

9. pico_K210 object detection

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

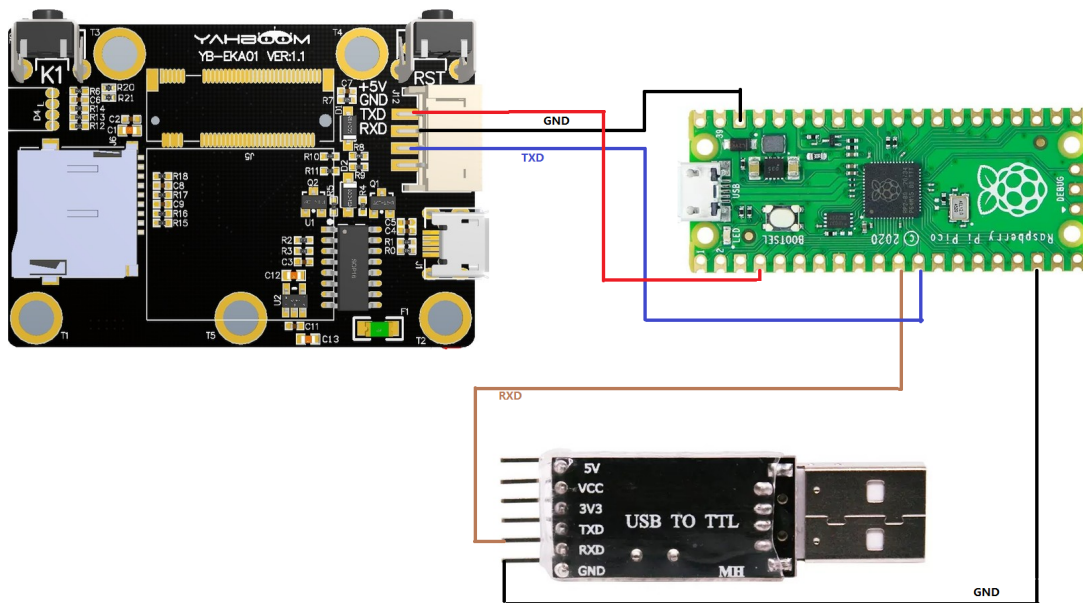
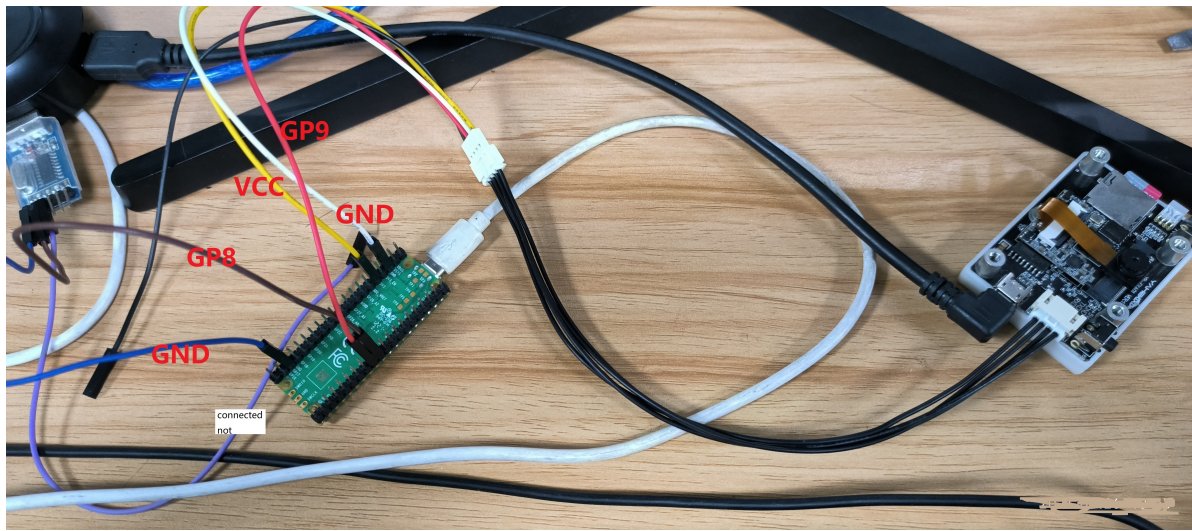
K210 perspective module * 1 (requires SD card (with AI model inside) and camera)

USB to TTL module * 1

1.2 Experimental wiring

pico	usb to ttl
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 == 9:
```

```
sstr = "x="+str(k210_data_x) + " y="+str(k210_data_y) + "  
w="+str(k210_data_w) + " h="+str(k210_data_h) + "\r\n"  
u1.write(sstr)  
u1.write(k210_data_msg+'\r\n')  
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`.

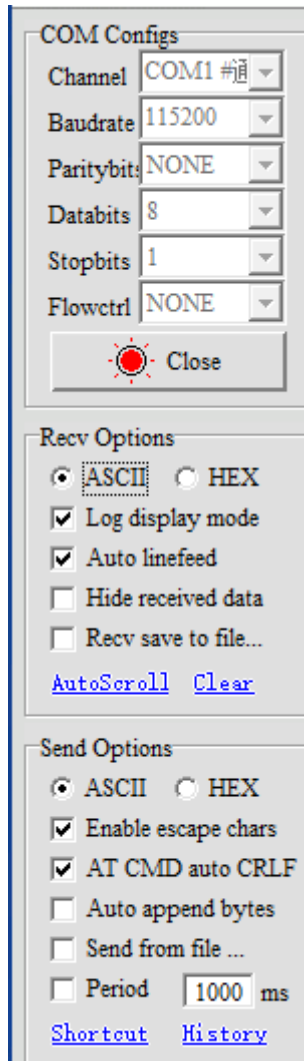
Attention

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 runs offline. Please check 【6.2 K210 as coprocessor】 -- 【ReadMe】

2. Set the serial port assistant to the interface shown in the figure



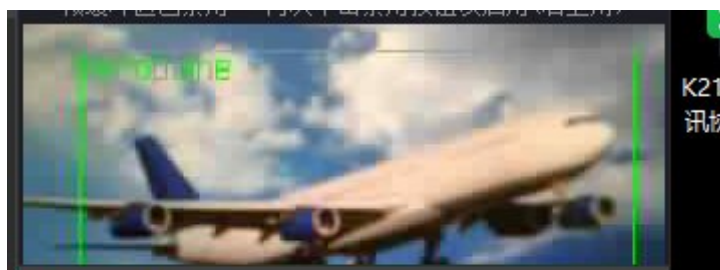
The screenshot displays the Pico Serial Assistant window, which is divided into three main sections: COM Configs, Recv Options, and Send Options.

COM Configs: This section contains several dropdown menus for configuring the serial port. The 'Channel' is set to 'COM1', 'Baudrate' is '115200', 'Paritybits' is 'NONE', 'Databits' is '8', 'Stopbits' is '1', and 'Flowctrl' is 'NONE'. A 'Close' button with a red circular icon is located at the bottom of this section.

Recv Options: This section contains radio buttons for 'ASCII' (selected) and 'HEX'. Below these are checkboxes for 'Log display mode' (checked), 'Auto linefeed' (checked), 'Hide received data' (unchecked), and 'Recv save to file...' (unchecked). At the bottom of this section are two links: 'AutoScroll' and 'Clear'.

Send Options: This section contains radio buttons for 'ASCII' (selected) and 'HEX'. Below these are checkboxes for 'Enable escape chars' (checked), 'AT CMD auto CRLF' (checked), 'Auto append bytes' (unchecked), 'Send from file ...' (unchecked), and 'Period' (unchecked) with a value of '1000 ms'. At the bottom of this section are two links: 'Shortcut' and 'History'.

3. Download Pico's Python firmware into Pico and run the object detection 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 following figure is the result of object detection



ATK XCOM V2.0

```
id = aeroplane
x=15, y=72, w=304, h=129
id = aeroplane
x=16, y=71, w=303, h=129
id = aeroplane
x=14, y=71, w=303, h=129
id = aeroplane
x=27, y=72, w=277, h=129
id = aeroplane
x=28, y=71, w=277, h=129
id = aeroplane
x=13, y=70, w=303, h=129
id = aeroplane
x=13, y=69, w=303, h=129
id = aeroplane
x=13, y=70, w=303, h=129
id = aeroplane
x=28, y=68, w=276, h=129
id = aeroplane
x=14, y=74, w=304, h=118
id = aeroplane
x=28, y=73, w=277, h=118
id = aeroplane
x=12, y=72, w=303, h=117
id = aeroplane
```

This routine only outputs data for these 5 members of x y w h msg

Msg: The information is (0. Aircraft, 1. Bicycle, 2. Bird, 3. Boat, 4. Bottle, 5. Bus, 6. Car, 7. Cat, 8. Chair, 9. Cow, 10. Dining table, 11. Dog, 12. Horse, 13. Motorcycle, 14. Person, 15. Potting, 16. Sheep, 17. Sofa, 18. Train, 19. Monitor)