

pico_ K210 Handwritten Digit Recognition

1.K210 and Pico communication

1.1 Experimental premises

This tutorial uses Pico, and K210 requires running the program in **K210-AI (stm32_pico_arduino)** to start the experiment

Pico * 1

K210 perspective module * 1 (requires SD card (with AI model inside) and camera)

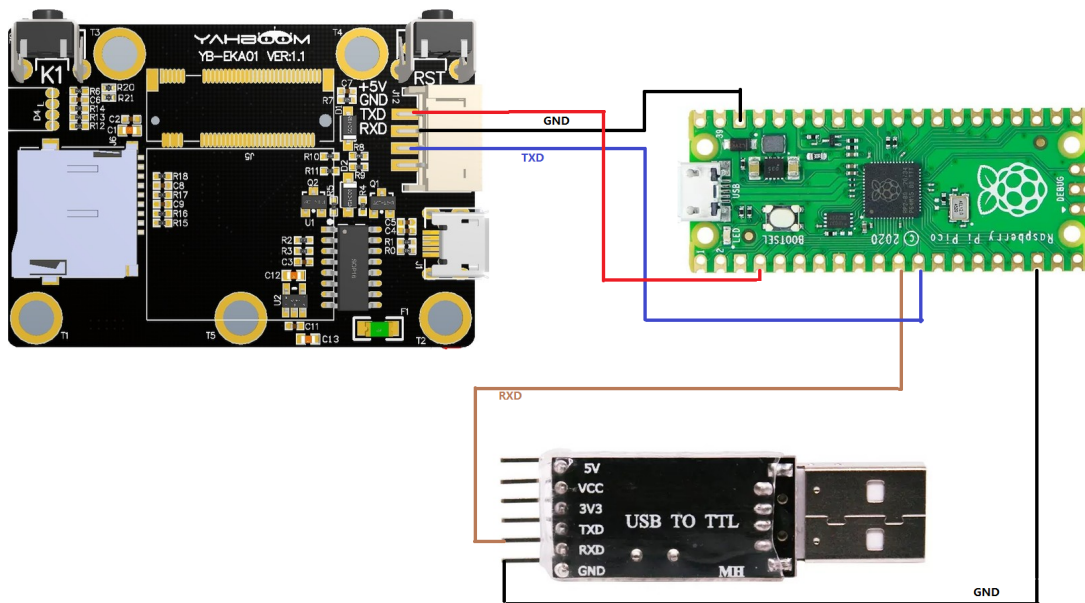
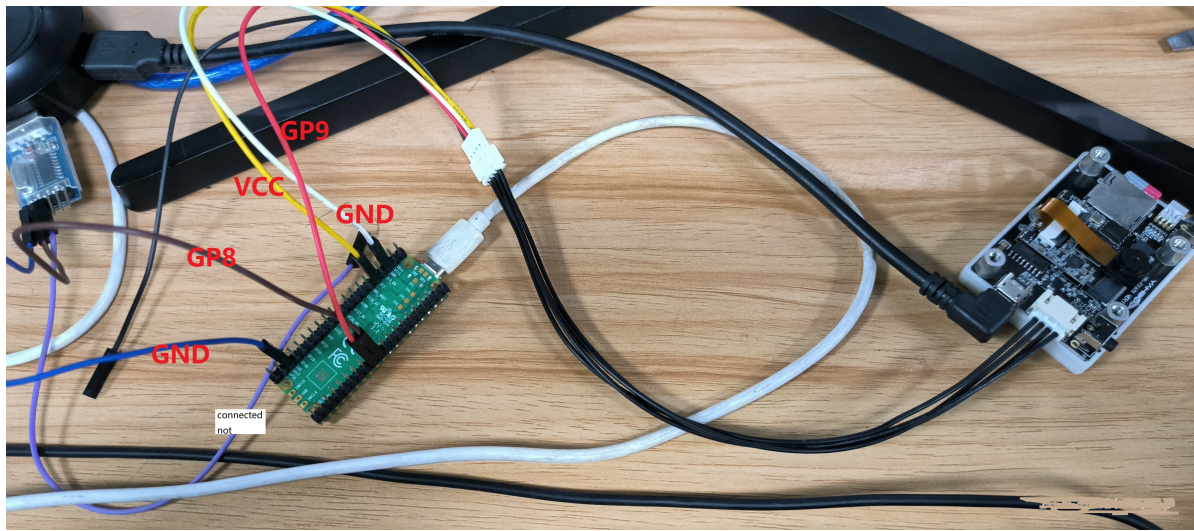
USB to TTL module * 1

1.2 Experimental wiring

pico	USB to TTL module
GP8	RXD
GND	GND

pico	k210
GP9	TXD
GND	GND
VCC	5V

Wiring as shown in the diagram :



1.3 Main code parsing

```
u1 = UART(1, baudrate=115200, tx=Pin(8), rx=Pin(9), bits=8, parity=None, stop=0)

k210_data_class = 0
k210_data_x = 0
k210_data_y = 0
k210_data_w = 0
k210_data_h = 0
k210_data_id = 0
k210_data_msg = ""

while True:
    while u1.any() > 0:
        rxx=u1.read()
        recv_k210_data(rxx)

    if k210_data_class != 0:
        if k210_data_class == 11:
            sstr = "id="+ k210_data_id +"\r\n"
            u1.write(sstr)
```

```
k210_data_class = 0
```

Obtained from the program

- k210_data_class :Routine number
- k210_data_x :It identifies the horizontal coordinate of the upper left corner of the box (range: 0-240)
- k210_data_y :It identifies the vertical coordinate of the upper left corner of the box (range: 0-320)
- k210_data_w :The width of the recognized box (range: 0-240)
- k210_data_h :The length of the recognized box (range: 0-320)
- k210_data_id :It's a recognized label
- k210_data_msg :It's the identified information

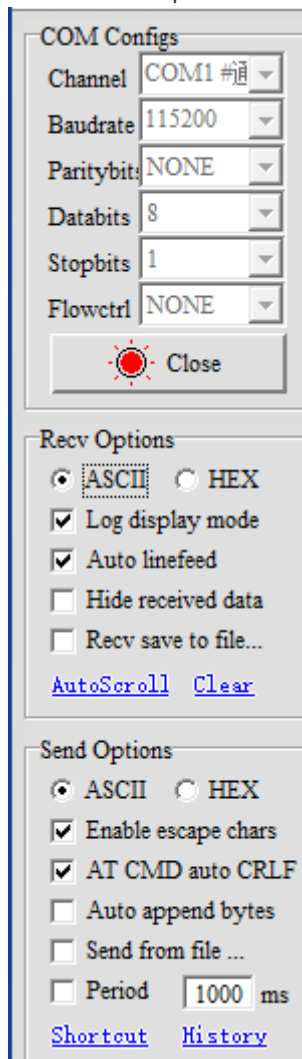
This processing mainly involves receiving a message from k210 and calling `recv_K210_Data()` for processing and assigning the processed information to `k210_Data_Members` of XXX.

Attention

If you want to develop for the second time, without changing the K210 program and data processing functions, directly call `K210_Data_The` variable of XXX is good (xxx: refers to x y w h id msg)

1.4 experimental phenomena

1. After connecting the cable, the K210 perspective module can be run offline
[K210 offline operation method](#)
2. Set the serial port assistant to the interface shown in the figure



3. Download Pico's Python firmware into Pico and run the handwritten digit recognition program provided in this tutorial. How to run Pico's Python program? Please refer to the Pico related environment building tutorial, which will not be elaborated in this tutorial
4. Then k210 runs the relevant routines, and the serial assistant will print out the important information transmitted by k210 to Pico. The phenomenon shown in the figure below is the result of handwritten digit recognition



```
id = 0
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 8
id = 0
id = 0
id = 6
id = 6
id = 5
id = 1
id = 9
id = 9
id = 1
id = 5
id = 6
id = 0
id = 6
id = 5
```

This routine only outputs data for one member of the ID

ID: Refers to the identified numerical ID (0-9)