

# MSPM0\_K210 color recognition

## 1. K210 communicates with MSPM0

### 1.1 Experimental prerequisites

This tutorial uses the MSPM0G3507 development board. K210 needs to run the program in **K210-AI(MSPM0G3507)** to start the experiment

MSPM0G \*1

K210 visual module \*1 (must have an SD card (with AI models), camera)

USB to TTL module \*1

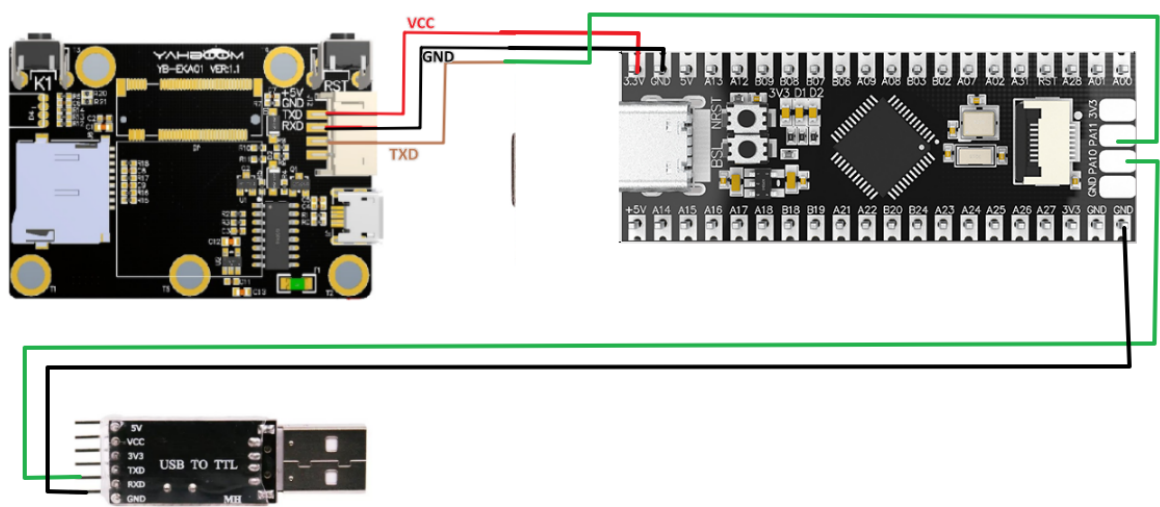
### 1.2 Experimental wiring

Method 1: Use USB to TTL module

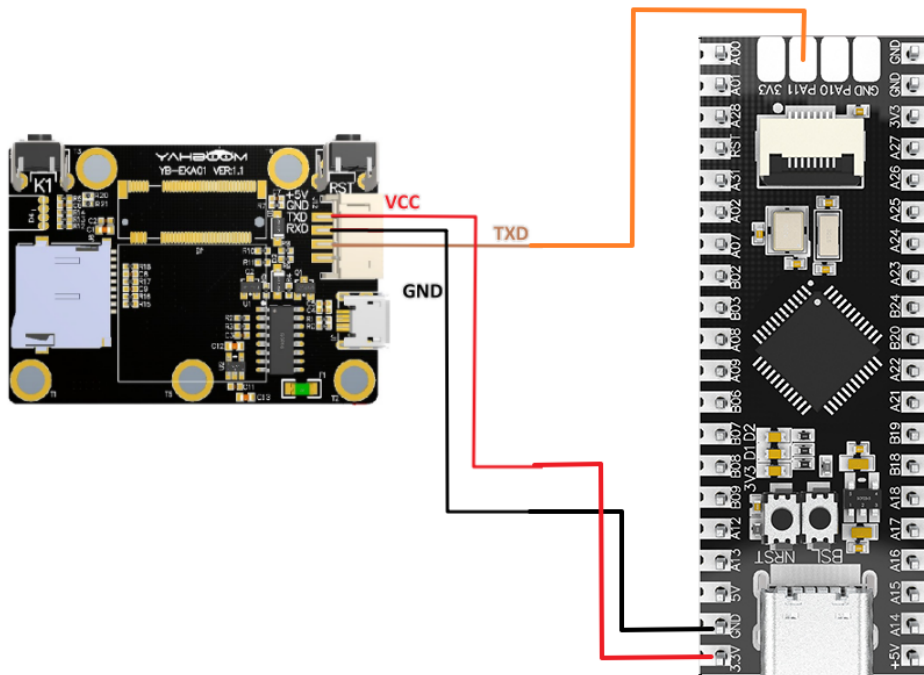
MSPM0G	K210 visual module
RX	TXD
GND	GND
VCC	5V

MSPM0G	USB to TTL module
TX	RXD
GND	GND



Method 2: Use the onboard Type-C port



## 1.3 Main code explanation

This example sets the baud rate of the serial port printing to 115200 bps, and the baud rate of the K210 module connection to 115200 bps.

The screenshot shows the TI Studio IDE's configuration window for the UART peripheral. The left sidebar shows the project configuration tree with the UART peripheral selected. The right pane shows the configuration details for the MYUART peripheral, which is connected to the K210 module's UART0. The configuration includes a target baud rate of 115200 bps, a calculated baud rate of 115211.52, and a calculated error of 0.01%.

Parameter	Value
Name	MYUART
Selected Peripheral	UART0
Quick Profiles	UART Profiles: Custom
Basic Configuration	
UART Initialization Configuration	
Clock Source	BUSCLK
Clock Divider	Divide by 1
Calculated Clock Source	32.00 MHz
Target Baud Rate	115200
Calculated Baud Rate	115211.52
Calculated Error (%)	0.01
Word Length	8 bits
Parity	None
Stop Bits	One
HW Flow Control	Disable HW flow control

Type Filter Text...
X
<<
<
>
Software
UART

PROJECT CONFIGURATION...
Project Config... 1/1 ✓ +
MSPM0 DRIVER LIBRARY ...
SYSTEM (9)
Board 1/1 ✓ +
DMA +
GPIO +
MATHACL +
Configuration NVM +
RTC +
SYSCTL 1/1 ✓ +
SYSTICK 1/1 ✓ +
WWDT +
ANALOG (6)
ADC12 +
COMP +
DAC12 +
GPAMP +
OPA +
VREF +
COMMUNICATIONS (6)
I2C +
I2C - SMBUS +
MCAN +
SPI +
UART 2/4 ✓ +
UART - LIN +
TIMERS (6)
TIMER - CAPTURE +
TIMER - COMPARE +

UART (2 of 4 Added) ②
+ ADD
REMOVE ALL

MYUART
K210\_Uart

Name K210\_Uart
Selected Peripheral UART1

Quick Profiles ^
UART Profiles Custom

Basic Configuration ^

UART Initialization Configuration ^

Clock Source BUSCLK
Clock Divider Divide by 1
Calculated Clock Source 32.00 MHz
Target Baud Rate 115200
Calculated Baud Rate 115211.52
Calculated Error (%) 0.01
Word Length 8 bits
Parity None
Stop Bits One
HW Flow Control Disable HW flow control

```

int main(void)
{
    SYSCFG_DL_init();

    NVIC_ClearPendingIRQ(MYUART_INST_INT_IRQN); //清除串口中断标志 clear the serial
    port interrupt flag
    NVIC_EnableIRQ(MYUART_INST_INT_IRQN); //使能串口中断 Enable serial port
    interrupt

    while (1)
    {
        if (k210_msg.class_n != 0) //例程号不为空 Routine number is not empty
        {
            if(k210_msg.class_n == 1) //是颜色识别 Color recognition
            {
                sprintf(buff_com, "class =
%d,x=%d,y=%d,w=%d,h=%d\r\n", k210_msg.class_n, k210_msg.x, k210_msg.y, k210_msg.w, k2
10_msg.h);
                uart0_send_string(buff_com);
                k210_msg.class_n = 0;
            }
        }
        delay_ms(500);
    }
}

```

```
}  
}
```

After the above program, if this routine is run, the members of the k210\_msg structure will have corresponding values and will be processed through the serial port printing

k210\_msg: is the structure for receiving information, and its main members are

- x: is the horizontal coordinate of the upper left corner of the identified box (range: 0-240)
- y: is the vertical coordinate of the upper left corner of the identified box (range: 0-320)
- w: is the width of the identified box (range: 0-240)
- h: is the length of the identified box (range: 0-320)
- id: is the identified label
- class\_n: routine number
- msg\_msg[20]: valid data

After the data is received and processed by the function, each member of k210\_msg will store valid information. If you want to do secondary development, you can directly call the members of k210\_msg

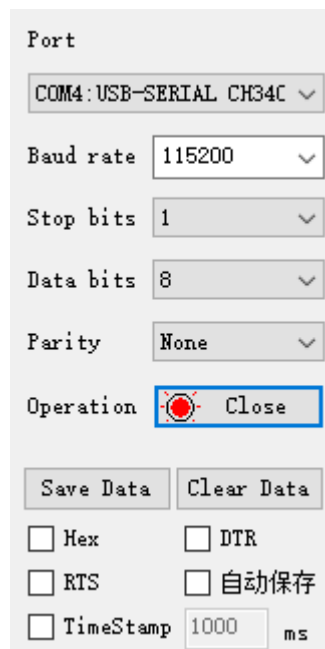
**Note: The keil project source code must be compiled under the SDK path.**

## 1.4 Experimental Phenomenon

1. After connecting the cable, the K210 perspective module runs offline. Please check 【6.2 K210 as coprocessor】 -- 【ReadMe】

Link:<http://www.yahboom.net/study/K210-AI-Camerahttps://www.yahboom.com/build.html?id=6655&cid=580>)

2. The serial port assistant is set to the interface as shown in the figure



3. Then run the color recognition routine, and the serial port assistant will print out the important information transmitted by k210 to MSPM0G, as shown in the figure below

```
x=0, y=0, w=319, h=106
x=0, y=0, w=319, h=95
x=0, y=0, w=319, h=85
x=0, y=0, w=319, h=73
x=177, y=0, w=142, h=62
x=192, y=0, w=127, h=65
x=197, y=0, w=122, h=52
x=202, y=0, w=117, h=60
x=204, y=0, w=115, h=48
x=201, y=0, w=118, h=49
x=202, y=0, w=117, h=49
x=206, y=0, w=113, h=47
x=209, y=0, w=110, h=47
x=209, y=0, w=110, h=47
x=209, y=0, w=110, h=47
x=211, y=0, w=108, h=46
x=215, y=0, w=104, h=44
x=216, y=0, w=103, h=44
x=216, y=0, w=103, h=43
x=218, y=0, w=101, h=43
x=219, y=0, w=100, h=42
x=219, y=0, w=100, h=42
x=218, y=0, w=101, h=41
x=219, y=0, w=100, h=40
x=224, y=0, w=95, h=36
```