |
| Operating Voltage | | 3.3V/5V (select via onboard switch)) |
| Operating Temperature | | -40℃~85℃ |
| Operating System | | Linux, Windows 11 / 10 / 8.1 / 8 / 7 |
| USB | Connector | USB-B |
| | Interface Protection | Resettable fuse, ESD protection |
| UART | Support Channels | 2 (the red DIP switch needs to be set to M0 mode) |
| | Connector | 6PIN IDC connector |
| | Baudrate | 1200bps ～ 9Mbps (M0 mode) |
| | | 1200bps ～ 7.5Mbps (M1/M2/M3 mode) |
| | Hardware Flow Control | CTS & RTS |
| I2C | Support Channels | 1 (the red DIP switch needs to be set to M1/M2 mode) |
| | Interface Form | 12PIN IDC connector (the first 4 pins are I2C) |
| SPI | Support Channels | 1 (the red DIP switch needs to be set to M1/M2 mode) |
| | Interface Form | 12PIN IDC connector (the last 8 pins are SPI) |
| JTAG | Support Channels | 1 (the red DIP switch needs to be set to M3 mode) |
| | Connector | 12PIN IDC connector (the last 8 pins are JTAG) |

## Function Description

- USB TO UART/I2C/SPI/JTAG is a high-speed USB bus adapter device that supports USB to 2-ch UART, USB to 1-ch UART + 1-ch I2C + 1-ch SPI, USB to 1-ch UART + 1-ch JTAG.
- In Mode 0, the product provides 2x high-speed UART channels.
- In Mode 1 or Mode 2, the product provides 1x high-speed UART channel, 1x I2C interface (SCL and SDA lines), and 1 4-wire SPI interface (CS line, SCK line, SDI/MISO line, SDO/MOSI line).
- In Mode 3, the product provides a JTAG interface, supporting either a 4-wire or 5-wire interface (TMS, TCK, TDI, TDO, and TRST lines).
- In Mode 2, it operates as an HID plug-and-play device (Human Interface Device) and does not require drivers. Therefore, the newly added device may not be visible as a new port in the Device Manager.
- I2C and SPI are for Host/Master mode.

## Mode Description

**Please adjust the mode before powering on it.**




## Interface Description

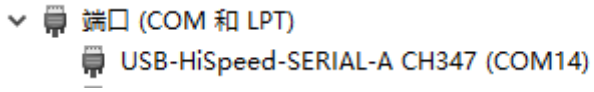


# Windows

## Environment Building

## Driver Installtion

The installation provides CH341PAR and CH343SER (driver demo), and you can view the serial port and corresponding ports through the device manager.




- Another viewing way: Go to Device Manager -> click "View" at the top -> "List Devices by Connection" -> select "ACPI x64 based computers" -> "PCI Express Root Complex" -> "Intel(R) USB 3.20 Scalable Host Controller - 1.20 (Microsoft)" (varies from computer to computer). "PCI Express Root Complex" -> "Intel(R) USB 3.20 Scalable Host Controller - 1.20 (Microsoft)" (may vary from computer to computer) -> "USB Root Hub (USB 3.0)" -> CH347 related devices can be found in "USB Composite Device" of multiple "Universal USB Hubs".
- Note: A serial port exists for all modes except mode 0.

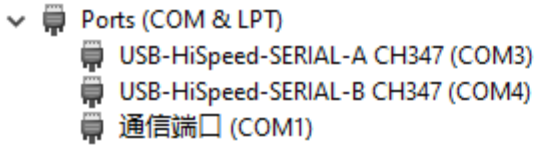
## Python IDLE Environment Building

- Install Python IDLE (Installation address: Python IDLE), please select and add to PATH when installing.
- Click "WIN + R", type cmd, enter pip install pyserial in the window and make sure the pyserial library is installed.

```
pip install pyserial
```

# UART Interface Usage Demo

If you want to use two UART ports, you can switch to Mode0 and then connect to the PC.

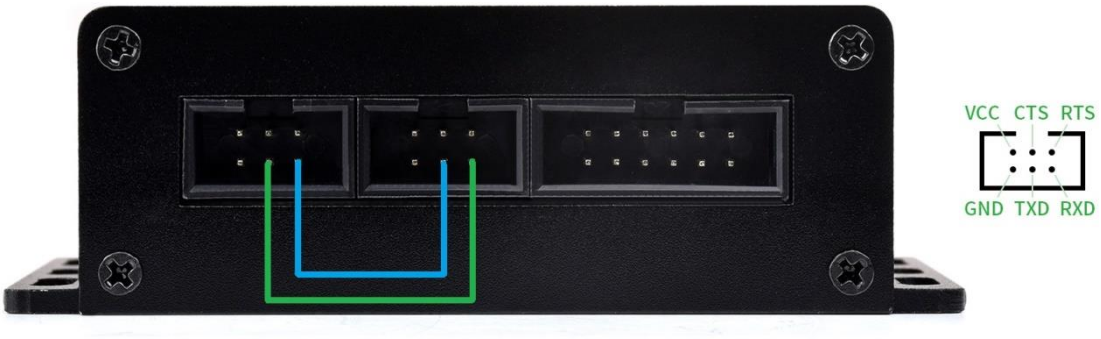



## UART Self-Transmission and Reception Communication in SSCOM

The following is using two serial ports of the product to perform self-transmission and reception. Please switch to mode0.

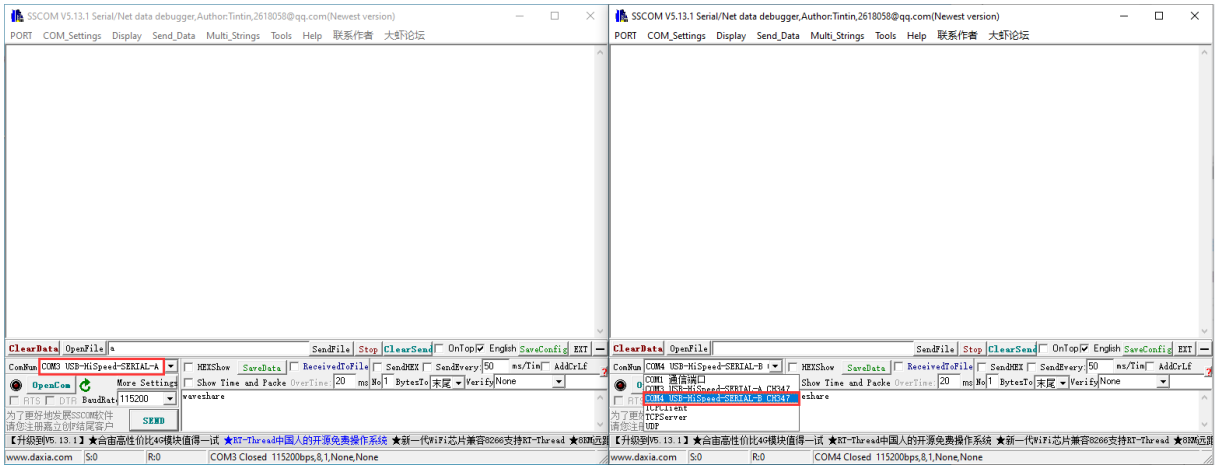
## *Hardware Connection*

| USB TO UART/I2C/SPI/JTAG(UART0) | USB TO UART/I2C/SPI/JTAG(UART1) |
|---|---|
| UART0.TXD | UART1.RXD |
| UART0.RXD | UART1.TXD |

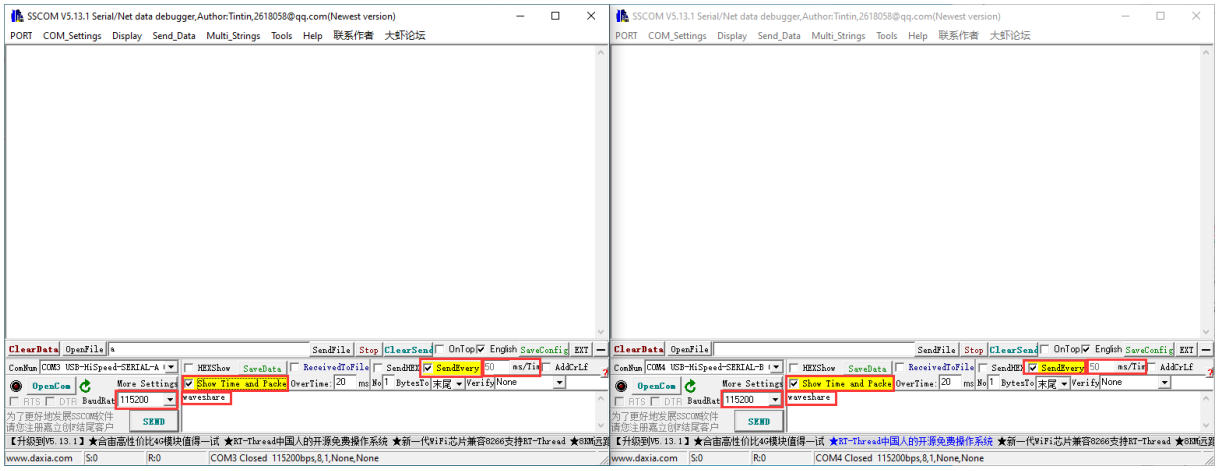



## *Software Operation*

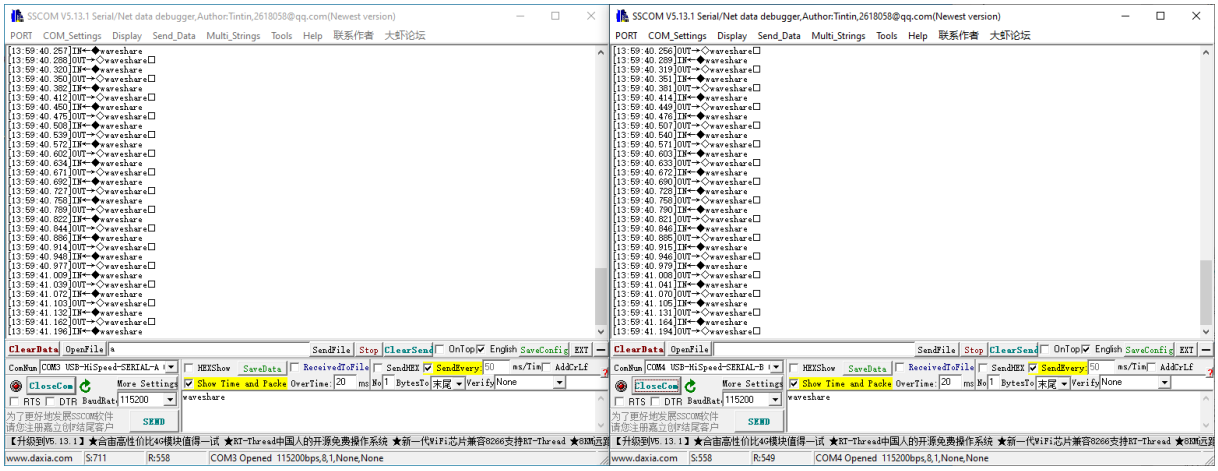
- Enable two SSCOM demos, and select two COM ports of the product.



- Set to the same baud rate, enter the characters to be sent, select "Add time stamp and packet display", and set "50ms/time, timed send".



- Click on "Open Serial Ports" to receive data as shown below:

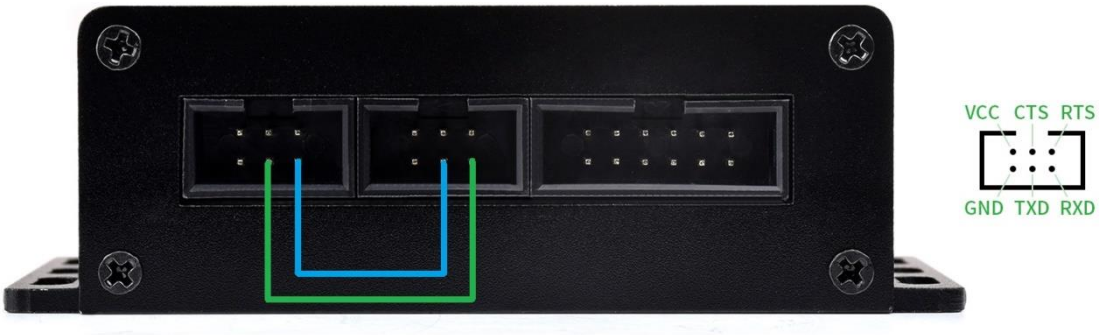


## UART Self-Transmission and Reception Communication in Python IDLE

The following is a demonstration of self-sending and receiving using the product's two serial ports. (Sample demo)

### *Hardware Connection*

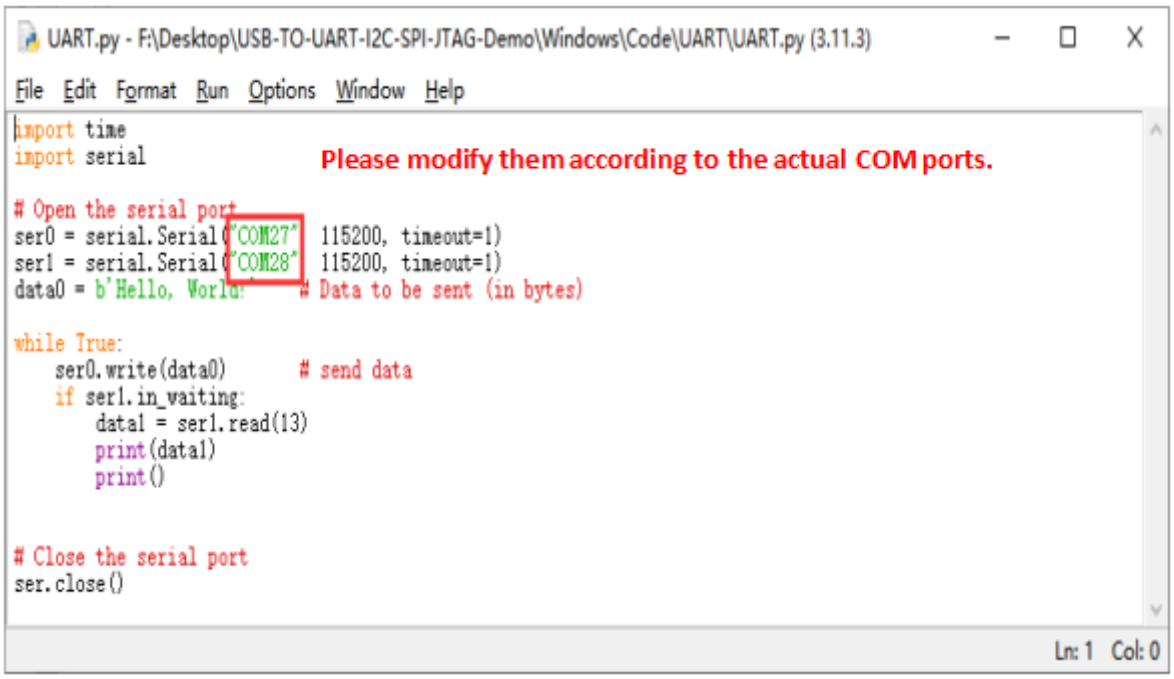
| USB TO UART/I2C/SPI/JTAG(UART0) | USB TO UART/I2C/SPI/JTAG(UART1) |
|---|---|
| UART0.TXD | UART1.RXD |
| UART0.RXD | UART1.TXD |



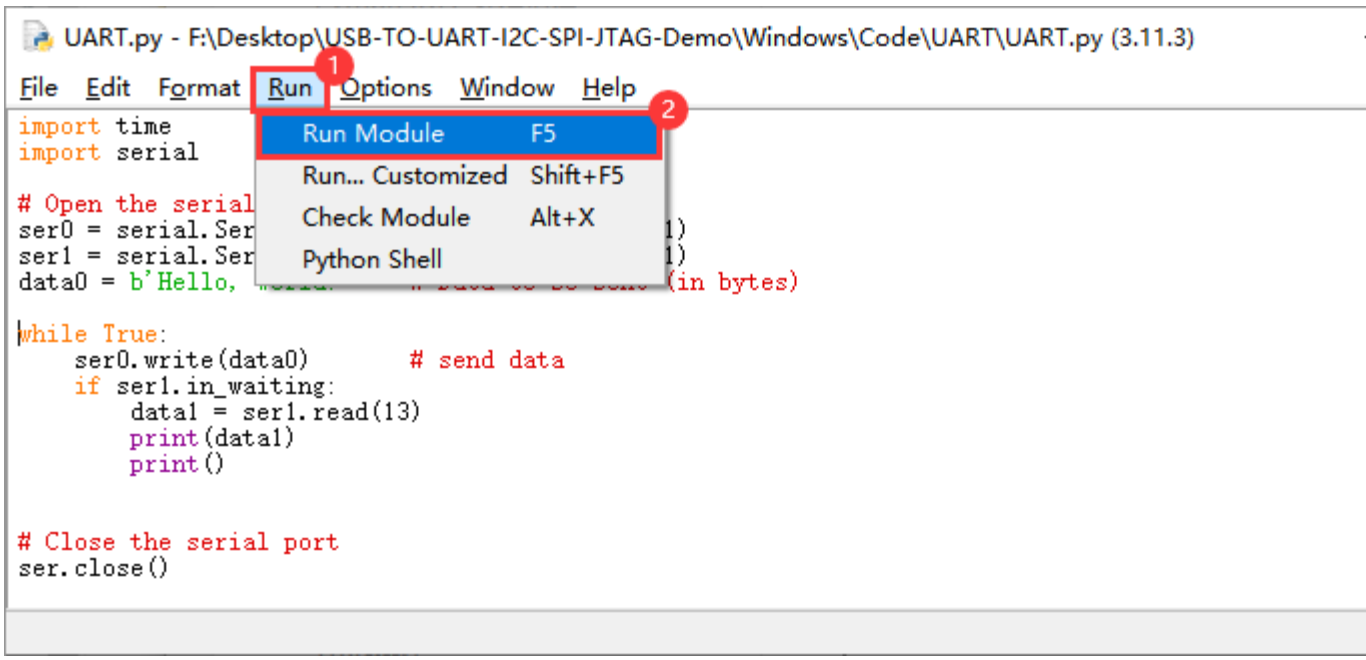

## *Software Operation*

- Open Python IDLE, click "File -> Open..." at the top. ", go to the sample demo"... /USB-TO-UART-I2C-SPI-JTAG-Demo/Windows/Code".

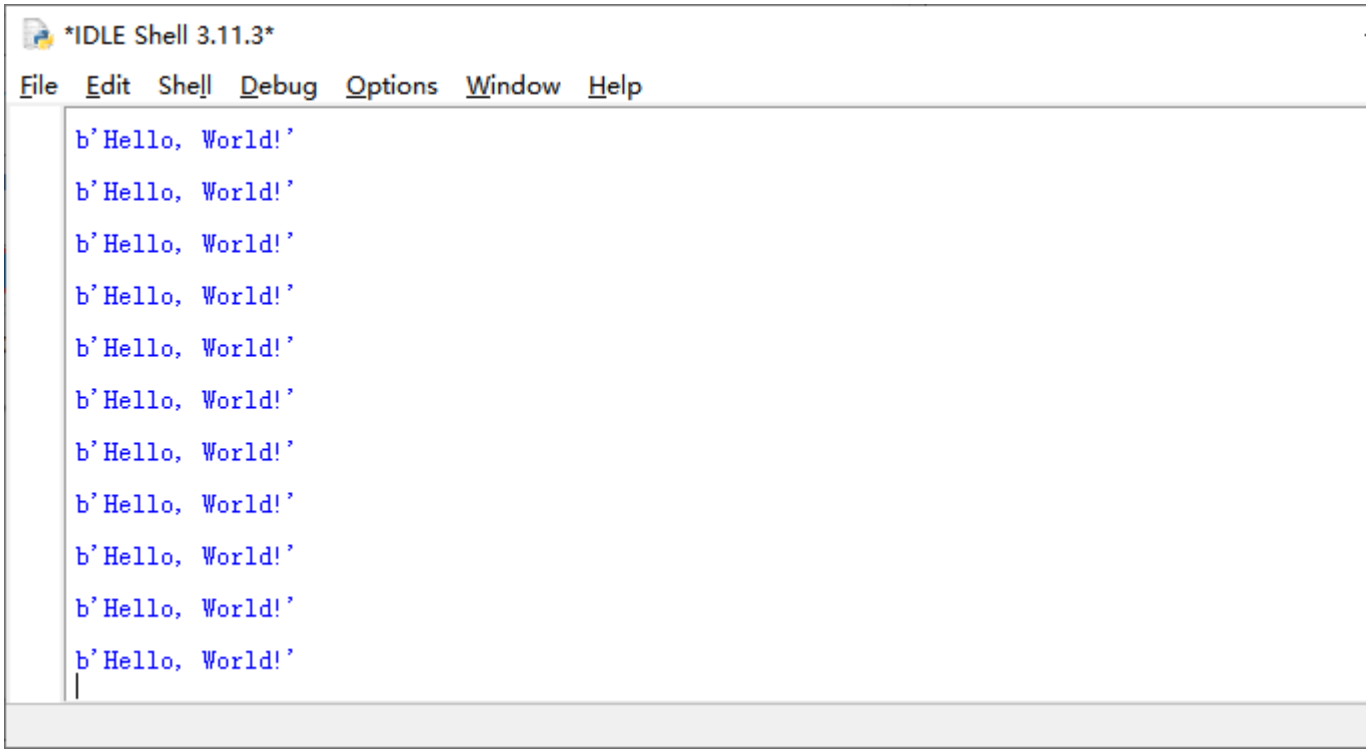
- Go to the UART folder, and choose to open the UART.py file (please check if it is the corresponding port.)




- Click "Run" -> "Run Module" or directly click F5 to run the demos.




- The effects as shown below:




## How to Use I2C Interface

If you want to use the serial port debugging assistant to send and receive UART when using I2C or SPI, please switch the mode to Mode 1 (Mode 2 is HID driverless mode and will not be displayed in the port).

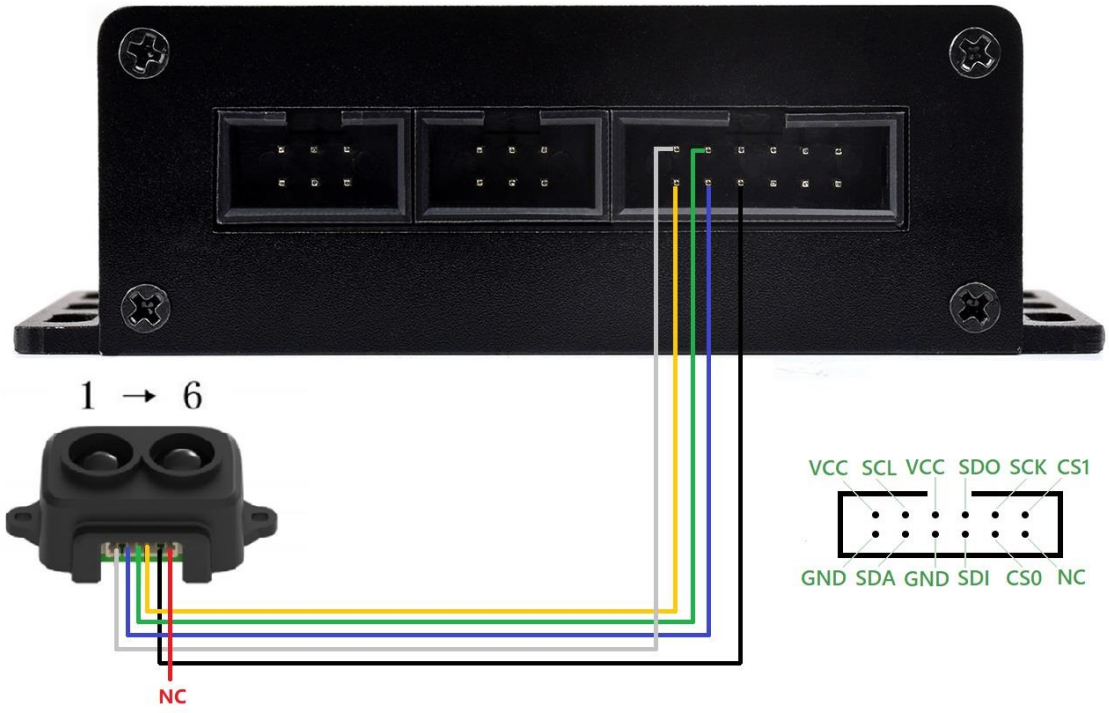
## I2C Gets Range Measuring Module Data In Python IDE

The following is a sample demo that demonstrates how to acquire data (TF-Luna-related information and pinout) from the TF-Luna in I2C mode using the product's I2C function. (Sample demo).

### *Hardware Connection*

Please set the mode switch to mode 1 or mode 2 and connect the computer after connecting the cable.

| Peripheral（TF-Luna） | USB TO UART/I2C/SPI/JTAG |
|---|---|
| Pin 1 | VCC |
| Pin 2 | I2C.SDA |
| Pin 3 | I2C.SCL |
| Pin 4 | GND |
| Pin 5 | GND (Connect it first, configure TF-Luna for I2C mode (required for TF-Luna)) |
| Pin 6 | N/C |

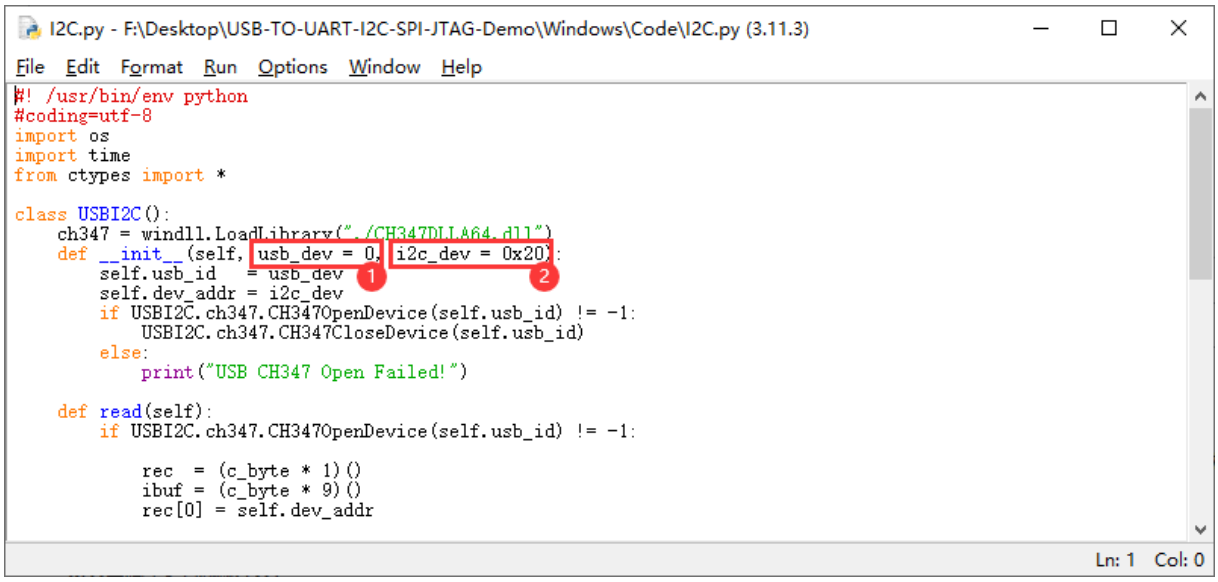


## *Software Operation*

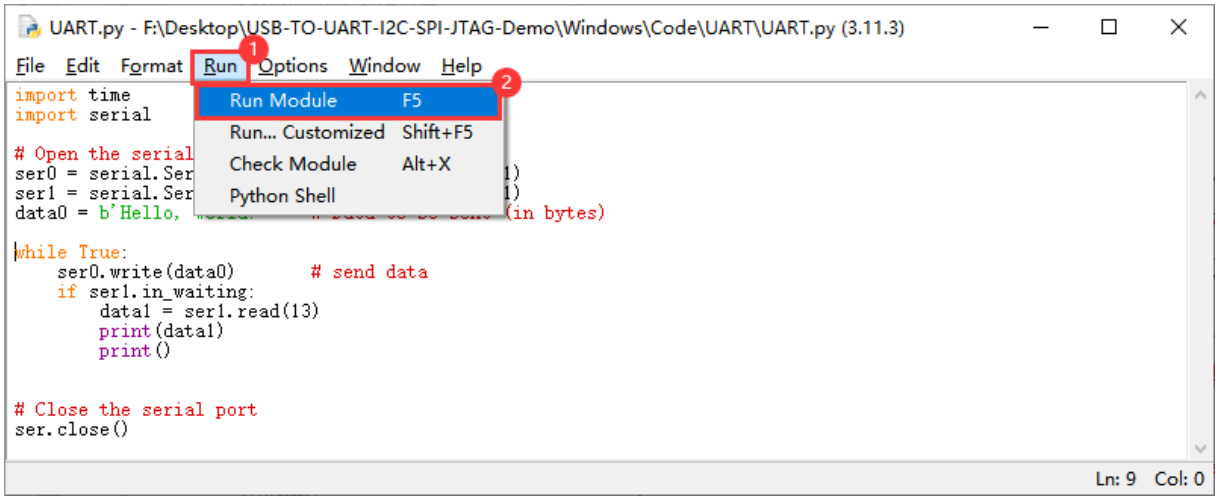
- Enable Python IDLE, click "File" -> Open... Enter the sample demo "../USB-TO-UART-I2C-SPI-JTAG-Demo/Windows/Code" (Sample demo).
- Enter the I2C file folder and select open I2C.py file.

① If you are using multiple USB TO UART/I2C/SPI/JTAG devices at the same time, please select the device at ① (similar to the device serial number, 0, 1, 2... etc.)

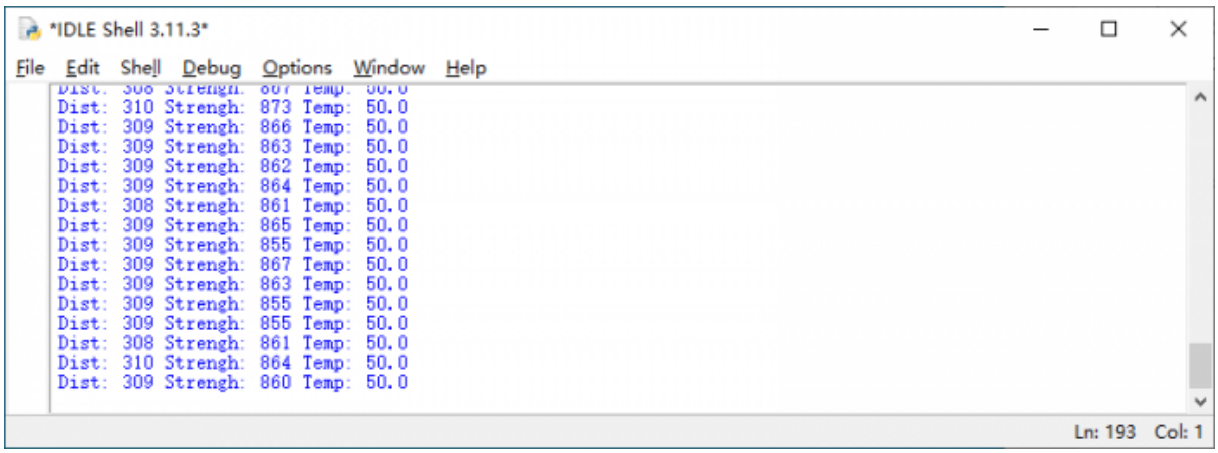
②Modify the I2C device address according to the actual need to operate.




- Click "Run" -> "Run Module" or directly click F5 to run the demo.




- The effects as shown below:




## I2C Debug Ranging Module Using Host Computer

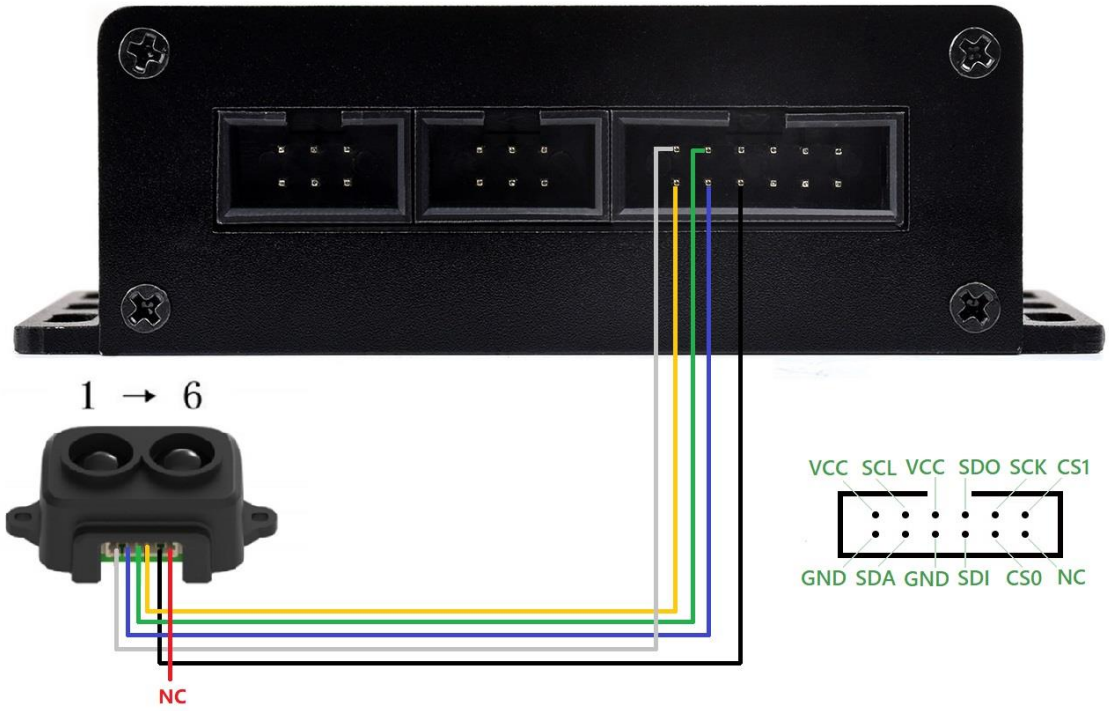
The following is a demonstration of using the I2C function of the product to turn on and off the data output of TF-Luna in I2C mode (TF-Luna-related information).

Download the I2C debugging software (USB TO UART_I2C_SPI_JTAG Software demo), no need to install it, directly open it to use.

### *Hardware Connection*

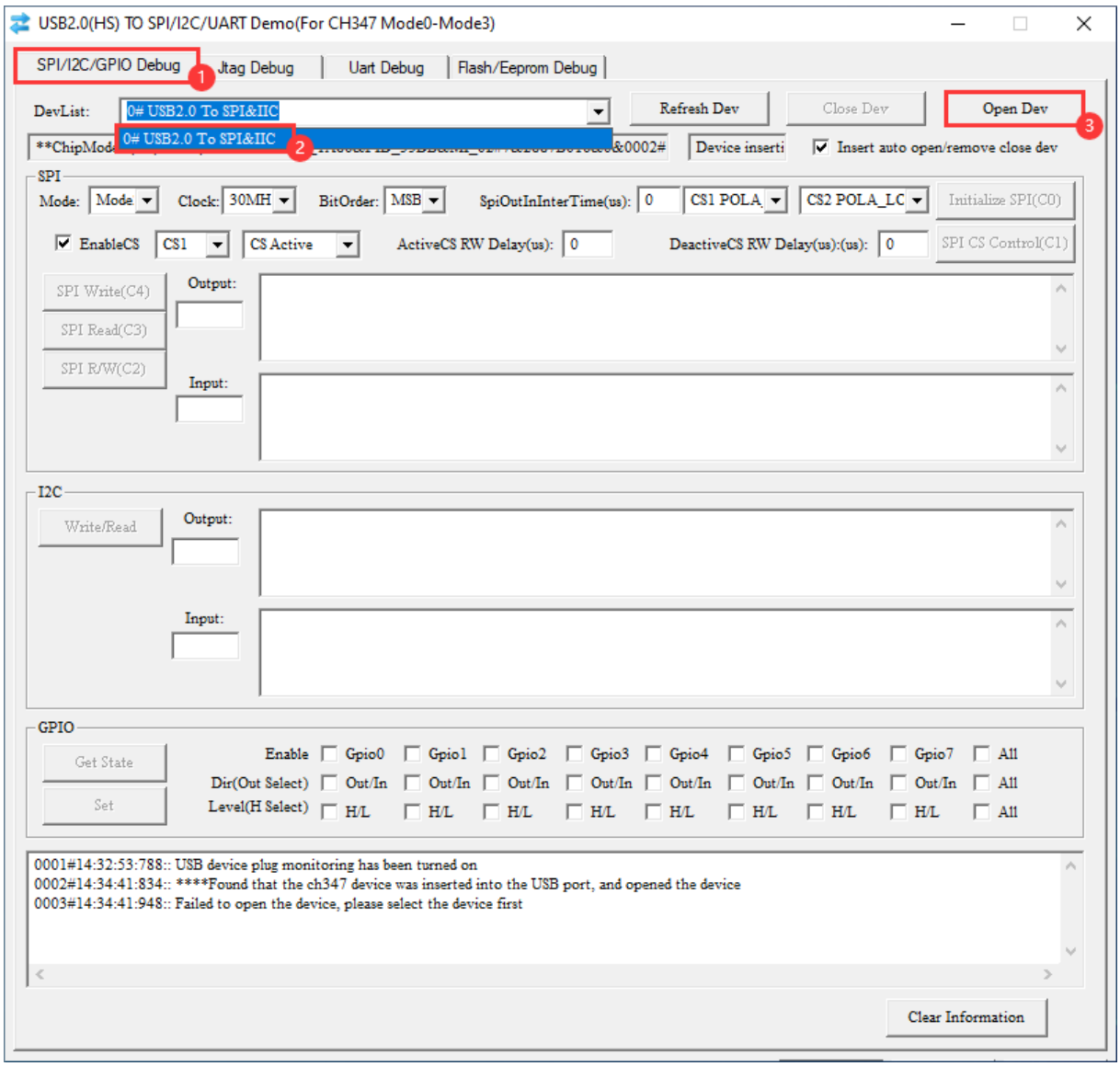
Please switch the mode to mode 1 or mode 2 and connect the computer after connecting the cable.

| Peripheral（TF-Luna） | USB TO UART/I2C/SPI/JTAG |
|---|---|
| Pin 1 | VCC |
| Pin 2 | I2C.SDA |
| Pin 3 | I2C.SCL |
| Pin 4 | GND |
| Pin 5 | GND (Connect IT FIRST, configure TF-Luna for I2C mode (required for TF-Luna)) |
| Pin 6 | N/C |




## *Software Operation*

- Enable USB TO UART_I2C_SPI_JTAG Demo software to enter the I2C debugging interface, and enable the device.

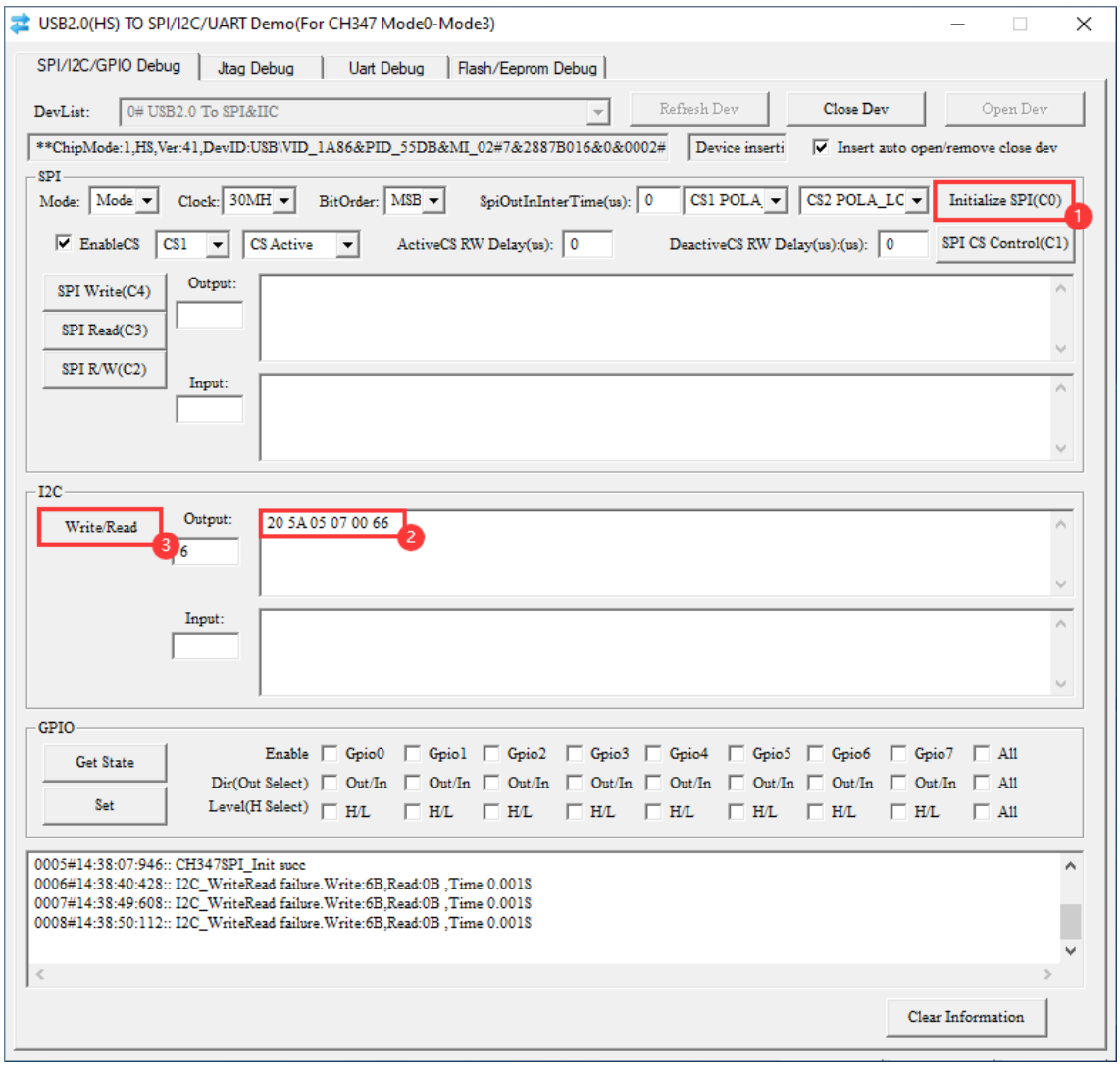



- Click Initialize SPI (the software and SPI share the same interface), don't care about those parameters before the initialization button.

- Input the data to be sent in the I2C input box (the input is hexadecimal data), and click Write/Read.

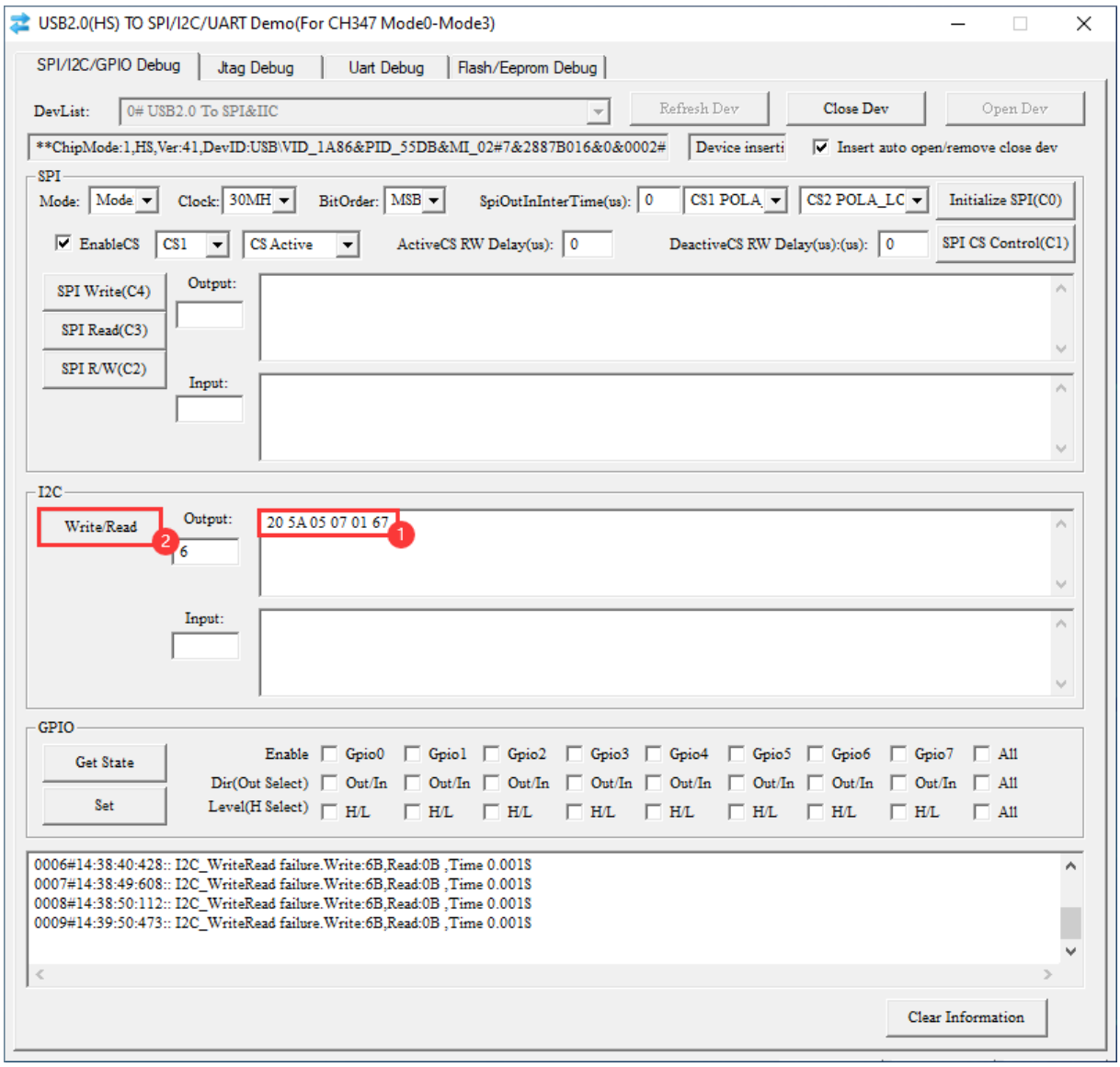
```
20 5A 05 07 00 66
```

1. Note that 0x20 is the I2C written address of TF-Luna.
2. "0x5A 0x05 0x07 0x00 0x66" is the command to disable TF-Luna data output. (The red indicator of TF-Luna will be off.)

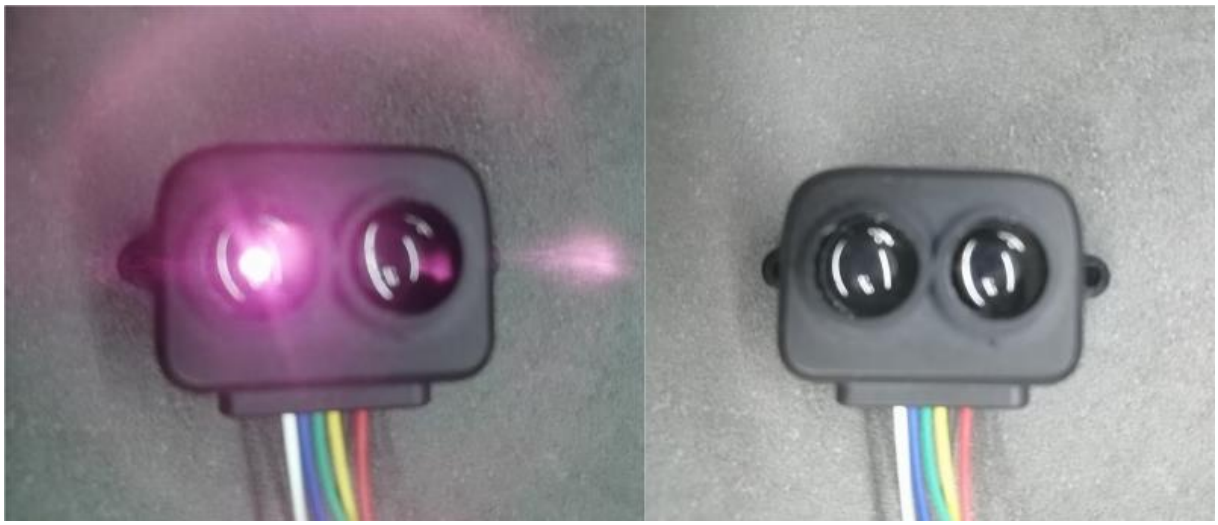



- Input 20 5A 05 07 01 67, clicking Write/Read will turn on the TF-Luna's data output (the TF-Luna's red light is on again).

```
20 5A 05 07 01 67
```




- The phenomenon is as follows (the shooting effect is more conspicuous than the human eye observation, please turn the TF-Luna to prevent the angle from not observing it).



## SPI Interface Usage Demo

If you want to use the serial port debugging assistant to send and receive UART when using I2C or SPI, please switch the mode to Mode 1 (Mode 2 is HID driverless mode and will not be displayed in the port).

## SPI Drives OLED Screen In Python IDLE

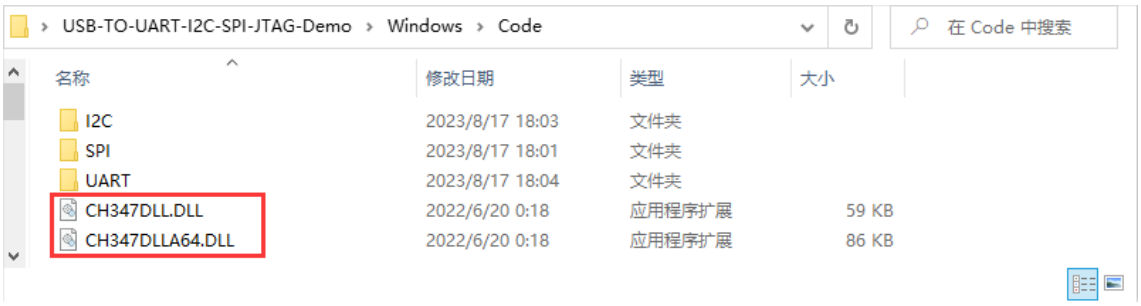
The following is a demonstration of using the product's SPI function to turn on an OLED in SPI mode (OLED-related information) (sample demo)

### *Environmet Debugging Description*

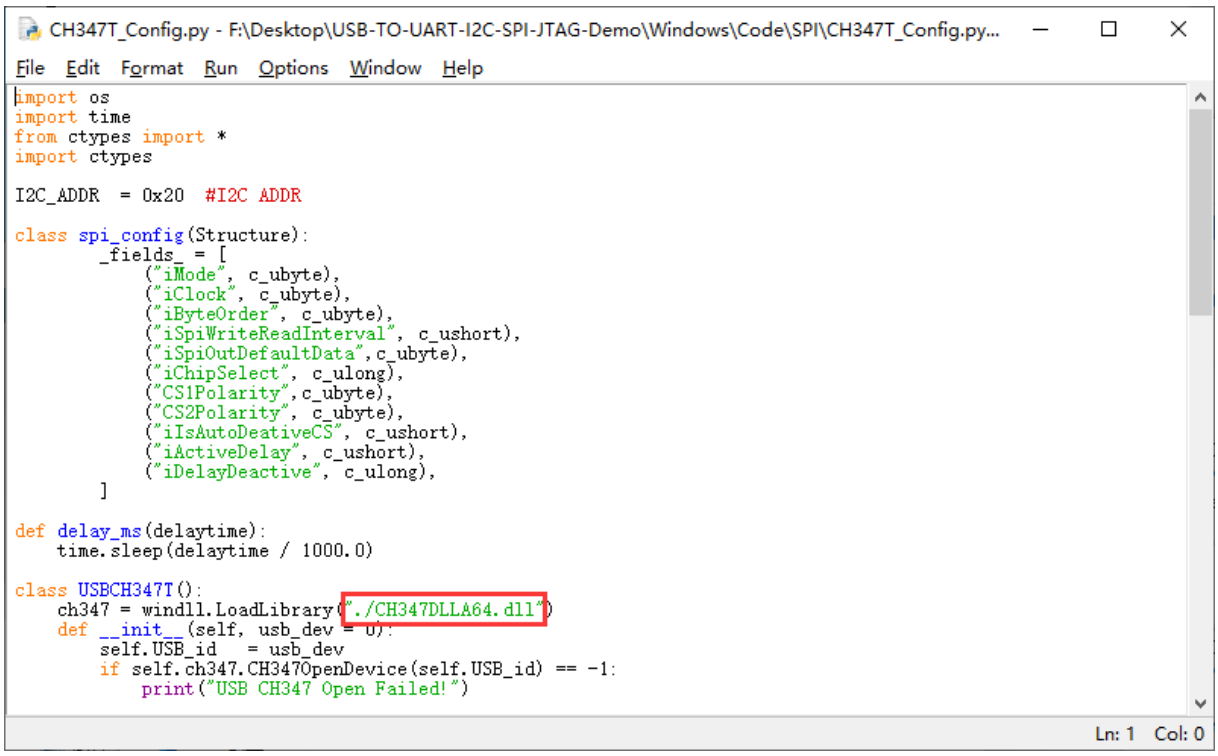
The current example has already been set up, so there is no need to do the following operation:

- 

The DLL file should be placed in the directory where the demo program is located, there are two DLL files stored in the sample file (corresponding to 64-bit system and 32-bit system respectively), please adjust according to the system.



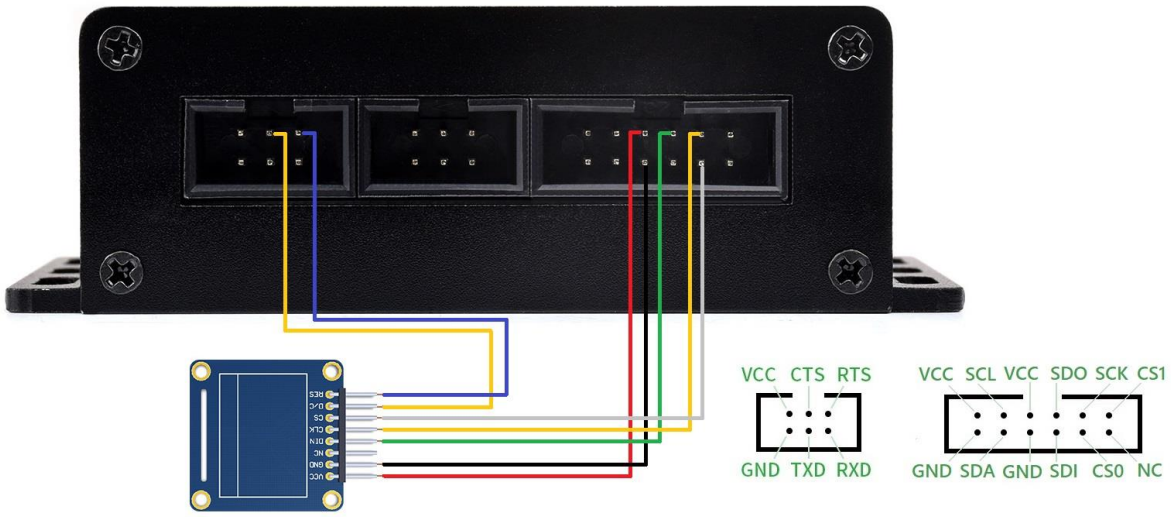

- Or you can modify the file path in the demo as the DLL file storage path.




## *Hardware Connection*

Please set the mode switch to mode 1 or mode 2 and connect the computer after connecting the cable.

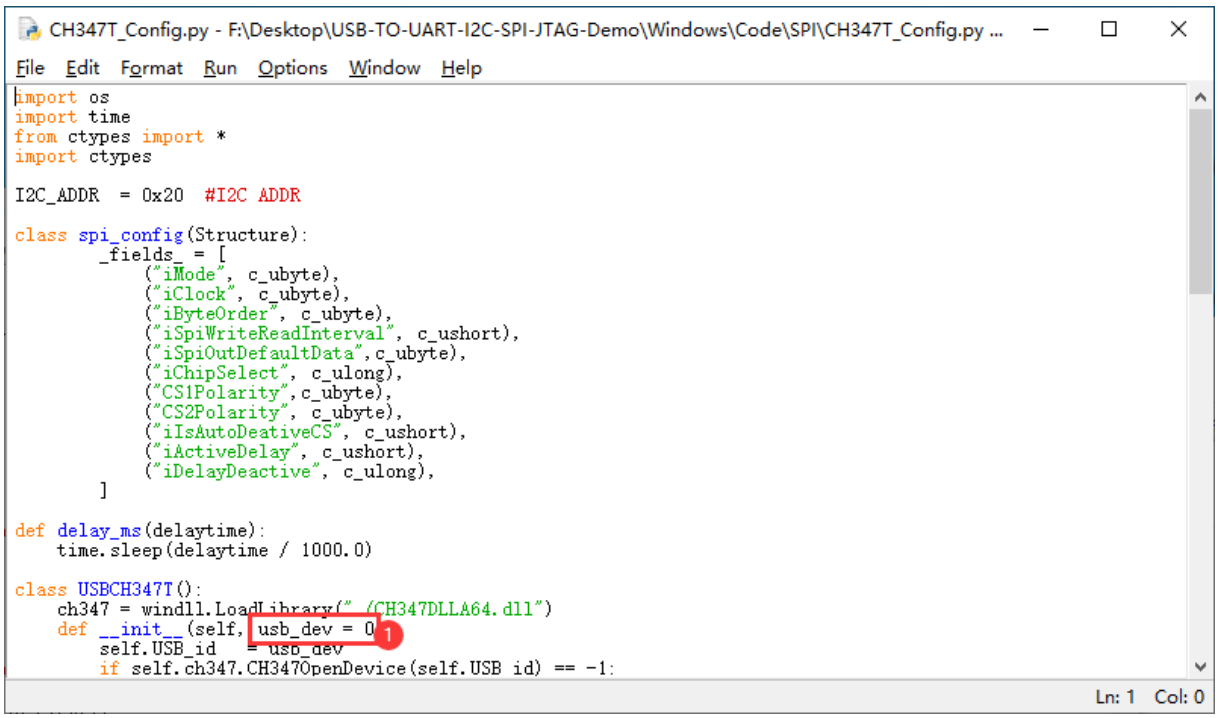
| Peripheral | USB TO UART/I2C/SPI/JTAG |
|---|---|
| RES | UART1.RTS (Used to control OLEDs for reset (required for OLEDs)) |
| D/C | UART1.CTS (Used to indicate whether a command or data is being sent (required for OLEDs)) |
| CS | SPI.CS0 |
| CLK | SPI.SCK |
| DIN | SPI.SDO |
| GND | SPI.GND |
| VCC | SPI.VCC |



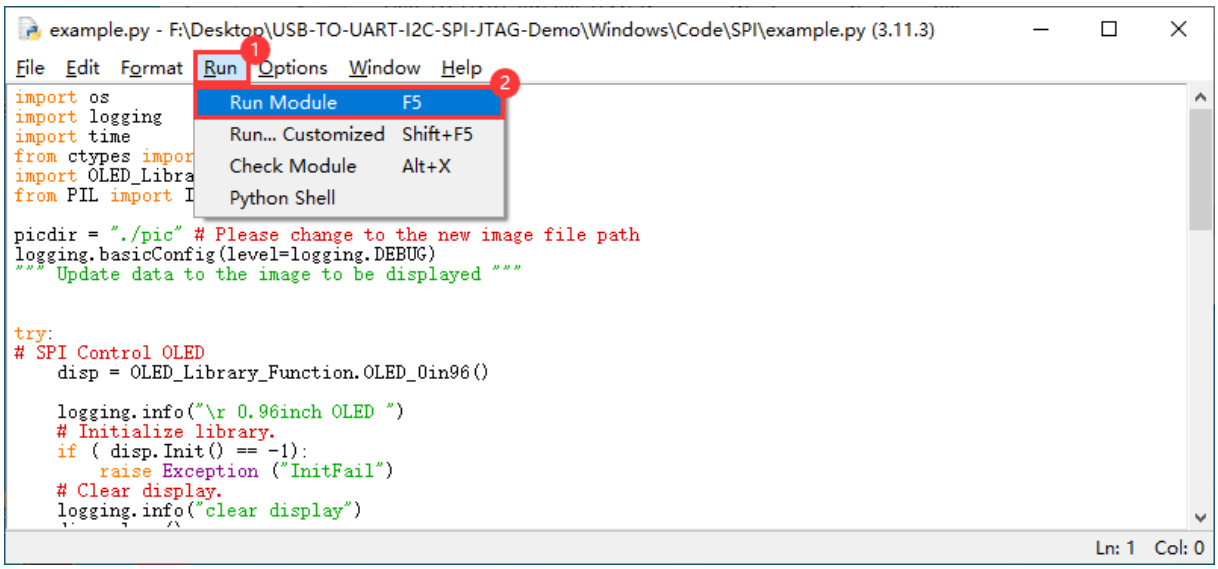

## *Software Operation*

- Open Python IDLE, click "File -> Open..." at the top. ", go to the sample demo "... /USB-TO-UART-I2C-SPI-JTAG-Demo/Windows/Code" (example demo).
- Go to the SPI folder, and choose to open the example.py file.

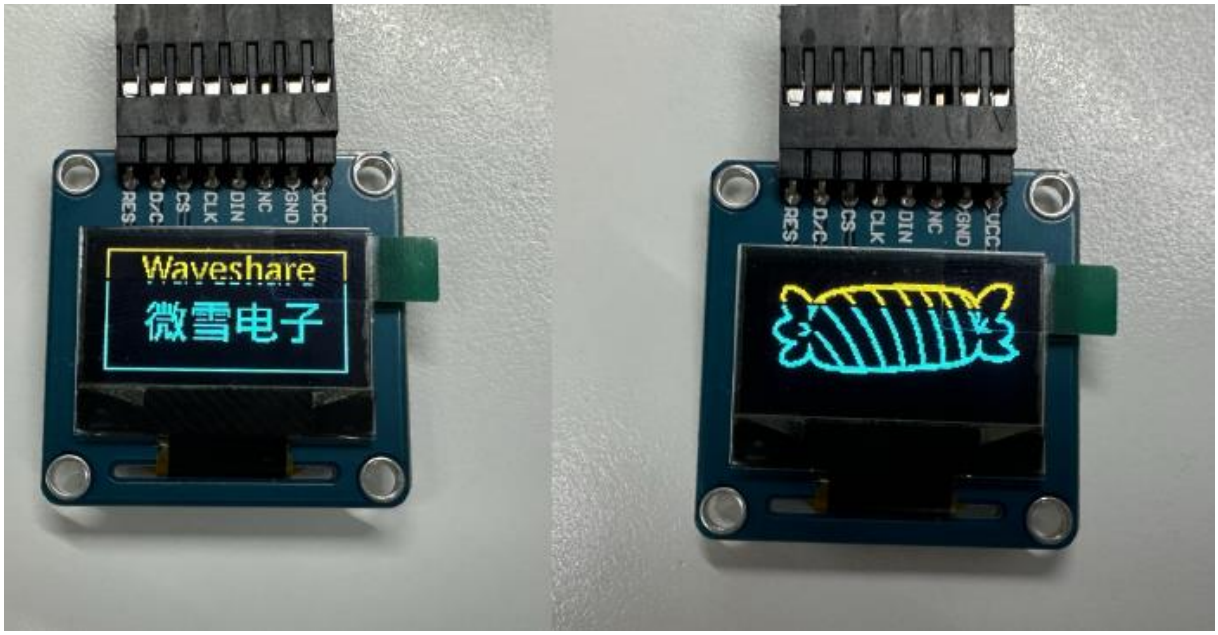
① If you are using more than one USB TO UART/I2C/SPI/JTAG device at the same time, please select the device at ① in the CH347T_Config.py file (similar to the device serial number, 0, 1, 2... etc.)




- Click "Run" -> "Run Module" or click F5 to run the demo.




- The effect is shown below:



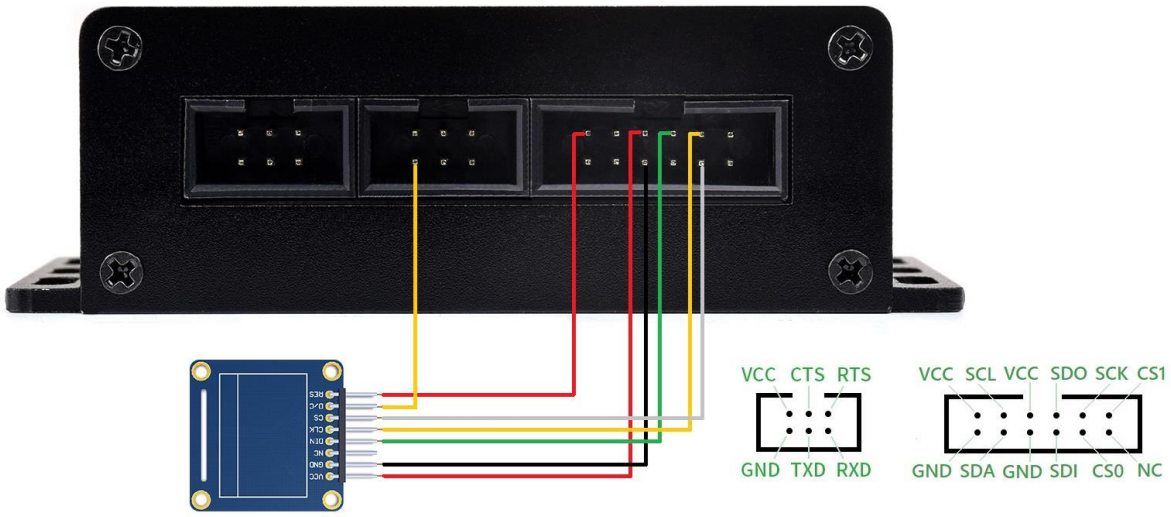

## SPI Debug OLED Screen Using Host Computer

The following is a demonstration of using the SPI function of the product to light up the OLED in SPI mode (OLED-related information) Download the SPI debugging software (USB TO UART_I2C_SPI_JTAG Software demo), no need to install, and directly open the use.

### *Hardware Connection*

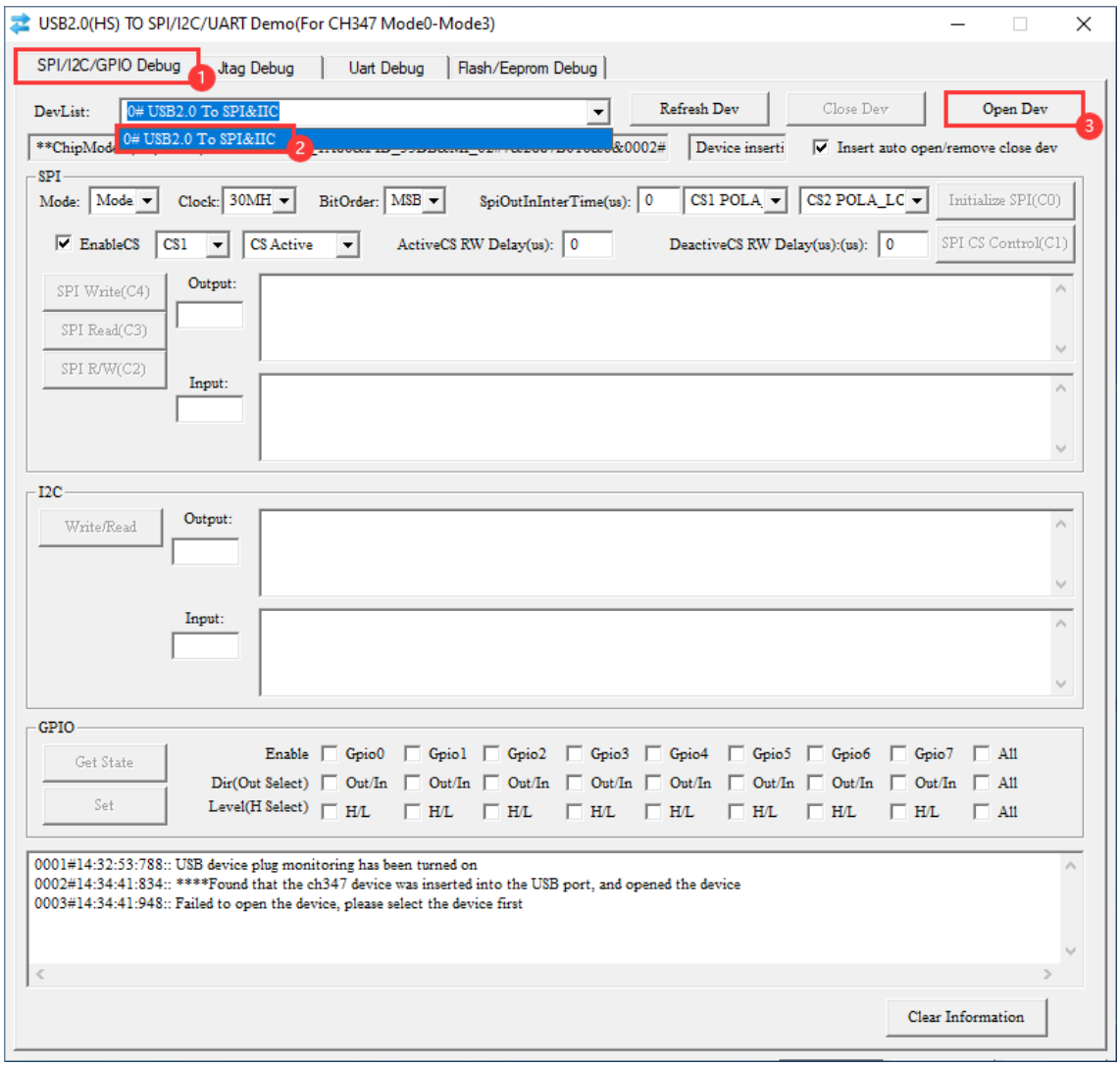
Please set the mode switch to mode 1 or mode 2 and connect the computer after connecting the cable.

| Peripheral | USB TO UART/I2C/SPI/JTAG |
|---|---|
| RES | I2C.VCC ((Keeping the OLED in operation (required for OLED)) |
| D/C | URAT0.GND (Used to indicate whether a command or data is being sent (required for OLEDs)) |
| CS | SPI.CS0 |
| CLK | SPI.SCK |
| DIN | SPI.SDO |
| GND | SPI.GND |
| VCC | SPI.VCC |

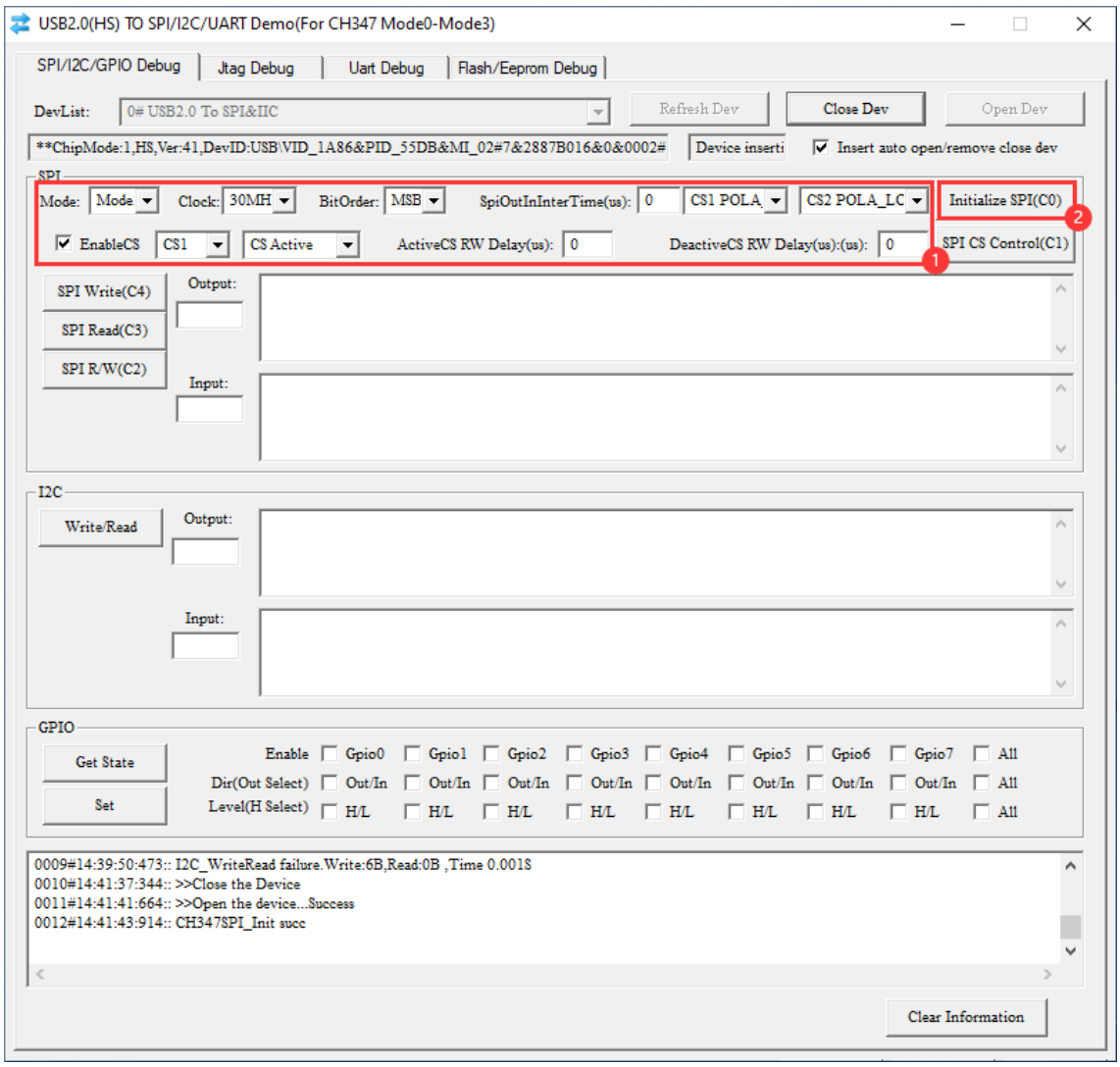



## *Software Operation*

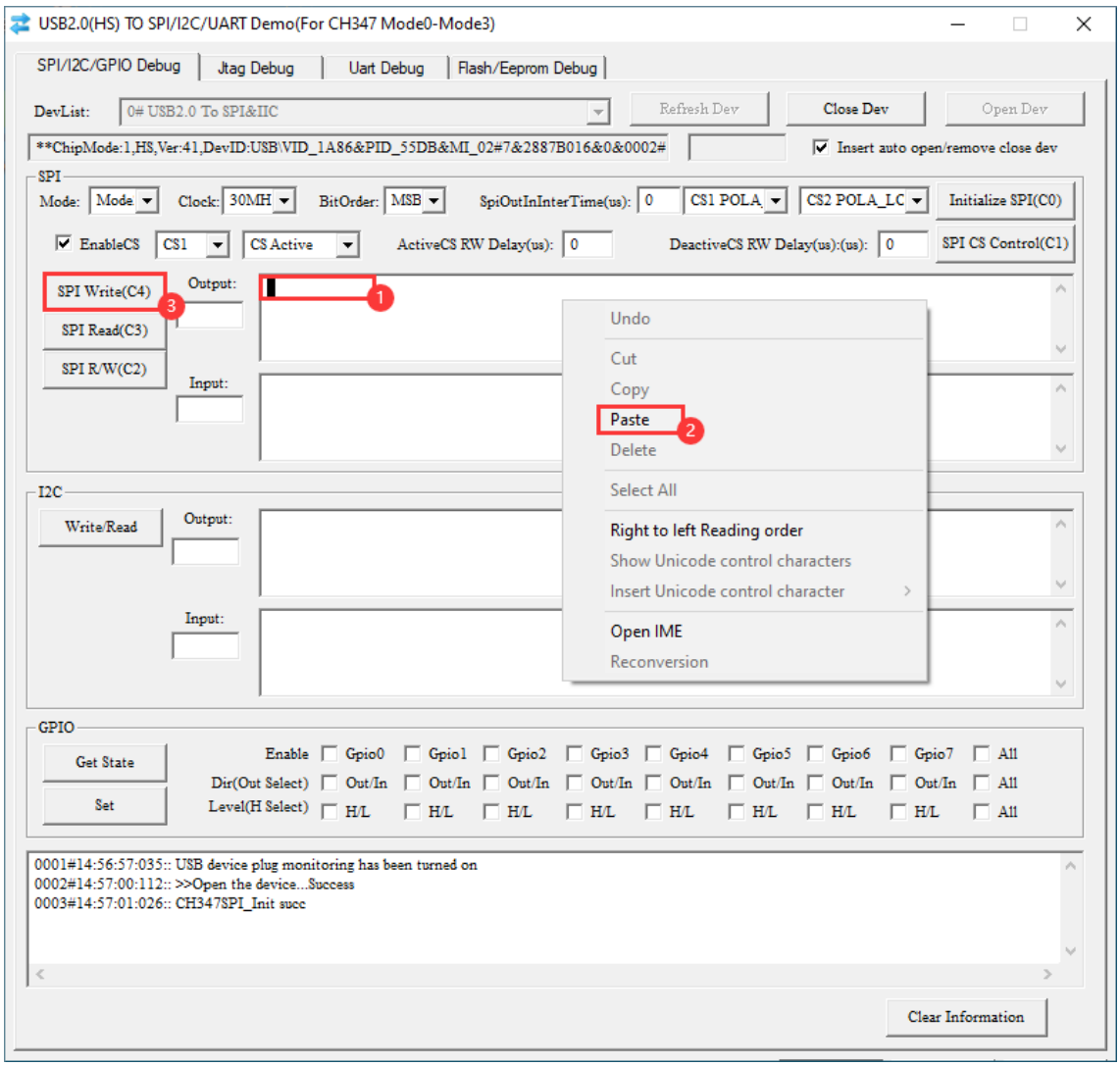
- Enable USB TO UART_I2C_SPI_JTAG Demo software to enter the SPI debugging interface, and enable the device.




- Initialize SPI parameters according to the use of the environment, after selecting the parameters click on the initialization of SPI (more clicks on the initialization of SPI, to prevent initialization failure).

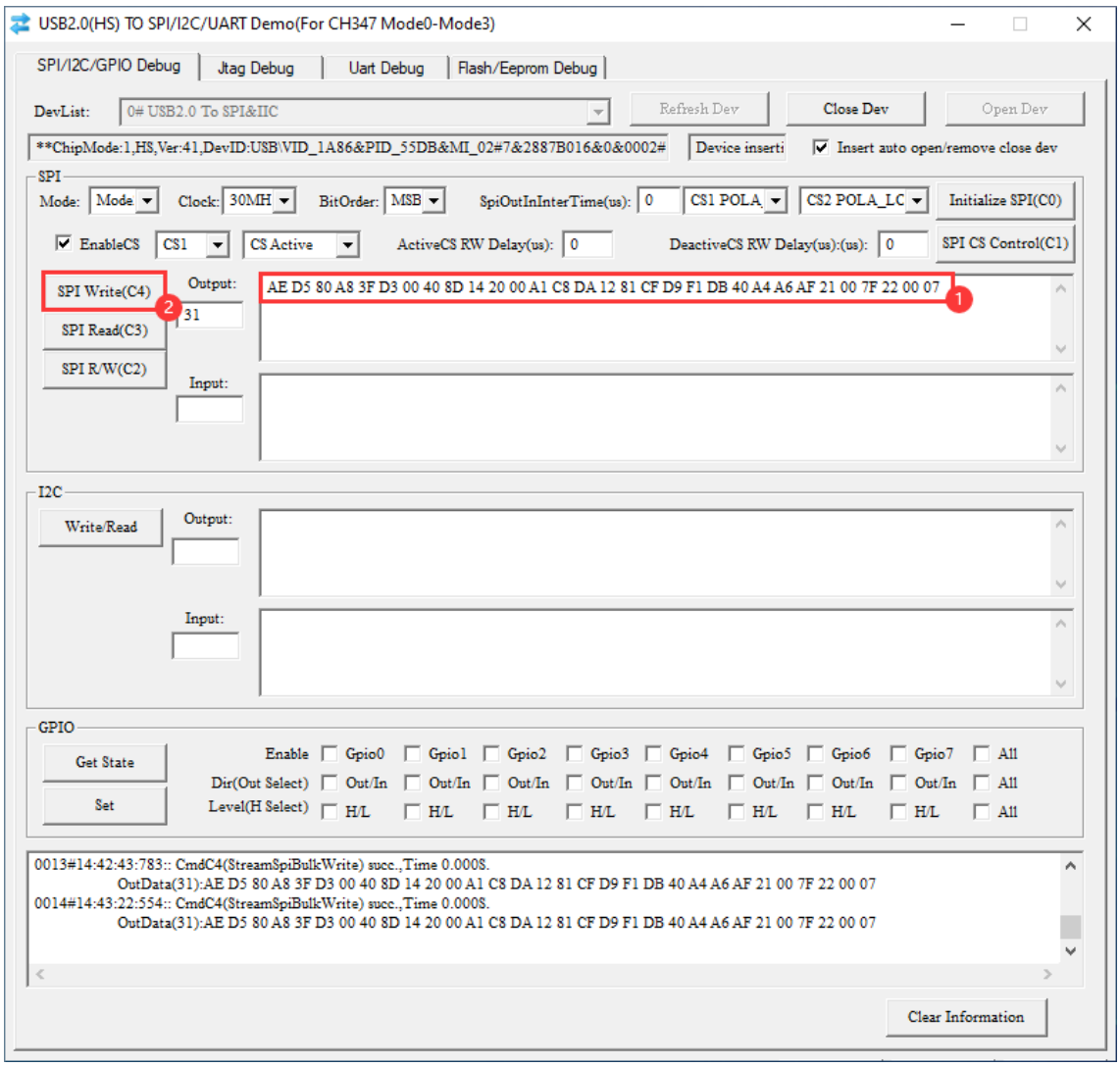



- Enter the data to be sent in the SPI input box and select SPI Read, SPI Write or SPI Read/Write according to the desired operation.

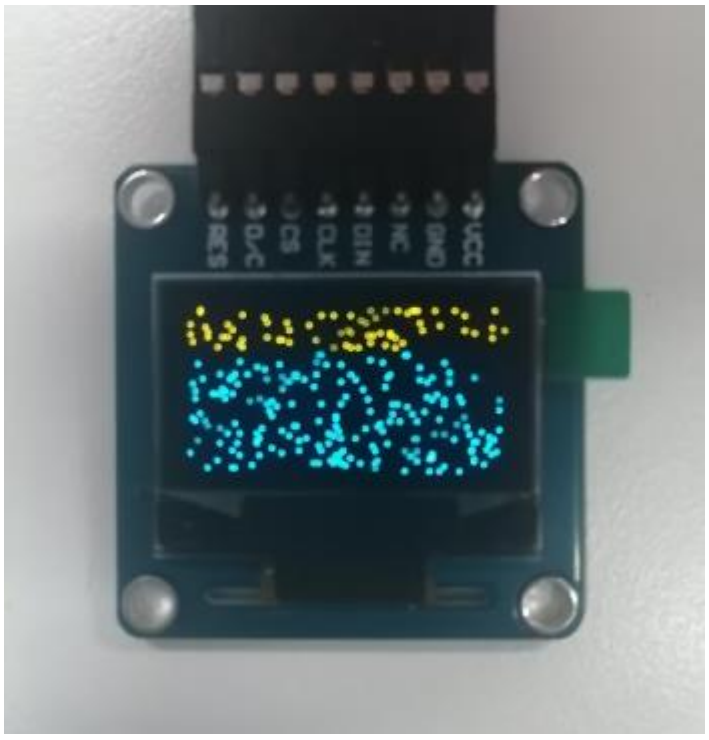



- The data below are OLED initialization commands (use the right mouse button to paste the data, keyboard shortcuts cannot be used):

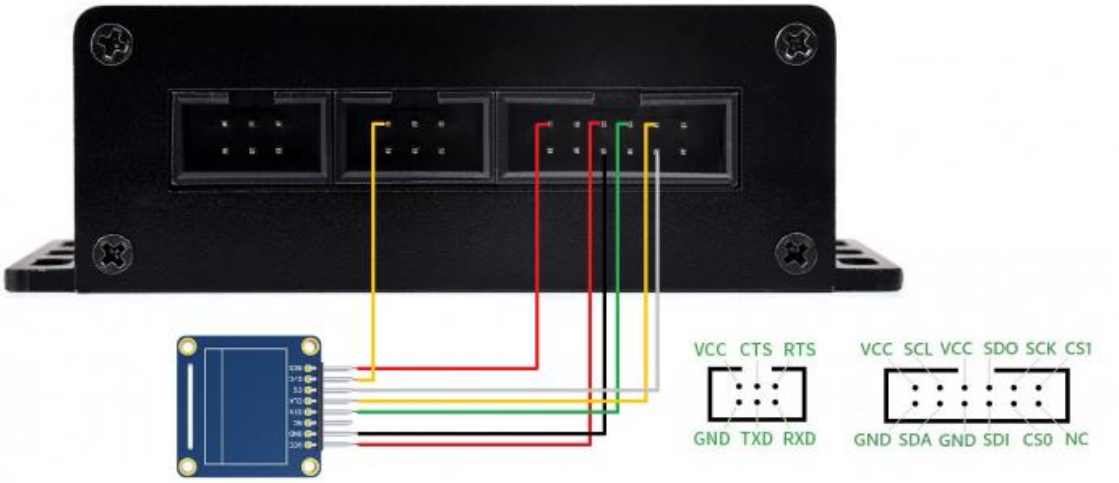
```
AE D5 80 A8 3F D3 00 40 8D 14 20 00 A1 C8 DA 12 81 CF D9 F1 DB 40 A4 A6
AF 21 00 7F 22 00 07
```




- Initialization effect as shown below: (the screen is not on).



- Connect the D/C pin of the OLED to VCC (Connecting to GND for sending commands, to VCC for sending data):

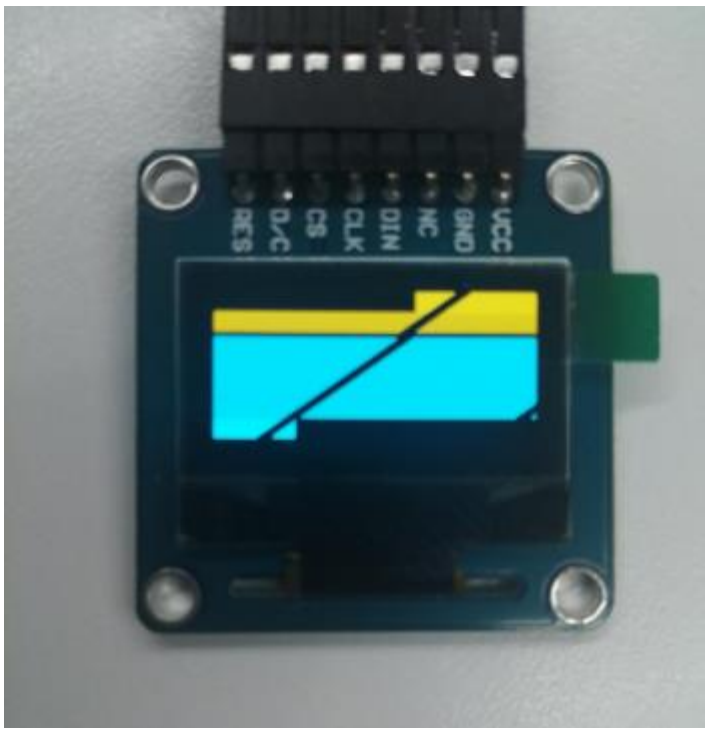



- Sending data to clear the screen (use the right mouse button to paste the data, keyboard shortcuts cannot be used), click SPI once and clear part of them:

```
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

- Sending data to light on (use the right mouse button to paste the data, keyboard shortcuts cannot be used), click SPI once and clear part of them:

```
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```




# JTAG Interface Usage

## STM32 Microcontroller Debugging And Flashing On OpenOCD

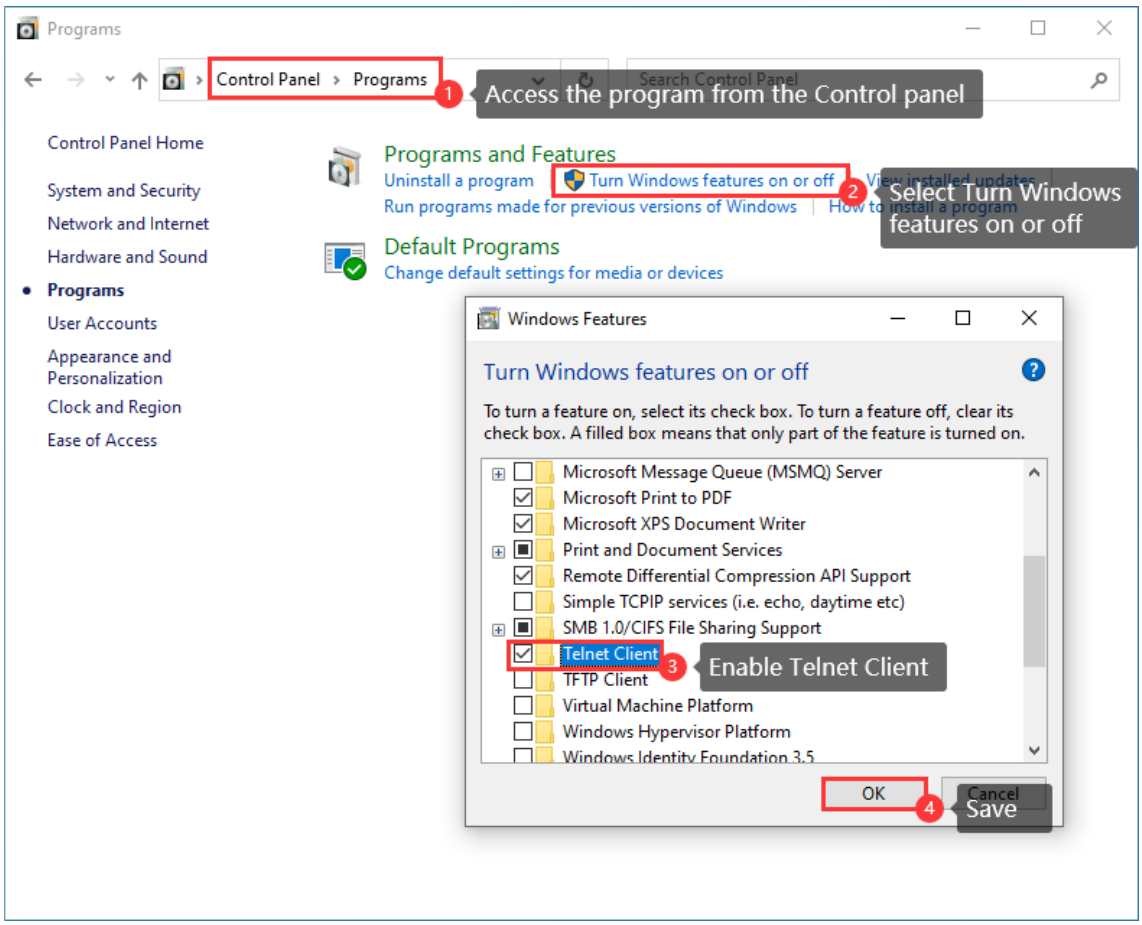
The following is a demonstration of flashing a demo into the STM32F429IGT6 development board using the product's JTAG interface.
Please note: Make sure the device is at 3V3 and not 5V (keep the same potential as the device to be flashed).

### *Hardware Connection*

| External JTAG Interface | USB TO UART/I2C/SPI/JTAG |
|---|---|
| TDI | TDI |
| TDO | TDO |
| TMS | TMS |
| TCLK | TCK |
| TRST (N/C) | TRST (N/C) |
| GND | GND |

### *Preparation*

- Enable Telnet Function.




- Click the Win+R key, and input "cmd" to enter the command window.
- Go to the "USB-TO-UART-I2C-SPI-JTAG-Demo\Windows\Software\OpenOCD-CH347\bin" directory in the path of the package (the demo is for the desktop).

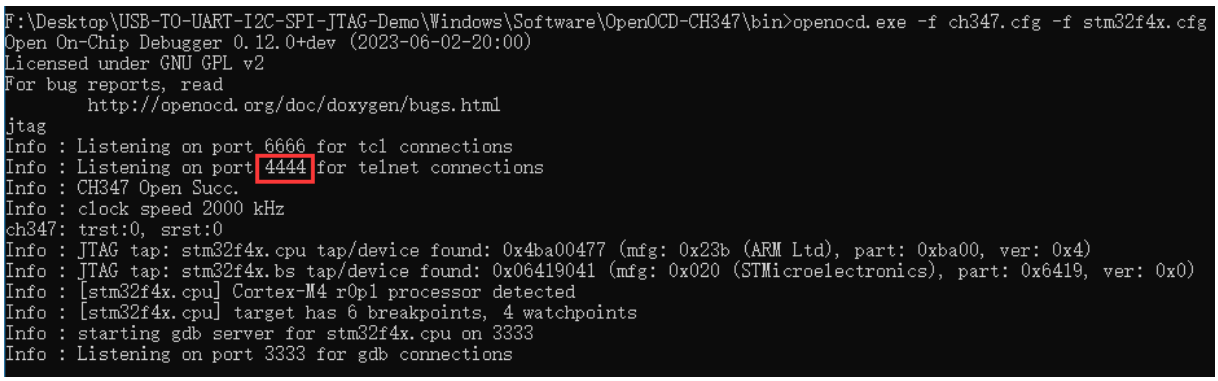
```
cd Desktop\USB-TO-UART-I2C-SPI-JTAG-Demo\Windows\Software\OpenOCD-CH347\
bin
```

```
F:\Desktop\USB-TO-UART-I2C-SPI-JTAG-Demo\Windows\Software\OpenOCD-CH347\bin>
```

- Connect CH347 and STM32F4 (openocd.exe -f ch347.cfg -f + parameter: here the parameter is the configuration file of the connected chip, you can copy the file to the bin folder in the 2nd point, otherwise you need to add the path of the configuration file.)

Note: The configuration file of the common chip is stored in "USB-TO-UART-I2C-SPI-JTAG-Demo\Windows\Software\OpenOCD-CH347\scripts\target", you can copy the file to the current folder.

```
openocd.exe -f ch347.cfg -f stm32f4x.cfg
```




- Click "Win +R" to enable the new command window.
- telnet.exe Localhost 4444 (Return the result according to the above)

```
telnet.exe Localhost 4444
```


- If the following characters show, the connection is successful:


- Program the demo to STM 32F4 using Openocd.

*Demo Download*

- Copy the hex file to the directory "USB-TO-UART-I2C-SPI-JTAG-Demo\Windows\Software\OpenOCD-CH347\bin".

Note: In the example file, there is a Test folder under the bin file, and there are two files under the folder that correspond to the clockwise and counterclockwise control of the light source by pressing the key under the Open429I-C (Package A).

- Enter "halt" in the Telnet window to pause the running demo.

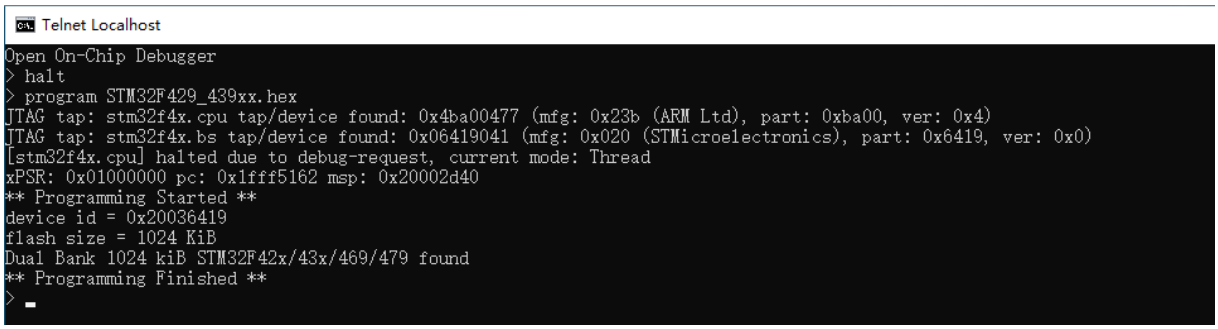
```
halt
```

- Execute "program STM32F429_439xx.hex" to download the program (program + parameter: here the parameter is the hex file to be downloaded, you can copy it to the

bin folder mentioned in the previous operation, or you need to change the parameter to path + hex file or elf file to be downloaded).

Please note: Do not name files with spaces!

```
program STM32F429_439xx.hex
```




*Demo Debug*

- The debugging command "halt" has already been used in the program download to pause the running program.
- Use "flash probe 0" to scan the flash.
- Execute various debugging commands for functional debugging (e.g. reset, halt, resume, etc.).

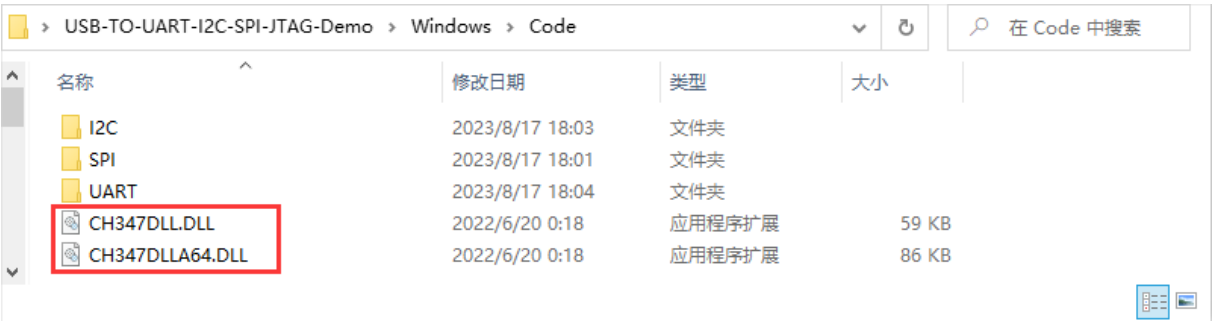
```
Open On-Chip Debugger
> flash probe 0
device id = 0x20036419
flash size = 1024 KiB
Dual Bank 1024 kiB STM32F42x/43x/469/479 found
flash 'stm32f2x' found at 0x08000000
> reset
JTAG tap: stm32f4x.cpu tap/device found: 0x4ba00477 (mfg: 0x23b (ARM Ltd), part: 0xba00, ver: 0x4)
JTAG tap: stm32f4x.bs tap/device found: 0x06419041 (mfg: 0x020 (STMicroelectronics), part: 0x6419, ver: 0x0)
> target
  dap info [ap_num | 'root']
fast_load
  flash bank bank_id driver_name base_address size_bytes chip_width_bytes
            bus_width_bytes target [driver_options ...]
gdb_save_tdesc
gdb_sync
gdb_target_description ('enable'|'disable')
get_reg list
halt [milliseconds]
init
  nand device bank_id driver target [driver_options ...]
poll ['on'|'off']
read_memory address width count ['phys']
reg [(register_number|register_name) [(value|'force')]]
reset [run|halt|init]
resume [address]
set_reg dict
soft_reset_halt
stm32f4x.cpu
  stm32f4x.cpu array2mem arrayname bitwidth address count
  stm32f4x.cpu cget target_attribute
  stm32f4x.cpu configure [target_attribute ...]
  stm32f4x.cpu curstate
  stm32f4x.cpu eventlist
  stm32f4x.cpu get_reg list
  stm32f4x.cpu mdb address [count]
  stm32f4x.cpu mdd address [count]
  stm32f4x.cpu mdh address [count]
  stm32f4x.cpu mdw address [count]
  stm32f4x.cpu mem2array arrayname bitwidth address count
  stm32f4x.cpu mwb address data [count]
  stm32f4x.cpu mwd address data [count]
  stm32f4x.cpu mwh address data [count]
  stm32f4x.cpu mww address data [count]
  stm32f4x.cpu read_memory address width count ['phys']
  stm32f4x.cpu rtt
  stm32f4x.cpu set_reg dict
  stm32f4x.cpu write_memory address width data ['phys']
target
  target create name type '-chain-position' name [options ...]
  target current
  target init
  target names
  target smp targetname1 targetname2 ...
  target types
target_request
  target_request debugmsgs ['enable'|'charmsg'|'disable']
targets [target]
test_mem_access size
write_memory address width data ['phys']

> targets
    TargetName         Type       Endian TapName            State
--  ------------------ ---------- ------ ------------------ ------------
 0* stm32f4x.cpu       cortex_m   little stm32f4x.cpu       running
> halt
[stm32f4x.cpu] halted due to debug-request, current mode: Thread
xPSR: 0x21000000 pc: 0x0800023e msp: 0x20000410
> targets
    TargetName         Type       Endian TapName            State
--  ------------------ ---------- ------ ------------------ ------------
 0* stm32f4x.cpu       cortex_m   little stm32f4x.cpu       halted
> resume
> targets
    TargetName         Type       Endian TapName            State
--  ------------------ ---------- ------ ------------------ ------------
 0* stm32f4x.cpu       cortex_m   little stm32f4x.cpu       running
>
```

## Porting Description

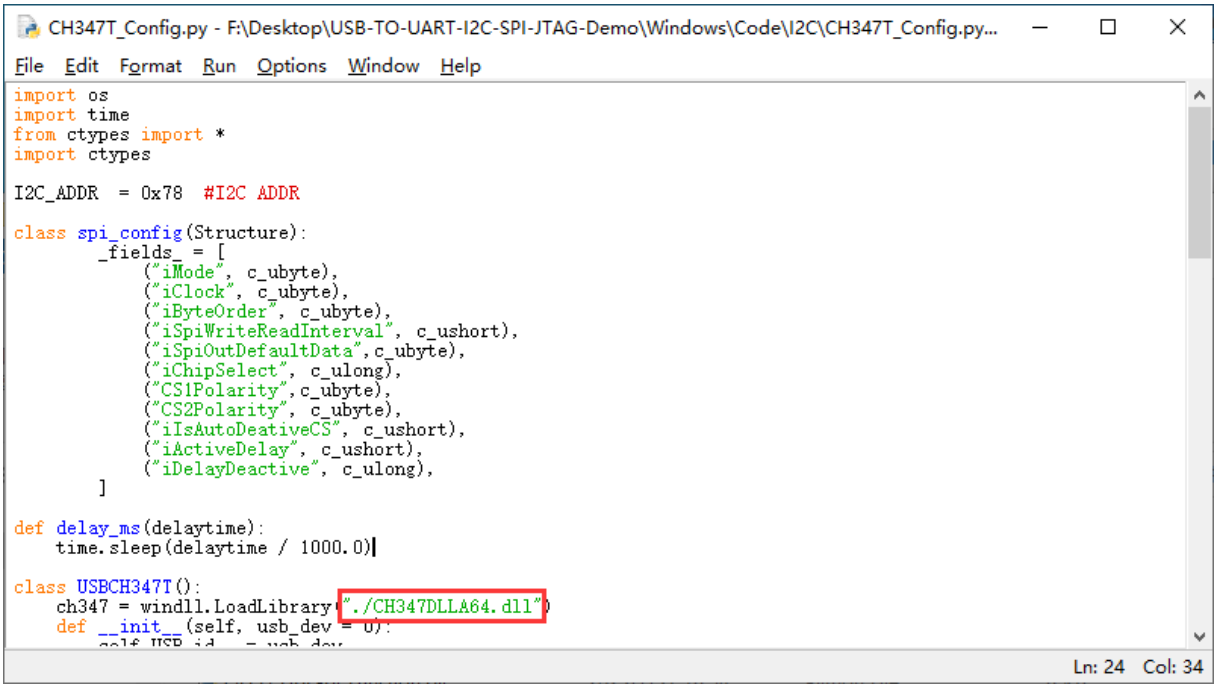
## Porting Reference

### *Environment Configuration Instructions*

- DLL files should be placed in the directory where the demo program is located. There are two DLL files in the sample files (corresponding to 64-bit and 32-bit systems respectively). Please adjust it according to your system.




- Or you can modify the file path of the demo as a DLL file storage path.




### *Example Reference*

Note: The demo is modified based on the Raspberry Pi driver OLED demo. Reference link: OLED related resource Reference example is the file under "../OLED_Module_Code /RaspberryPi/python". (Sample demo)

- The I2C and SPI examples is in "../USB-TO-UART-I2C-SPI-JTAG-Demo/Windows/Code"

- Application 1: Use the I2C port of the product to turn on OLED. (device used: 0.96inch OLED (A))
- Application 2: Use the SPI port of the product to turn on OLED. (device used: 0.96inch OLED (A))

### *File Description*

- CH347T_Config.py corresponds to the reference example "../OLED_Module_Code/RaspberryPi/python/lib/waveshare_OLED/config.py", define CH347T device initialization, etc.
- OLED_Library_Function.py corresponds to the reference example "../OLED_Module_Code/RaspberryPi/python/lib/waveshare_OLED/OLED_0in96.py", define OLED device initialization, etc.
- example.py corresponds to the reference example "../OLED_Module_Code/RaspberryPi/python/lib/waveshare_OLED/OLED_0in96_test.py", and is the mainstream program.
- The pic folder storages images and font files.

For more functions description, you can refer to CH347 Application Development Manual

# Linux (Raspberry Pi)

## Environment Setting

### Driver Installation

Download the file package to the Raspberry Pi and unzip the file:

```
wget https://files.waveshare.com/wiki/USB-TO-UART-I2C-SPI-JTAG/USB-TO-UART-I2C-SPI-JTAG-Demo.zip

unzip USB-TO-UART-I2C-SPI-JTAG-Demo.zip -d ./USB-TO-UART-I2C-SPI-JTAG-Demo
```

Execute example:

```
pi@raspberrypi:~ $ wget https://www.waveshare.net/w/upload/2/2b/USB-TO-UART-I2C-SPI-JTAG-Demo.zip
--2023-08-03 11:28:33--  https://www.waveshare.net/w/upload/2/2b/USB-TO-UART-I2C-SPI-JTAG-Demo.zip
Resolving www.waveshare.net (www.waveshare.net)... 120.77.147.21
Connecting to www.waveshare.net (www.waveshare.net)|120.77.147.21|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 15050376 (14M) [application/zip]
Saving to: 'USB-TO-UART-I2C-SPI-JTAG-Demo.zip'

USB-TO-UART-I2C-SPI-JT 100%[=========================>]  14.35M   654KB/s    in 40s

2023-08-03 11:29:13 (363 KB/s) - 'USB-TO-UART-I2C-SPI-JTAG-Demo.zip' saved [15050376/15050376]

pi@raspberrypi:~ $ ls
Bookshelf  Downloads  Pictures   USB-TO-UART-I2C-SPI-JTAG-Demo
Desktop    Music      Public     USB-TO-UART-I2C-SPI-JTAG-Demo.zip
Documents  OLED       Templates  Videos
```

Enter the driver file directory:

```
cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver/
```

Install the execution environment on Raspberry Pi:

```
sudo apt-get install raspberrypi-kernel-headers
```

Install on Ubuntu with different commands:

```
sudo apt-get update

sudo apt-get install build-essential

sudo apt install python3-pip
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver $ sudo apt-get install raspber
rypi-kernel-headers
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  raspberrypi-kernel-headers
0 upgraded, 1 newly installed, 0 to remove and 105 not upgraded.
Need to get 27.7 MB of archives.
After this operation, 180 MB of additional disk space will be used.
Get:1 http://archive.raspberrypi.org/debian buster/main armhf raspberrypi-kernel-headers armhf 1:1.20
230509~buster-1 [27.7 MB]
Fetched 27.7 MB in 27s (1,036 kB/s)
Selecting previously unselected package raspberrypi-kernel-headers.
(Reading database ... 99388 files and directories currently installed.)
Preparing to unpack .../raspberrypi-kernel-headers_1%3a1.20230509~buster-1_armhf.deb ...
Unpacking raspberrypi-kernel-headers (1:1.20230509~buster-1) ...
Setting up raspberrypi-kernel-headers (1:1.20230509~buster-1) ...
```

Execute compilation and load the driver:

```
make

sudo insmod ch34x_pis.ko
```

Use the driver demo to operate permanently:

```
sudo make install
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver $ make
sudo insmod ch34x_pis.ko
make -C /lib/modules/6.1.21-v8+/build  M=/home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driv
er
make[1]: Entering directory '/usr/src/linux-headers-6.1.21-v8+'
  CC [M]  /home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver/ch34x_pis.o
  MODPOST /home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver/Module.symvers
  CC [M]  /home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver/ch34x_pis.mod.o
  LD [M]  /home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver/ch34x_pis.ko
make[1]: Leaving directory '/usr/src/linux-headers-6.1.21-v8+'
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver $ ls
ch34x_pis.c   ch34x_pis.mod    ch34x_pis.mod.o  Makefile       Module.symvers
ch34x_pis.ko  ch34x_pis.mod.c  ch34x_pis.o      modules.order
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver $ sudo make install
make -C /lib/modules/6.1.21-v8+/build  M=/home/pi/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driv
er
make[1]: Entering directory '/usr/src/linux-headers-6.1.21-v8+'
make[1]: Leaving directory '/usr/src/linux-headers-6.1.21-v8+'
mkdir -p /lib/modules/6.1.21-v8+/kernel/drivers/usb/misc
cp -f ./ch34x_pis.ko /lib/modules/6.1.21-v8+/kernel/drivers/usb/misc/
depmod -a
```

- Install serial library: (If you fail, you can execute **sudo pip3 install pyserial**)

```
pip install pyserial
```

- Switch to Mode1 and connect to the Raspberry Pi, view the device, and see "ch34x_pis*".

```
ch34x_pis*"
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Driver/driver $ ls /dev/
autofs           initctl       ppp         sg0         tty25  tty5       vchiq       vcsu7
block            input         ptmx        shm         tty26  tty50      vcio        vga_arbiter
bsg              kmsg          pts         snd         tty27  tty51      vc-mem      vhci
btrfs-control    kvm           ram0        spidev0.0   tty28  tty52      vcs         vhost-net
bus              log           ram1        spidev0.1   tty29  tty53      vcs1        vhost-vsock
cachefiles       loop0         ram10       stderr      tty3   tty54      vcs2        video10
cec0             loop1         ram11       stdin       tty30  tty55      vcs3        video11
cec1             loop2         ram12       stdout      tty31  tty56      vcs4        video12
ch34x_pis0       loop3         ram13       tty         tty32  tty57      vcs5        video13
char             loop4         ram14       tty0        tty33  tty58      vcs6        video14
console          loop5         ram15       tty1        tty34  tty59      vcs7        video15
cpu_dma_latency  loop6         ram2        tty10       tty35  tty6       vcsa        video16
cuse             loop7         ram3        tty11       tty36  tty60      vcsa1       video18
disk             loop-control  ram4        tty12       tty37  tty61      vcsa2       video19
dma_heap         mapper        ram5        tty13       tty38  tty62      vcsa3       video20
dri              media0        ram6        tty14       tty39  tty63      vcsa4       video21
fb0              media1        ram7        tty15       tty4   tty7       vcsa5       video22
fd               media2        ram8        tty16       tty40  tty8       vcsa6       video23
full             media3        ram9        tty17       tty41  tty9       vcsa7       video31
fuse             mem           random      tty18       tty42  ttyACM0    vcsm-cma    watchdog
gpiochip0        mmcblk0       rfkill      tty19       tty43  ttyAMA0    vcsu        watchdog0
gpiochip1        mmcblk0p1     sda         tty2        tty44  ttyprintk  vcsu1       zero
gpiomem          mmcblk0p2     sda1        tty20       tty45  ttyS0      vcsu2
hwrng            mqueue        sda2        tty21       tty46  uhid       vcsu3
i2c-1            net           serial      tty22       tty47  uinput     vcsu4
i2c-20           null          serial0     tty23       tty48  urandom    vcsu5
i2c-21           port          serial1     tty24       tty49  v4l        vcsu6
```

- The devices identified by different modes:

| Mode | Device number |
| --- | --- |
| Mode 0 | tty* and tty* (often ttyACM*) |
| Mode 1 | ch34x_pis* and tty* |
| Mode 2 | hidraw* |
| Mode 3 | ch34x_pis* and tty* |

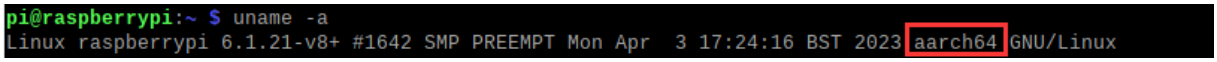
## Preparation

- View the system information:

```
uname - a
```

- armv61 (32-bit)
- armv71 (32-bit)
- aarch64 (64-bit)
- x86_64 (64-bit but not Raspberry Pi)

If the return value is armv61 or armv71, it means it is 32-bit ARM architecture (for Raspberry Pi). If the return value is aarch64, it means it is 64-bit ARM architecture (for Raspberry Pi). If the return value is x86_64, it is not Raspberry Pi. Select x64 folder.




Currently using the Raspberry Pi 64-bit libraries, if your query result is aarch64, then you do not need to do the following operations.

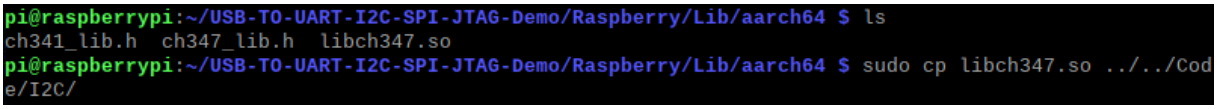
- Enter the downloaded file, "../USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/lib/XXX" (XXX: select the file folder according to the above query result).

```
cd
cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Lib/aarch64
```

- Copy the files with the ".so" extension to the program folder. If there is already a ".so" file in the folder that is intended for use on aarch64 architecture, replace it with the ".so" file that is compatible with your current system.

For instance, copy the appropriate ".so" file into the I2C example:

```
sudo cp libch347.so ../../Code/I2C/
```




- Or copy to SPI example:

```
sudo cp libch347.so ../../Code/SPI/
```

- When using UART, it is the same as other normal UART devices (the device number identified by the Raspberry is ttyACM*, and the new devices can be queried by plugging and unplugging devices.)

1. Do not connect USB TO UART/I2C/SPI/JTAG first, use the commands to query the current device:

```
ls /dev/tty*
```

2. Connect the Raspberry Pi and USB TO UART/I2C/SPI/JTAG, and query "ls /dev/tty*", the new device is the device number of the product:

```
ls /dev/tty*
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyAMA0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyprintk
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyS0
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyACM0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyACM1
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyAMA0
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61  /dev/ttyprintk
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62  /dev/ttyS0
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
```

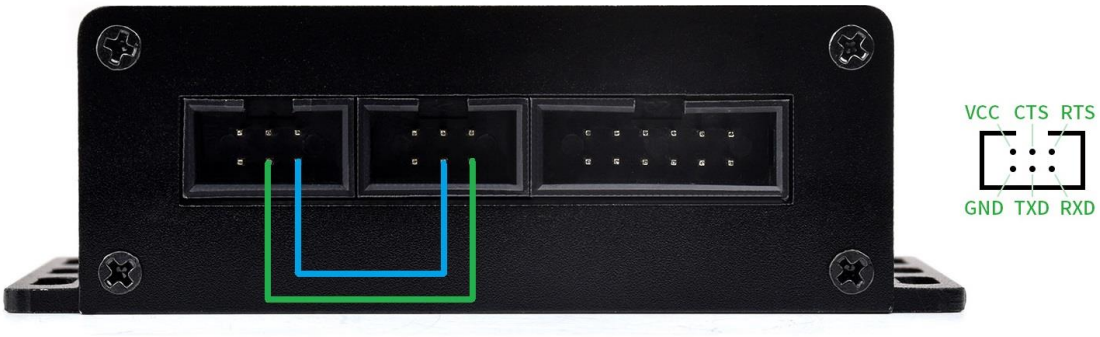
## UART Interface Usage

The following is a demonstration of using the product's two serial ports for self-sending and receiving, please switch the mode to mode 0 (for two tty* devices).

### Serial Self-sending and Receiving Communication in Python Environment

#### *Hardware Connection*

| USB TO UART/I2C/SPI/JTAG(UART0) | USB TO UART/I2C/SPI/JTAG(UART1) |
|---|---|
| UART0.TXD | UART1.RXD |
| UART0.RXD | UART1.TXD |




#### *Software Operation*

- Query the current identified device number:

1. Do not connect USB TO UART/I2C/SPI/JTAG first, and use commands to query the current device.

```
ls /dev/tty*
```

2. Connect the Raspberry Pi and USB TO UART/I2C/SPI/JTAG, query "ls /dev/tty*" again, and the new device is the device number of the product.

```
ls /dev/tty*
```


- Enter the UART example directory, and edit the program UART.py.

```
cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/UART/
vi UART.py
```


- Move the cursor to position ① and change it to the recognized device number (move the cursor using 'up, down, left and right keys' -> click 'i' and then modify it -> click 'Esc' after modifying it -> input ':wq' to save and exit).

```
import time^M
import serial^M
^M
# Open the serial port^M
ser0 = serial.Serial( /dev/ttyACM0', 115200)^M
ser1 = serial.Serial( /dev/ttyACM1', 115200)^M
data0 = b'Hello, World!'     # Data to be sent (in bytes)^M
^M
while True:^M
    ser0.write(data0)        # send data^M
    if ser1.in_waiting:  ^M
        data1 = ser1.read(13)^M
        print(data1)^M
        print()^M
        ^M
^M
# Close the serial port^M
ser.close()^M
~
```

- Execute demo:

```
sudo python3 UART.py
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/UART $ sudo python3 UART.py
b'Hello, World!'

b'Hello, World!'

b'Hello, World!'

b'Hello, World!'

b'Hello, World!'

b'Hello, World!'

b'Hello, World!'

b'Hello, World!'
```

## I2C Interface Usage

If you want to use the UART to send and receive data when using I2C or SPI, switch the mode to mode 1 or mode 2 (mode 1 for ch34x_pis* and tty* devices, mode 2 for hidraw* devices).

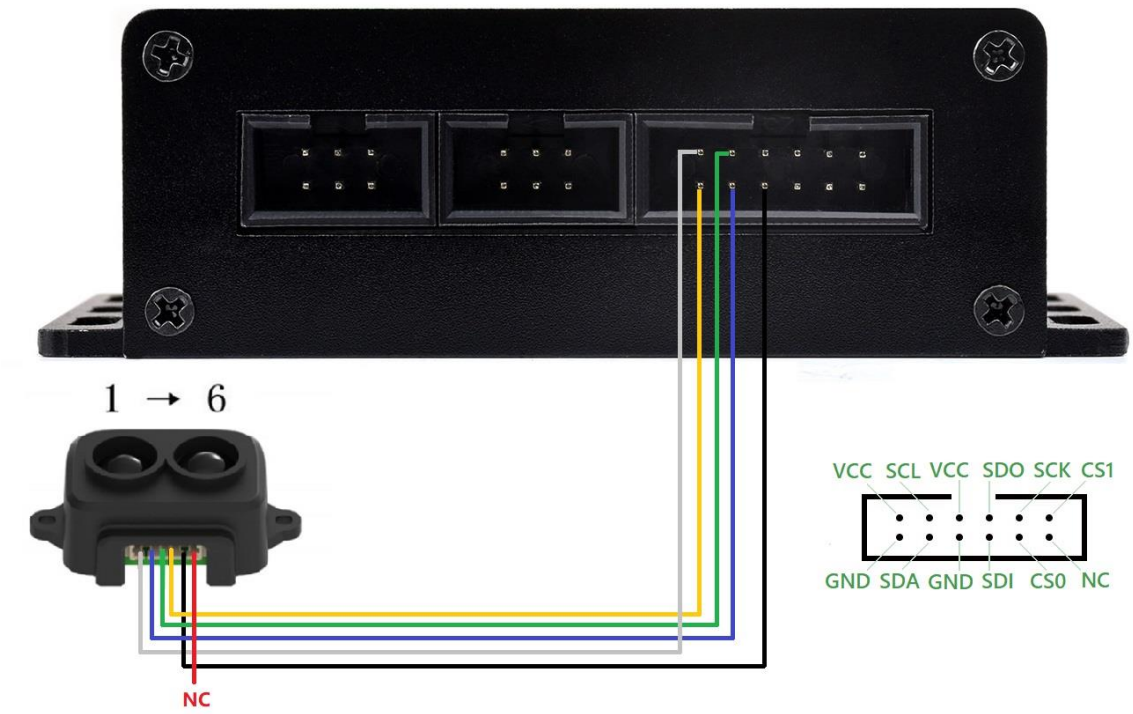
### I2C Gets Ranging Module Data in Python Environment

#### *Hardware Connection*

Please switch to Mode 1 or Mode 2, and connect to the computer by connecting the cables.

| Peripheral（TF-Luna） | USB TO UART/I2C/SPI/JTAG |
|---|---|
| Pin 1 | VCC |
| Pin 2 | I2C.SDA |

| | |
|---|---|
| Pin 3 | I2C.SCL |
| Pin 4 | GND |
| Pin 5 | GND (Connect first and configure TF-Luna to I2C mode (required for TF-Luna)) |
| Pin 6 | N/C |




## *Software Operation*

- Query the current identified device number (connect the Raspberry Pi and USB TO UART/I2C/SPI/JTAG, query the device).

Mode 1 Query 'ch34x_pis*' and 'tty*', can be queried once when the device is connected and once when the device is not connected(('ch34x_pis*' for SPI/I2C,'tty*' for UART)).

```
ls /dev/ch34x_pis*
```

```
pi@raspberrypi:~ $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyAMA0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyprintk
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyS0
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
pi@raspberrypi:~ $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyACM0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyAMA0
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyprintk
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61  /dev/ttyS0
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
```

Mode 2 Query 'hidraw*', can be queried once when the device is connected and once when the device is not connected.

```
ls /dev/hidraw*
```

```
pi@raspberrypi:~ $ ls /dev/hidraw*
/dev/hidraw0
pi@raspberrypi:~ $ ls /dev/hidraw*
/dev/hidraw0  /dev/hidraw1  /dev/hidraw2
```

- Enter the I2C example directory, and edit the demo I2C.py:

```
cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C/
vi I2C.py
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/UART $ cd
pi@raspberrypi:~ $ cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C/
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C $ vi I2C.py
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C $
```

- Move the cursor to position ① and change it to the recognized device number (move the cursor using 'up, down, left and right keys' -> click 'i' and then modify it -> click 'Esc' after modifying it -> input ':wq' to save and exit).

```
#! /usr/bin/env python^M
#coding=utf-8^M
import ctypes^M
import os^M
import time^M
from ctypes import *^M
^M
DevIndex = '/dev/ch34x_pis0'^M
DevIndex_c = ctypes.c_char_p(DevIndex.encode('utf-8'))          #Convert DevIndex to const char *^M
^M
class USBI2C():^M
    ch347 = cdll.LoadLibrary("./libch347.so")^M
    def __init__(self, usb_dev = DevIndex_c, i2c_dev = 0x20):^M
        self.usb_id   = usb_dev^M
        self.dev_addr = i2c_dev^M
        self.handle = USBI2C.ch347.CH347OpenDevice(self.usb_id)^M
        if self.handle != -1:^M
            print("Open the devices:", self.handle)^M
            USBI2C.ch347.CH347CloseDevice(self.handle)^M
        else:^M
            print("USB CH347 Open Failed!")^M
^M
    def read(self):^M
"I2C.py" 64 lines, 2095 bytes
```

- Execute the demo:

```
sudo python3 I2C.py
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/I2C $ sudo python3 I2C.py
Open the devices: 3
Dist: 25 Strengh: 2031 Temp: 44.0
Dist: 7 Strengh: 1399 Temp: 44.0
Dist: 8 Strengh: 10653 Temp: 44.0
Dist: 8 Strengh: 9584 Temp: 44.0
Dist: 8 Strengh: 1647 Temp: 44.0
Dist: 409 Strengh: 397 Temp: 44.0
Dist: 410 Strengh: 405 Temp: 44.0
Dist: 412 Strengh: 395 Temp: 44.0
Dist: 414 Strengh: 402 Temp: 44.0
Dist: 417 Strengh: 389 Temp: 44.0
Dist: 419 Strengh: 396 Temp: 44.0
Dist: 414 Strengh: 404 Temp: 44.0
Dist: 416 Strengh: 391 Temp: 44.0
Dist: 421 Strengh: 400 Temp: 44.0
Dist: 414 Strengh: 393 Temp: 44.0
Dist: 418 Strengh: 392 Temp: 44.0
Dist: 414 Strengh: 388 Temp: 44.0
```

## SPI Interface Usage

If you want to use I2C or SPI to transmit the data by UART, you can switch to mode 1 or mode 2.

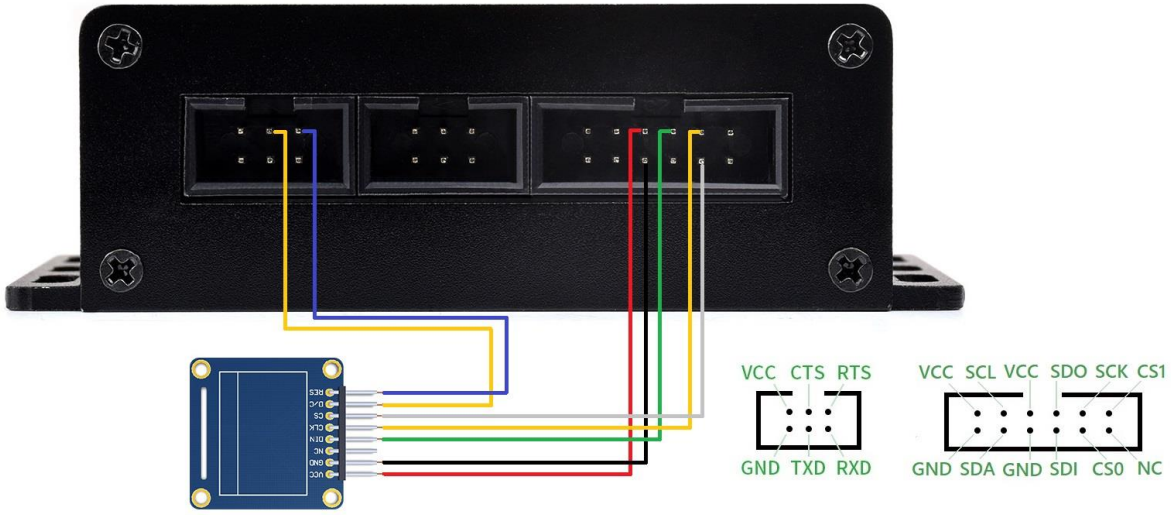
### SPI Drives OLED Screen In Python Environment

#### *Hardware Connection*

Please set the mode switch to mode 1 or mode 2 and connect the computer after connecting the cable..

| Peripheral | USB TO UART/I2C/SPI/JTAG |
| --- | --- |

| | |
|---|---|
| RES | UART1.RTS (Used to control OLEDs for reset (required for OLEDs)) |
| D/C | UART1.CTS (Used to indicate whether a command or data is being sent (required for OLEDs)) |
| CS | SPI.CS0 |
| CLK | SPI.SCK |
| DIN | SPI.SDO |
| GND | SPI.GND |
| VCC | SPI.VCC |




## *Software Operation*

- Query the current identified device number (connect the Raspberry Pi and USB TO UART/I2C/SPI/JTAG, query the device).

Mode 1 Query 'ch34x_pis*' and 'tty*' once for both connected and unconnected devices ('ch34x_pis*' for SPI/I2C,'tty*' for UART).

```
ls /dev/ch34x_pis*
```

```
pi@raspberrypi:~ $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyAMA0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyprintk
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyS0
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
pi@raspberrypi:~ $ ls /dev/tty*
/dev/tty    /dev/tty16  /dev/tty24  /dev/tty32  /dev/tty40  /dev/tty49  /dev/tty57  /dev/tty8
/dev/tty0   /dev/tty17  /dev/tty25  /dev/tty33  /dev/tty41  /dev/tty5   /dev/tty58  /dev/tty9
/dev/tty1   /dev/tty18  /dev/tty26  /dev/tty34  /dev/tty42  /dev/tty50  /dev/tty59  /dev/ttyACM0
/dev/tty10  /dev/tty19  /dev/tty27  /dev/tty35  /dev/tty43  /dev/tty51  /dev/tty6   /dev/ttyAMA0
/dev/tty11  /dev/tty2   /dev/tty28  /dev/tty36  /dev/tty44  /dev/tty52  /dev/tty60  /dev/ttyprintk
/dev/tty12  /dev/tty20  /dev/tty29  /dev/tty37  /dev/tty45  /dev/tty53  /dev/tty61  /dev/ttyS0
/dev/tty13  /dev/tty21  /dev/tty3   /dev/tty38  /dev/tty46  /dev/tty54  /dev/tty62
/dev/tty14  /dev/tty22  /dev/tty30  /dev/tty39  /dev/tty47  /dev/tty55  /dev/tty63
/dev/tty15  /dev/tty23  /dev/tty31  /dev/tty4   /dev/tty48  /dev/tty56  /dev/tty7
```

Mode 2 Query 'hidraw*' once for both connected and unconnected devices.

```
ls /dev/hidraw*
```

```
pi@raspberrypi:~ $ ls /dev/hidraw*
/dev/hidraw0
pi@raspberrypi:~ $ ls /dev/hidraw*
/dev/hidraw0  /dev/hidraw1  /dev/hidraw2
```

- Enter the SPI example directory, and edit the demo CH347T_Config.py.

```
cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/SPI/

vi CH347T_Config.py
```

```
pi@raspberrypi:~ $ cd USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/SPI/
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/SPI $ ls
CH347T_Config.py  example.py  libch347.so  OLED_Library_Function.py  pic
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/SPI $ vi CH347T_Config.py
```

- Move the cursor to position ① and change it to the recognized device number (move the cursor using 'up, down, left and right keys' -> click 'i' and then modify it -> click 'Esc' after modifying it -> input ':wq' to save and exit).

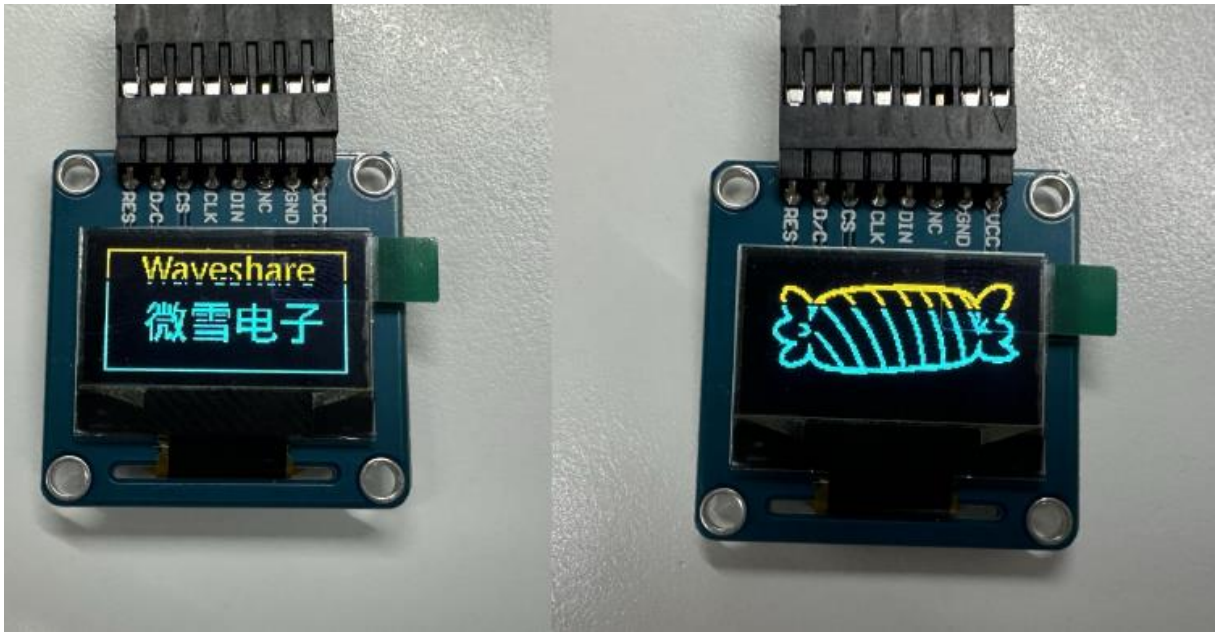
```
import os^M
import time^M
from ctypes import *^M
import ctypes^M
^M
I2C_ADDR  = 0x20  #I2C ADDR^M
DevIndex = "/dev/ch34x_pis0"^M
DevIndex_c = ctypes.c_char_p(DevIndex.encode('utf-8'))          #Convert DevIndex to const char *^M
^M
class spi_config(Structure):^M
        _fields_ = [^M
            ("iMode", c_ubyte),^M
            ("iClock", c_ubyte),^M
            ("iByteOrder", c_ubyte),^M
            ("iSpiWriteReadInterval", c_ushort),^M
            ("iSpiOutDefaultData",c_ubyte),^M
            ("iChipSelect", c_ulong),^M
            ("CS1Polarity",c_ubyte),  ^M
            ("CS2Polarity", c_ubyte), ^M
            ("iIsAutoDeativeCS", c_ushort), ^M
            ("iActiveDelay", c_ushort), ^M
            ("iDelayDeactive", c_ulong),^M
        ]^M
"CH347T_Config.py" 99 lines, 4291 bytes
```

- Execute the demo:

```
sudo python3 example.py
```

```
pi@raspberrypi:~/USB-TO-UART-I2C-SPI-JTAG-Demo/Raspberry/Code/SPI $ sudo python3 example.py
 0.96inch OLED
CH347 Open succeeded
SPI Initialization succeeded
OLED Open succeeded
CH347 Open succeeded
SPI Initialization succeeded
OLED Open succeeded
INFO:root:clear display
INFO:root:***draw line
INFO:root:***draw text
INFO:root:***draw image
```

- The effects as shown below:



# Resource

## Demo and Materials

- Demo
- CH347 Applicationa Development Manual
- Linux use information
- CH347

## Software and Driver

- OpenOCD
- Demo
- Driver Demo

# FAQ

***Question:****Mode switching has no effect?*

**Answer:**

This may be the case of switching modes after not carrying out the power-off operation:
1. First disconnect the device from the computer.
2. Toggle the mode switch to adjust to the desired mode.
3. Reconnect the device with the computer.

***Question:****Temperature data is -255 or distance data is 65535 when using the I2C debugging example?*

**Answer:**

In this case, the TF-Luna (external device) may not be configured to I2C mode.
1. Disconnect all the wires between TF-Luna and the device.
2. Connect the fifth wire of TF-Luna first, and then connect the other wires in turn.

***Question:****Unstable sending and receiving of data during communication?*

**Answer:**

- 1: It may be caused by the mismatch between the device communicating with this product and the current communication level of the device.

  - 1. Please check whether the allowable level of the equipment communicating with this product is 3.3V or 5V.
  - 2. Toggle the level switch to adjust the communication level to be consistent with the external equipment.
- 2: It may be caused by the high power consumption of the device communicating with this product or more devices using the VCC port of this product for power supply.
  - 1. Please use an external power supply for the device connected to the product and connect the GND of the power supply device to the GND of the product.
  - 2. Please note that the GND of each device needs to be connected together.

***Question:****The example runs with a missing PIL library as follows:*

**Answer:**

```
ModuleNotFoundError: No module named 'PIL'
```

- Click WIN + R, and execute the following PIL installation commands:

```
pip install pillow
```

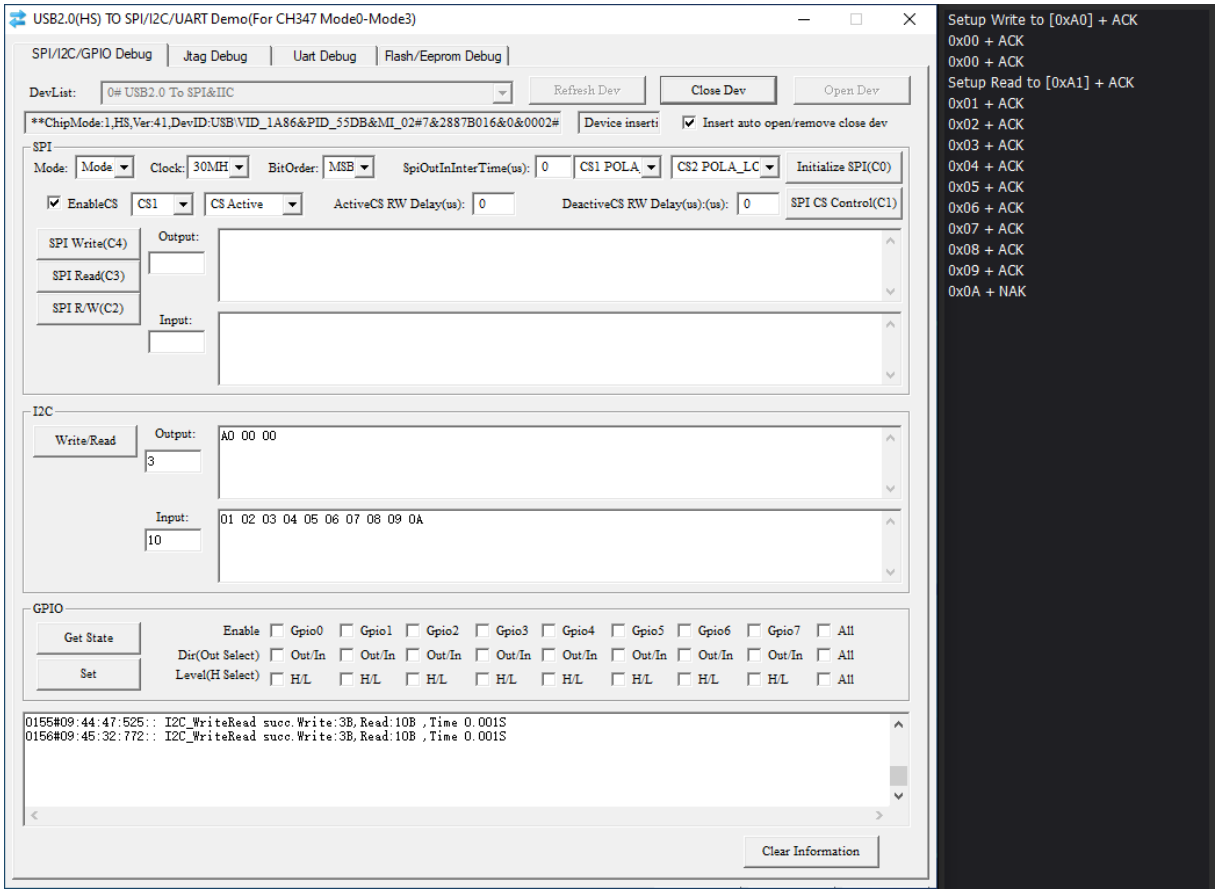
- If it can not be downloaded normally, you can use other sources to download:

```
pip install -i https://pypi.tuna.tsinghua.edu.cn/simple pillow
```

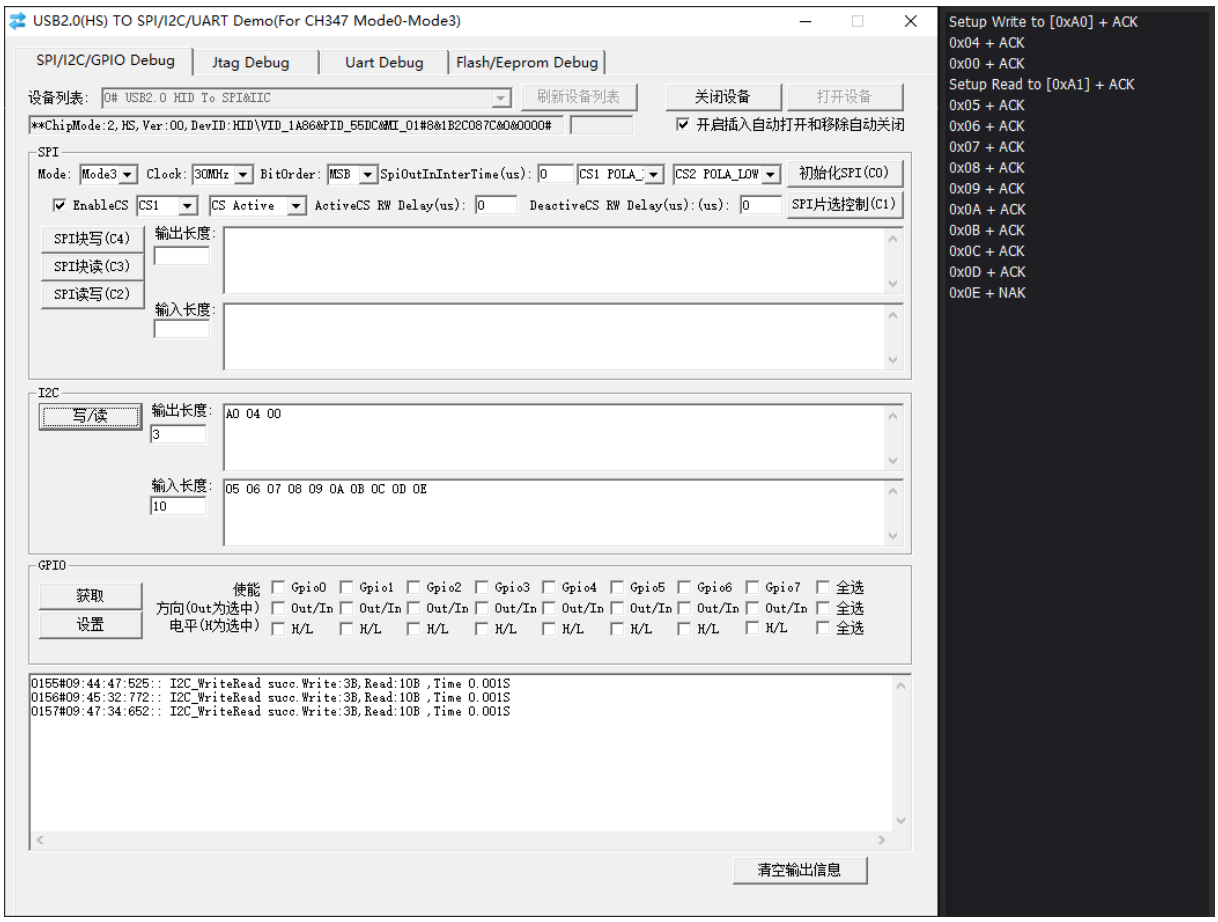
***Question:****How to read I2C data using USB TO UART/I2C/SPI/JTAG?*

**Answer:**

- Please enter the device address + register address in the I2C output box as follows:




- **A0** indicates the address after the device address is shifted to the left by 1 bit (the read/write bit will be handled automatically, just offset the device address by one bit), **00 00** indicates the address of the register to be read.
- If the register address is 16 bits, send the low byte first **(according to the requirements of the slave device, some devices need to send the high byte first)**, such as reading the 10 bytes of the 0x0004 address (the input length position needs to be filled in the number of bytes to be read):




- **Please note that if the slave device has other corresponding operations for data acquisition, please make adjustments according to the specific operations of the slave device.**

***Question:****3V3 communication succeeds while 5V communication fails?*

**Answer:**

Please check whether the communication device supports 5V.

***Question:*** *When sending data containing hundreds of numbers, there are breaks between the numbers*

**Answer:**

Due to the internal firmware version of the product, it can be solved by using the following firmware update.

USB TO UART/I2C/SPI/JTAG firmware package

# Support

## Technical Support

If you need technical support or have any feedback/review, please click the **Submit Now** button to submit a ticket, Our support team will check and reply to you within 1 to 2 working days. Please be patient as we make every effort to help you to resolve the issue.
Working Time: 9 AM - 6 PM GMT+8 (Monday to Friday)

Submit Now