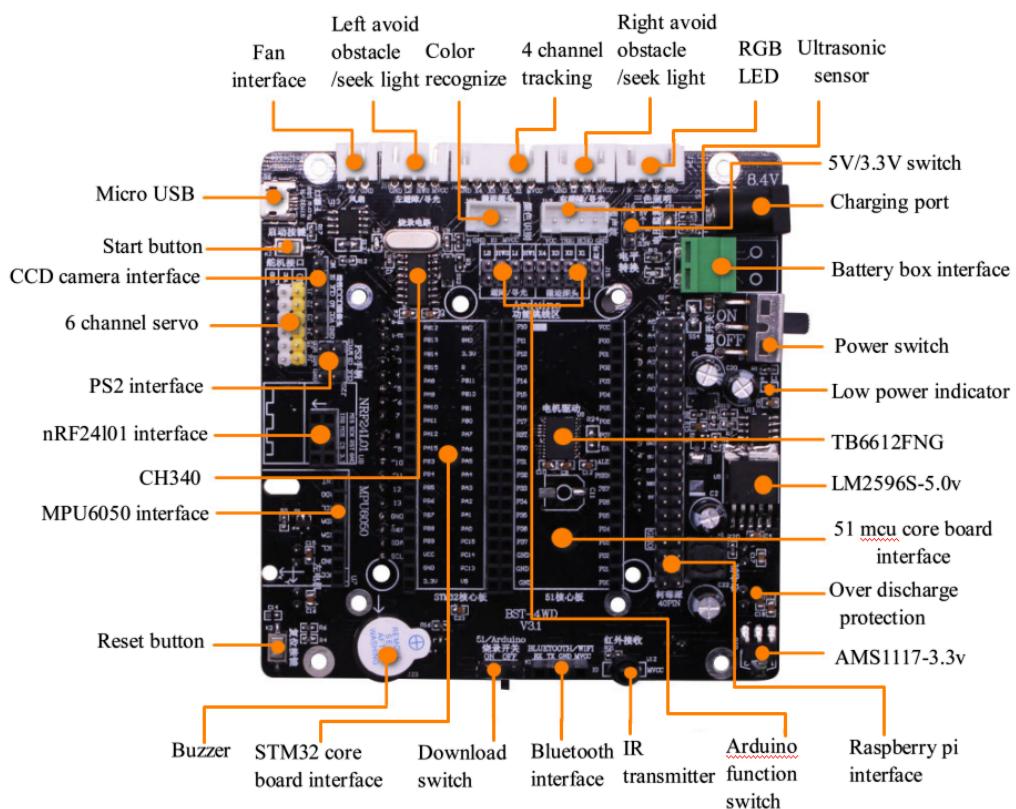
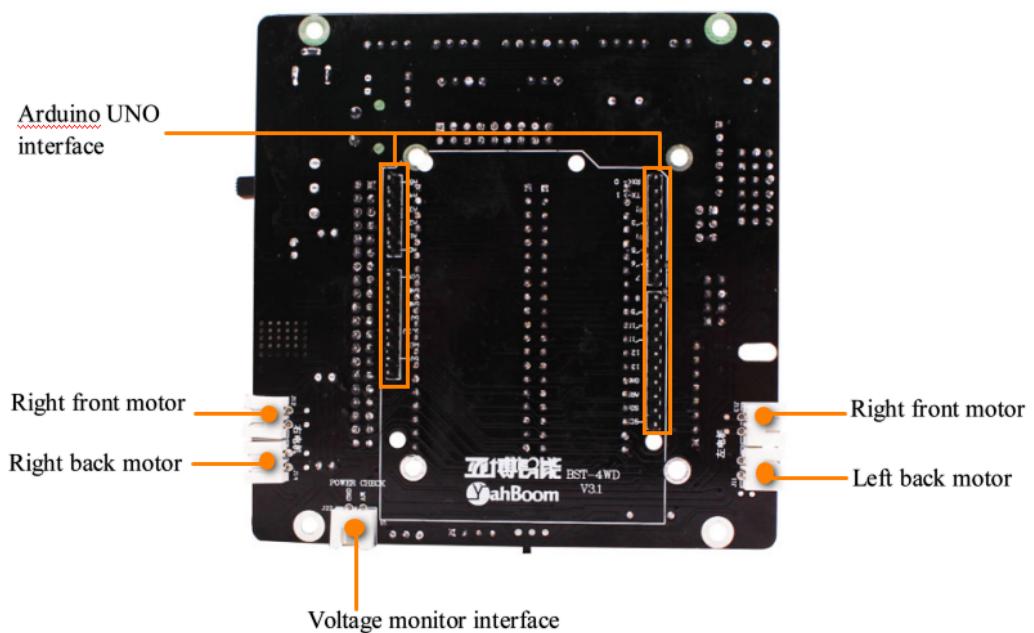


4WD expansion board manual

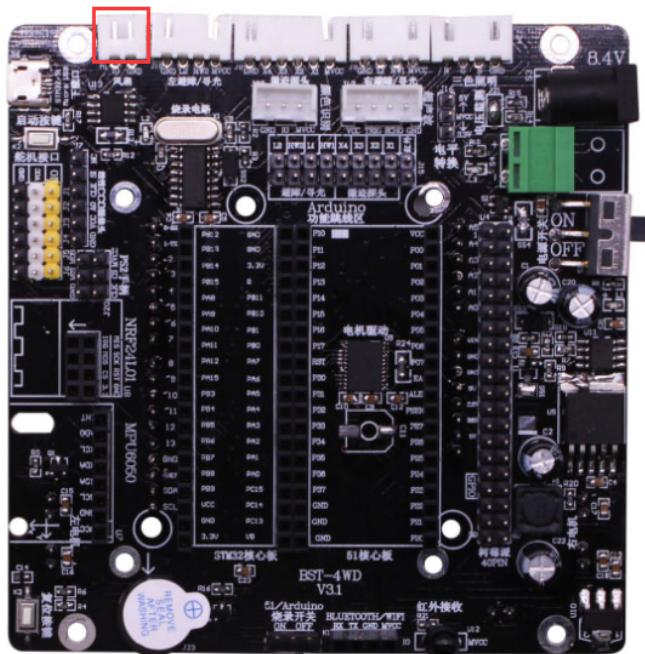
Front:



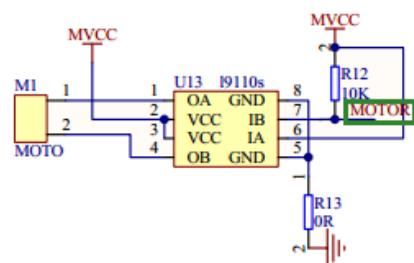
Back:



1. Fan interface:

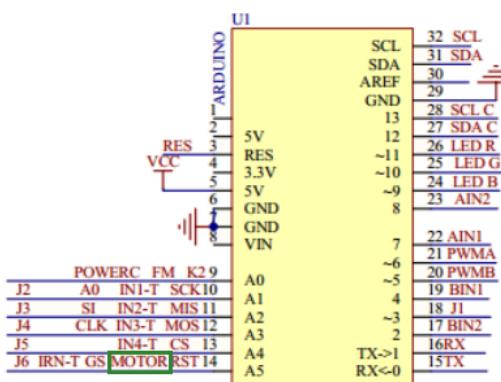


1-1 position



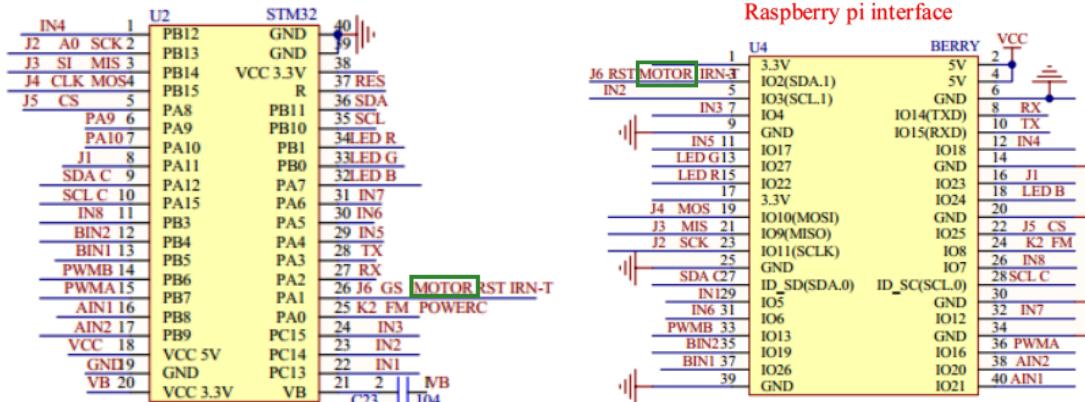
51 mcu core board interface

Arduino UNO interface



IN1	1	U3	40
IN2	2	P1.0	VCC
IN3	3	P1.1	P0.0
IN4	4	P1.2	38 J5 CS
IN5	5	P1.3	37 J4 MOS
IN6	6	P1.4	36 J3 MIS
IN7	7	P1.5	35 J2 SCK
IN8	8	P1.6	34 J1
		P1.7	33 SDA
		P0.6	32 SCL
		P0.7	
51 RES	9	RST	
PA10 TX	10	RXD	EA
PA9 RX	11	TXD	ALE
IRN	12	INT0	PSEN
		INT1	
	13	T0	28 K2 FM
	14	P2.7	27
	15	P2.6	26 PWMB
SDA C	16	P2.5	25 BIN2
SCL C	17	P2.4	24 BIN1
	18	P2.3	23 AIN1
XTAL2	19	P2.2	22 AIN2
XTAL1	20	P2.1	21 PWMA
		P2.0	

STM32 core board interface



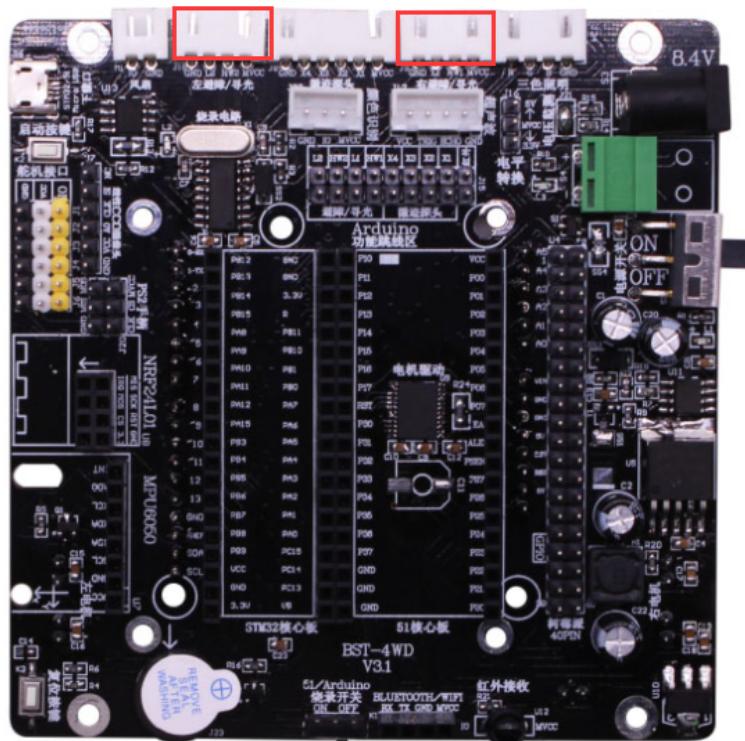
1-2 Schematic diagram

The interface has two pins: GND, IO port. We use l9110s motor drive chip in here. When the IO port gets low level, the fan can rotate.

Pin table:

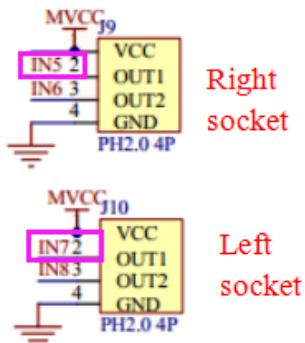
Module interface	Arduino	51controller	STM32	Raspberry Pi
IO port	A5	P0.0	PA1	IO2

2.Left and right infrared obstacle avoidance (light seeking) interface:

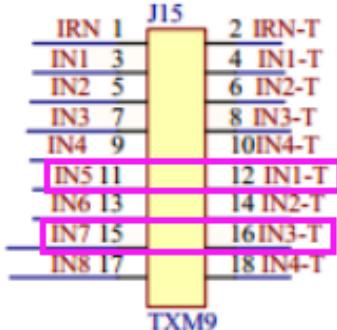


2-1 Position

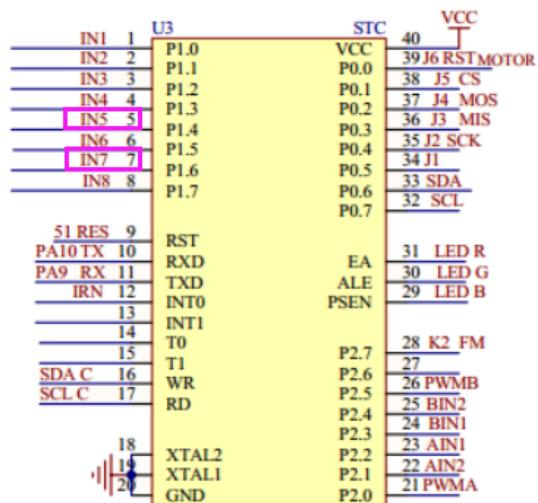
Left IR avoid obstacle/seek light Module interface



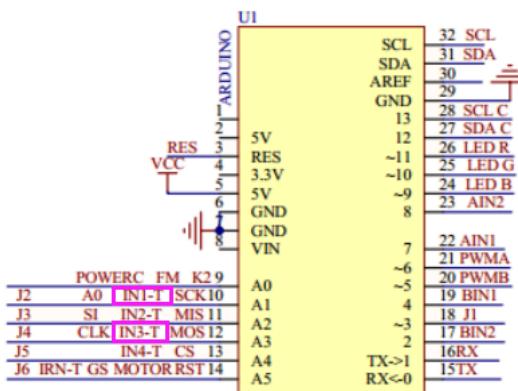
Arduino function switch



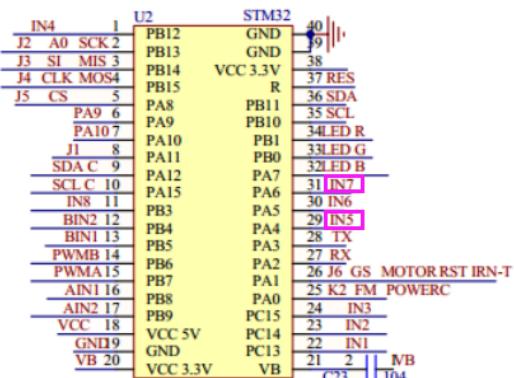
51 mcu core board interface



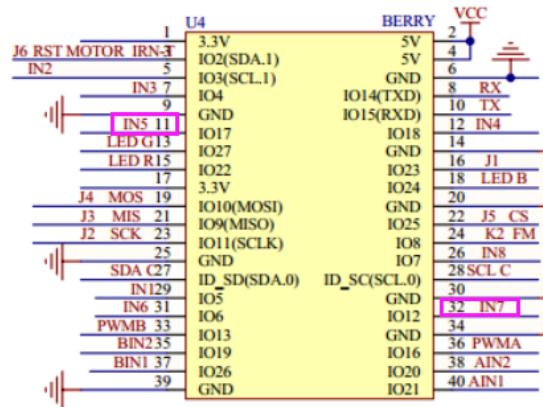
Arduino UNO interface



STM32 core board interface



Raspberry pi interface



2-2 Schematic diagram

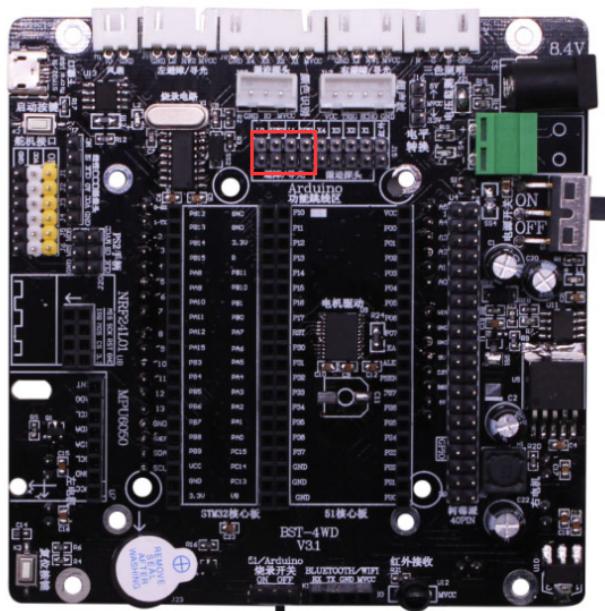
The interface has four pins: VCC, GND, and two OUT ports. Under normal working conditions, VCC is 5V voltage. We can connect the infrared obstacle avoidance sensor module to these two joints, and judge whether the front is an obstacle by detecting the level

of the two OUT1 ports.

Pin table:

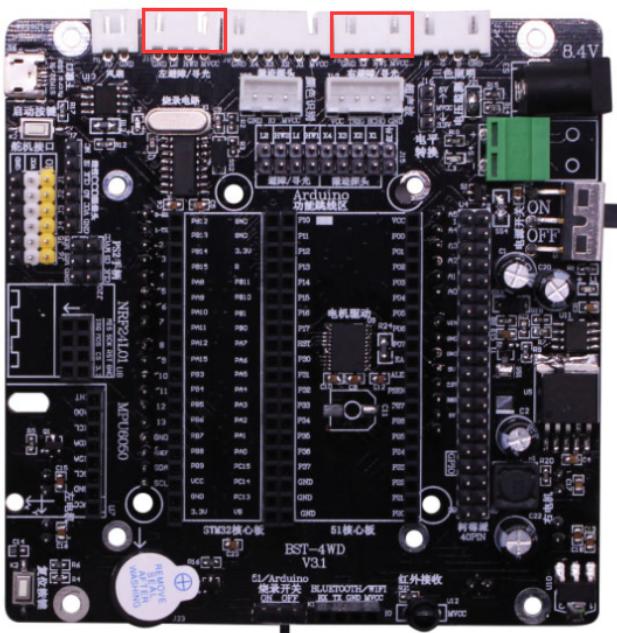
Module interface		Arduino	51 controller	STM32	Raspberry Pi
IN5(OUT1_R)	A1	P1.4	PA4	IO17	
IN7(OUT1_L)	A3	P1.6	PA6	IO12	

Note: When using the Arduino core controller, the corresponding IN5 and in1-t,IN7 and in3-t need to be connected with the jumper cap.



2-3 Position with jumper cap

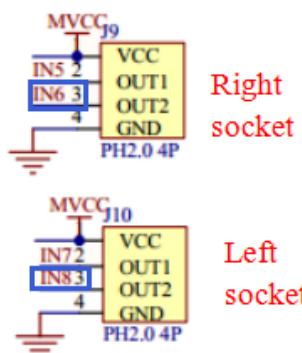
3. Light seeking (Left and right infrared obstacle avoidance) interface: :



3-1 Position

Left IR avoid obstacle/seek light

Module interface

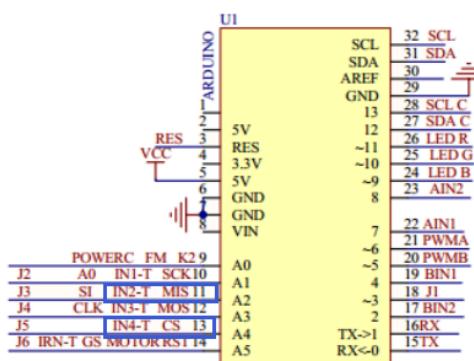


Arduino function switch

IRN 1	J15	2 IRN-T
IN1 3		4 IN1-T
IN2 5		6 IN2-T
IN3 7		8 IN3-T
IN4 9		10 IN4-T
IN5 11		12 IN1-T
IN6 13		14 IN2-T
IN7 15		16 IN3-T
IN8 17		18 IN4-T

TXM9

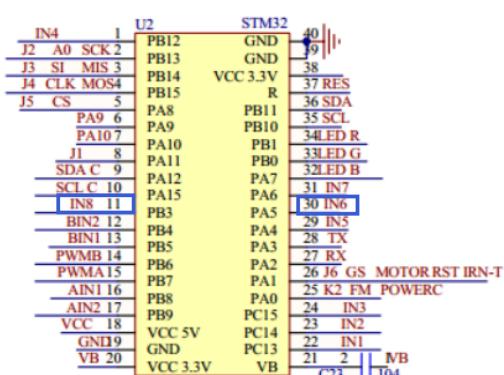
Arduino UNO interface



51 mcu core board interface

IN1 1	U3	STC 40	VCC
IN2 2	P1.0	VCC	39 J6 RST MOTOR
IN3 3	P1.1	P0.0	38 J5 CS
IN4 4	P1.2	P0.1	37 J4 MOS
IN5 5	P1.3	P0.2	36 J3 MIS
IN6 6	P1.4	P0.3	35 J2 SCK
IN7 7	P1.5	P0.4	34 J1
IN8 8	P1.6	P0.5	33 SDA
	P1.7	P0.6	32 SCL
PA10 TX 10	RST	EA	31 LED R
PA9 RX 11	RXD	ALE	30 LED G
IRN 12	TXD	PSEN	29 LED B
INT0	INT1		28 K2 FM
	INT1		27
	T0	P2.7	26 PWMB
	T1	P2.6	25 BIN2
	WR	P2.5	24 BIN1
	RD	P2.4	23 AIN1
		P2.3	22 AIN2
	XTAL2	P2.2	21 PWMA
	XTAL1	P2.1	
	GND	P2.0	

STM32 core board interface



Raspberry pi interface

J6 RST MOTOR	BERRY	VCC
IN2	5V	5V
IN3 7	IO2(SDA,1)	5V
IN5 11	IO3(SCL,1)	GND
LED G13	IO14(TXD)	IO15(RXD)
LED R15	IO17	IO18
	IO22	IO23
J4 MOS 19	3.3V	14
J3 MIS 21	IO10(MOSI)	J1
J2 SCK 23	IO9(MISO)	12 IN4
	IO11(SCLK)	16 J1
SDA C27	IO2	18 LED B
IN129	3.3V	20
IN6 31	IO10(MOSI)	22 J5 CS
PWMB 33	IO9(MISO)	IO25
BIN235	IO11(SCLK)	24 K2 FM
IN137	IO8	26 IN8
	IO7	28 SCL C
ID_SD(SDA,0)	30	32 IN7
PWMA 36	32 IN7	34
BIN135	IO6	36 PWMA
IN19	IO12	38 AIN2
IN137	IO13	40 AIN1
	IO16	
IO26	IO20	
	IO21	

3-2 Schematic diagram

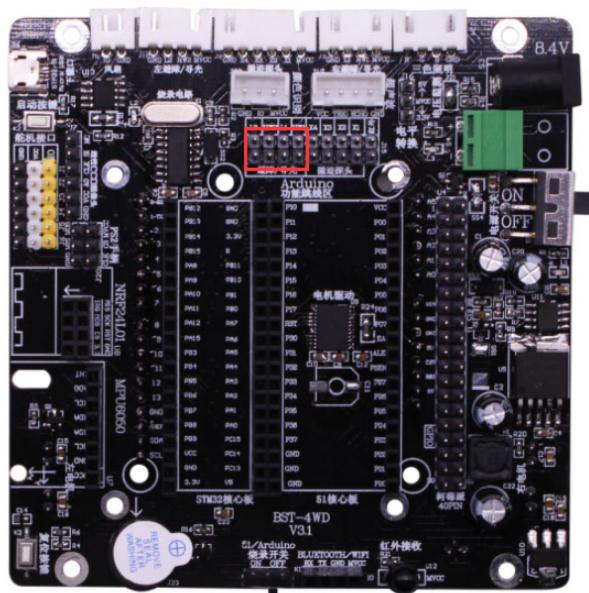
The interface has four pins: VCC, GND, and two OUT ports. Under normal working

conditions, VCC is 5V voltage. We can connect the infrared light-seeking sensor module to these two interfaces, and judge whether there is light by detecting the level of the two OUT2 ports.

Pin table:

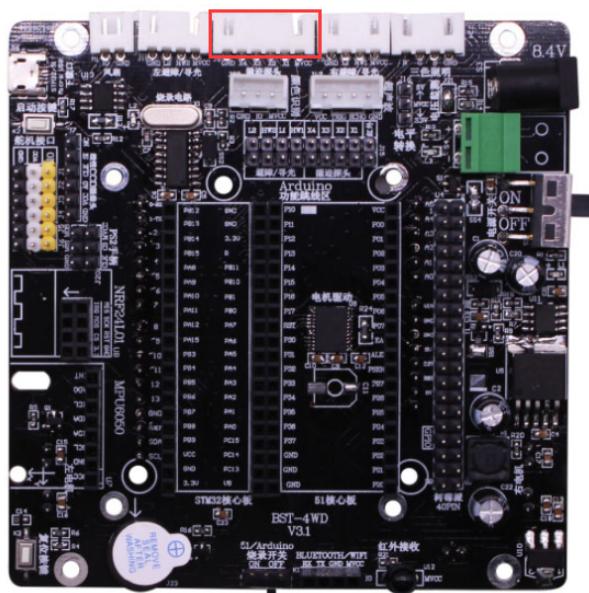
Module interface	Arduino	51controller	STM32	Raspberry Pi
IN6(OUT2_R)	A2	P1.5	PB3	IO6
IN8(OUT2_L)	A4	P1.7	PA5	IO7

Note: When using the Arduino core controller, the corresponding IN6 and in2-t, IN8 and in4-t need to be connected with the jumper cap.



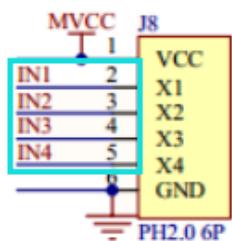
3-3 Position with jumper cap

4. 4-Channel tracking interface

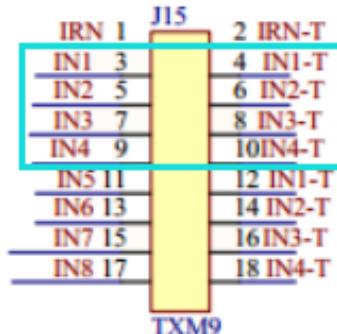


4-1 Position

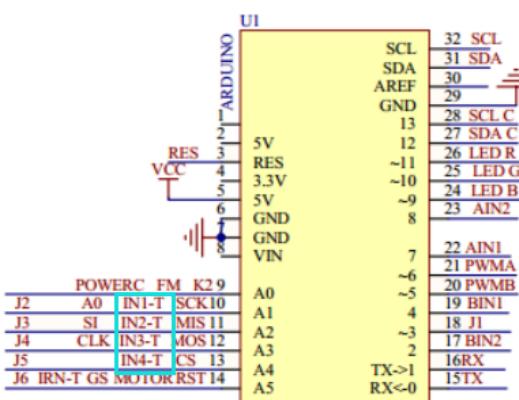
4 channel tracking Module interface



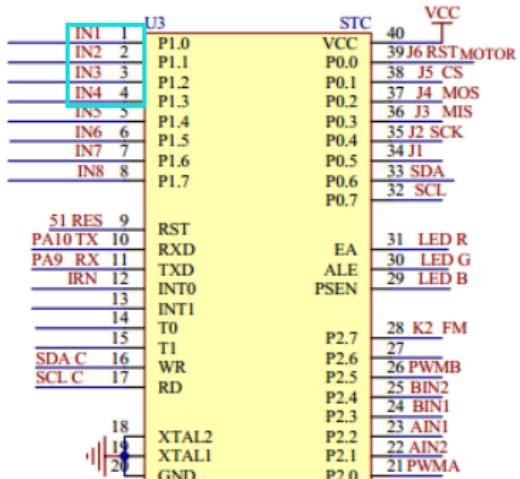
Arduino function switch



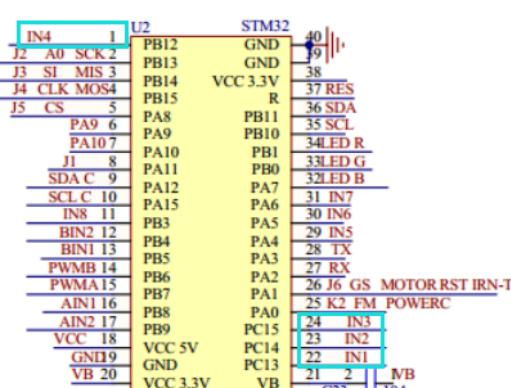
Arduino UNO interface



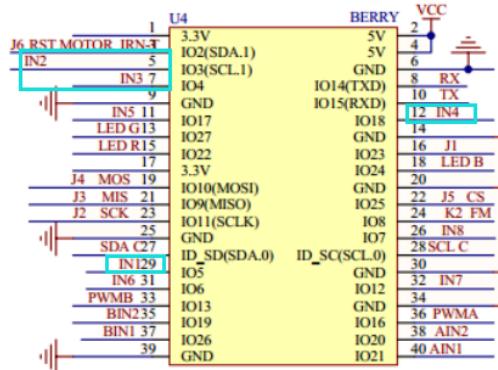
51 mcu core board interface



STM32 core board interface



Raspberry pi interface



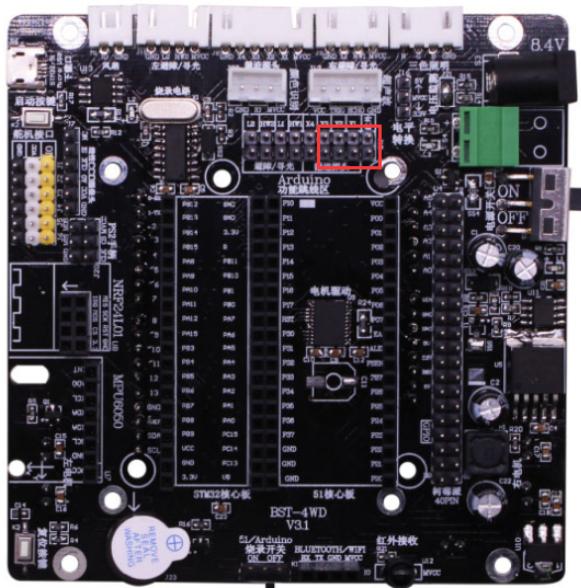
4-2 Schematic diagram

The interface has six pins: VCC, GND, IN1, IN2, IN3, and IN4. VCC is 5V voltage under normal operation. We can connect a four-channel tracking module here, and judge whether it is on the black track by checking the level of IN1, IN2, IN3 and IN4 ports.

Pin table:

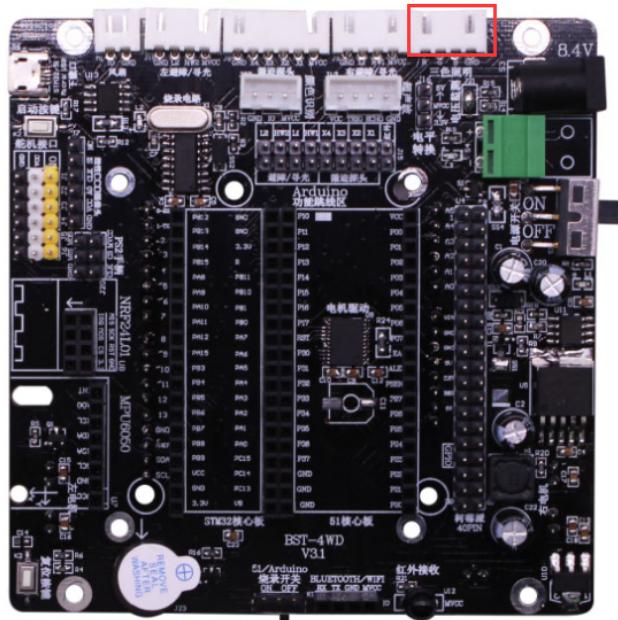
Module interface	Arduino	51controller	STM32	Raspberry
IN1	A1	P1.0	PC13	IO5
IN2	A2	P1.2	PC14	IO3
IN3	A3	P1.3	PC15	IO4
IN4	A4	P1.4	PB12	IO18

Note: When using the Arduino core controller, the corresponding IN1 and in1-t, IN2 and in2-t, IN3 and in3-t, IN4 and in4-t need to be connected with the jumper cap.



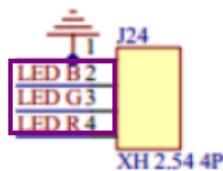
4-3 Position with jumper cap

5.RGB LED module interface

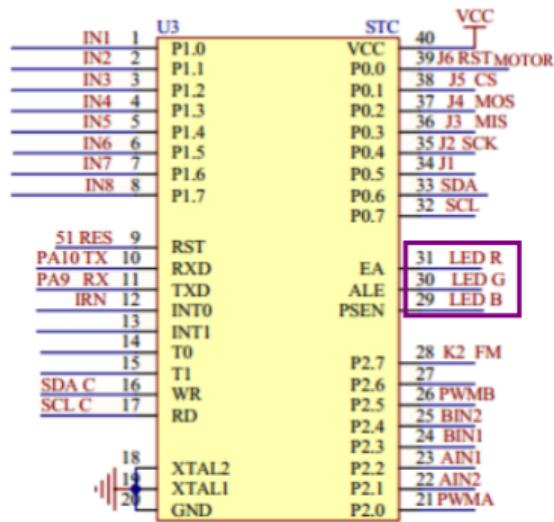


5-1 Position

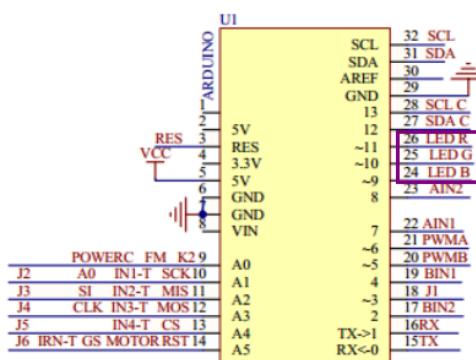
RGB LED Module interface



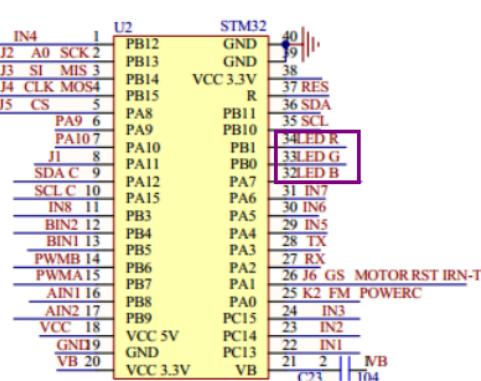
51 mcu core board interface



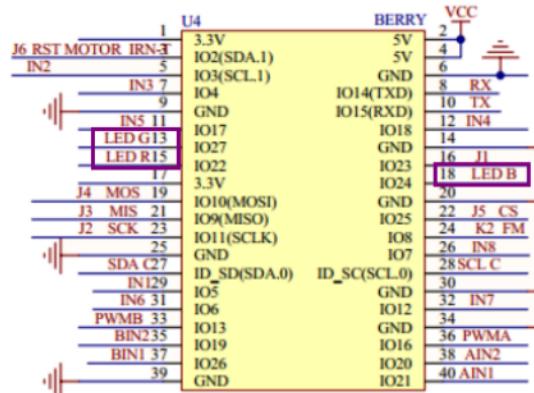
Arduino UNO interface



STM32 core board interface



Raspberry pi interface



5-2 Schematic diagram

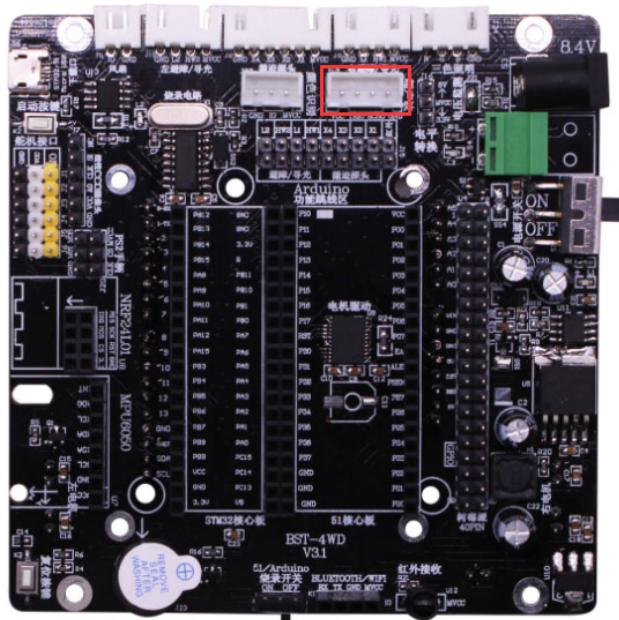
The interface has four pins: GND, LED R, LEDG, LEDB. When the LED R, LED G, and LED B pins are respectively turned on, the corresponding color lights (red, green, and blue) can be lit. When any two of the pins (or three pins) are at a high level, the RGB light will appear in a mixture of two colors (three colors).

Pin table:

Module interface	Arduino	51 controller	STM32	Raspberry Pi
------------------	---------	---------------	-------	--------------

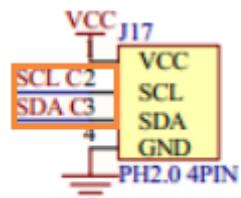
LED R	~11	P4.6 (EA)	PB1	IO22
LED G	~10	P4.5 (ALE)	PB0	IO27
LED B	~9	P4.4 (PSEN)	PA7	IO24

6. Ultrasonic module interface

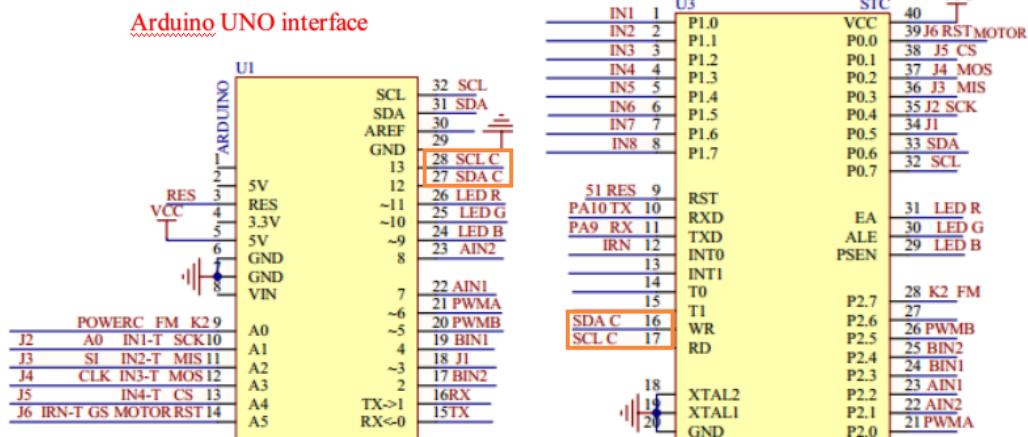


6-1 Position

Ultrasonic sensor Module interface



51 mcu core board interface



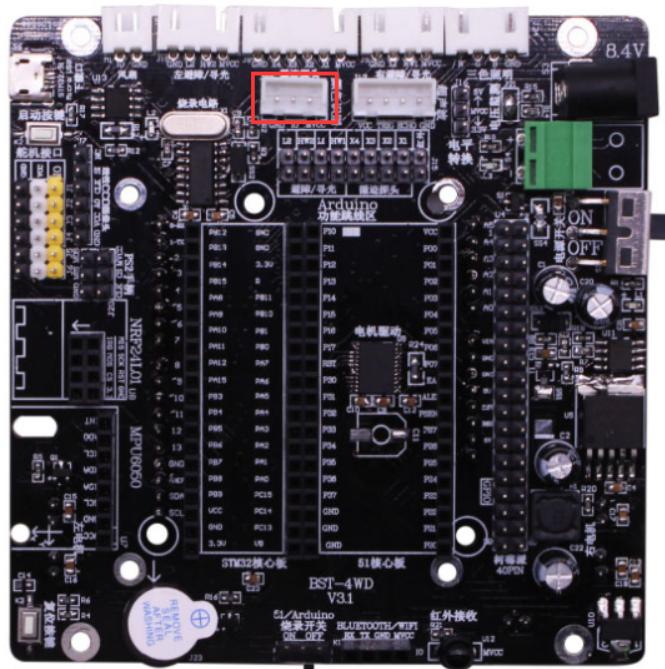
6-2 Schematic diagram

The interface has four pins: VCC, GND, SDA, SCL. Under normal operating conditions, VCC is 5V. When used, the Trig pin of the ultrasonic module is connected to SCL, and the Echo pin is connected to SDA.

Pin table:

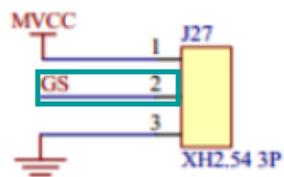
Module interface	Arduino	51controller	STM32	Raspberry Pi
SDA	12	P3.6 (WR)	PA12	ID_SD(SDA.0)
SCL	13	P3.7 (RD)	PA15	ID_SC(SCL.0)

7.Grayscale module (color recognition) interface

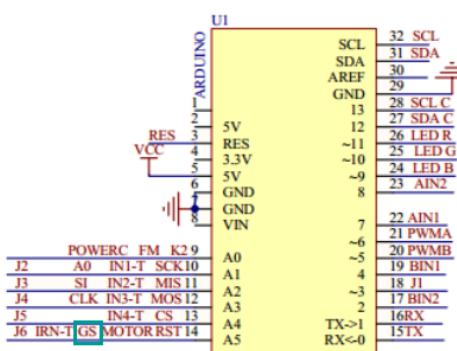


7-1 Position

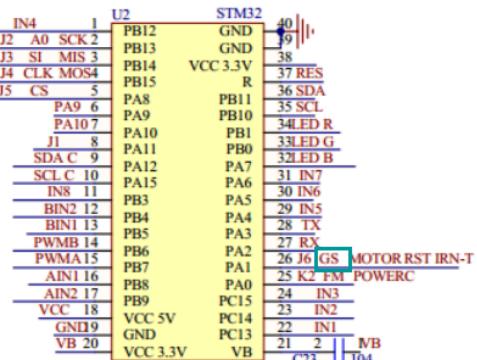
Color recognize Module interface



Arduino UNO interface



STM32 core board interface



7-2 Schematic diagram

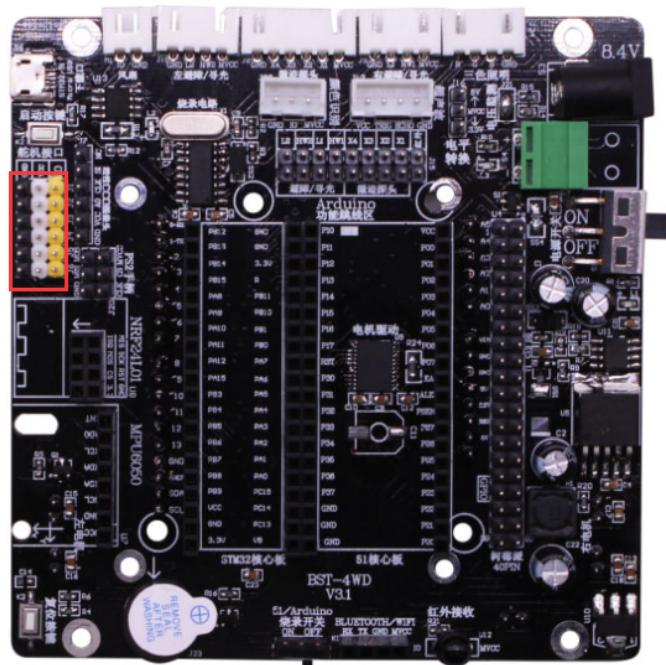
The interface has three pins: VCC, GND, and IO. VCC is 5V under normal operating conditions.

Pin table:

Module interface	Arduino	STM32
GS	A5	PA1

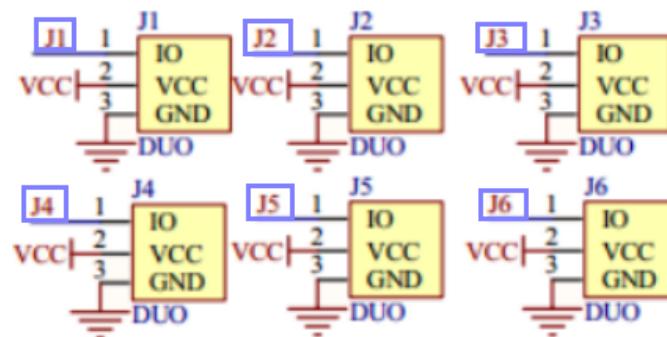
Note: This interface only supports Arduino and STM32 versions. The fan and infrared remote jumper caps need to be removed during use (explained later).

8. Servo interface

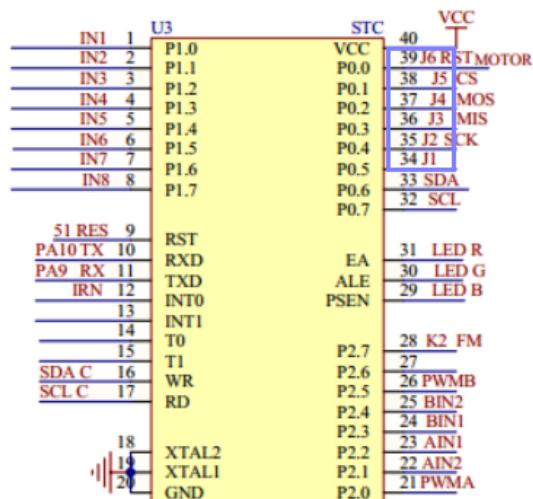
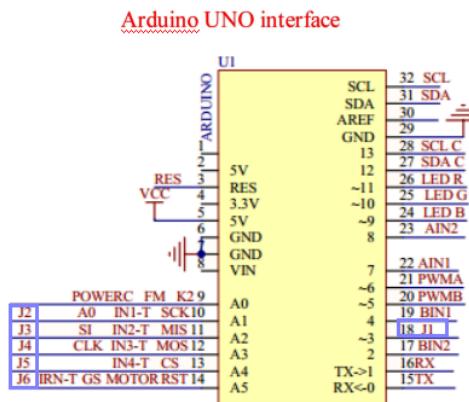


8-1 Position

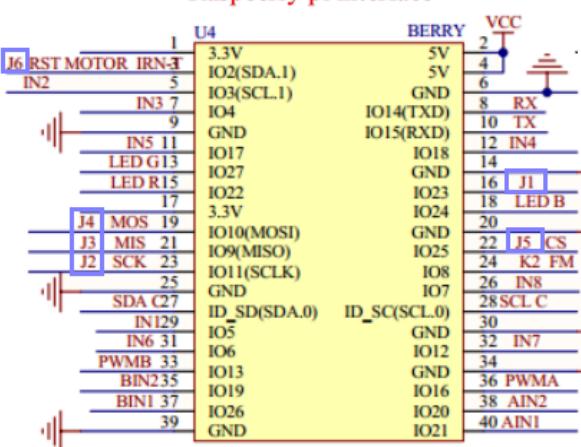
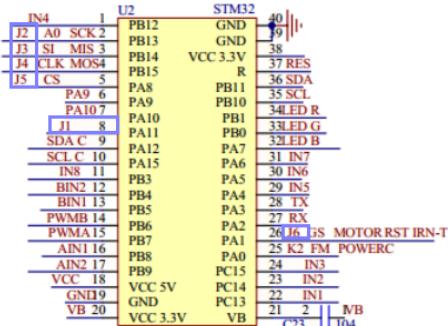
Servo interface



51 mcu core board interface



STM32 core board interface



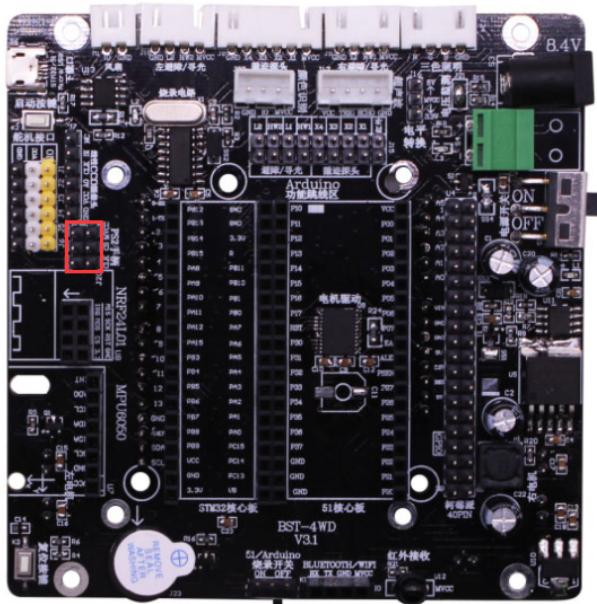
8-2 Schematic diagram

There are 6 servo interfaces, each with three pins: VCC, GND, and IO. VCC is 5V under normal operating conditions. It can simultaneously output 6 PWMs independently to control 6 servos.

Pin table:

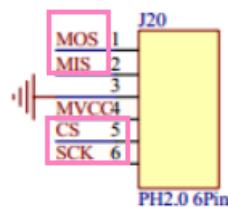
Module interface	Arduino	51 controller	STM32	Raspberry Pi
J1	~3	P0.5	PA11	IO23
J2	A1	P0.4	PB13	IO11
J3	A2	P0.3	PB14	IO9
J4	A3	P0.2	PB15	IO10
J5	A4	P0.1	PA8	IO25
J6	A5	P0.0	PA1	IO2

9. PS2controller receiving module interface



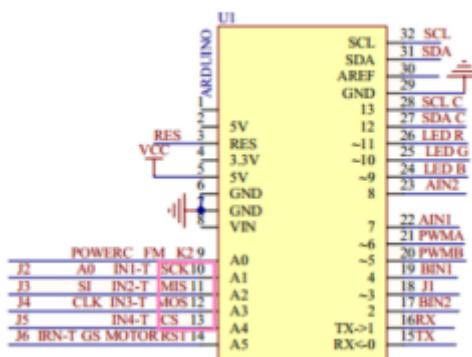
9-1 Position

PS2 receive Module interface

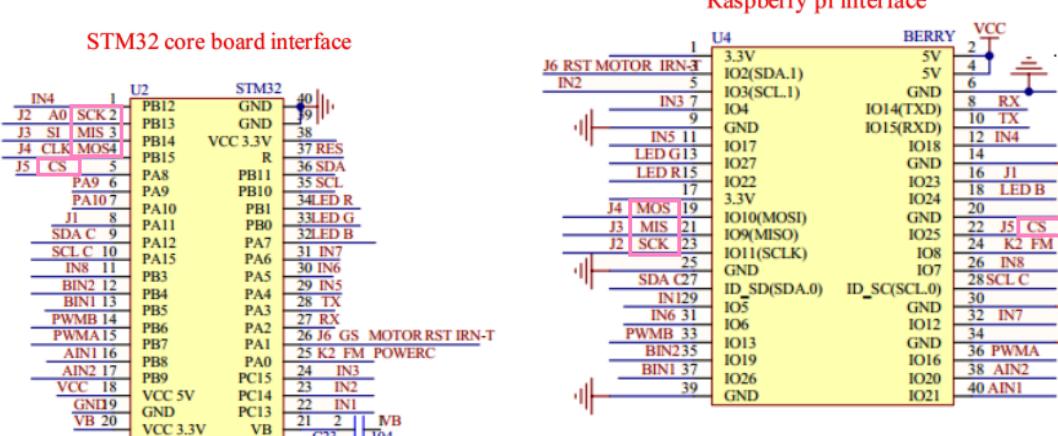


51 mcu core board interface

Arduino UNO interface



ARDUINO	U1	51 RES	51 mcu core board interface
VCC	32 SCL	9	40 VCC
VCC	31 SDA	PA10 TX	39 J6 RST MOTOR
RES	30 AREF	10	38 J6 CS
5V	29 GND	PA9 RX	37 J6 MOS
RES	28 SCL C	11	36 J6 MIS
5V	27 SDA C	PA11 IRN	35 J2 SCK
5V	26 LED R	12	34 J1
3.3V	25 LED G	PA12 IRN	33 SDA
5V	24 LED B	13	32 SCL
GND	23 AIN2	PA13 INT0	PSEN
GND	22 AIN1	14 T0	28 K2 FM
VIN	21 PWMA	PA14 T1	27
7	20 PWMB	PA15 WR	P2.6
7	19 BIN1	PA16 RD	P2.5
~6	18 J1	SDA C	25 BIN2
~5	17 BIN2	PA17 SCL C	P2.4
4	16RX	18 XTAL2	24 BIN1
~3	15TX	PA19 XTAL1	P2.3
2	RX<-0	19 GND	P2.2
A4	TX>1	20 GND	P2.1
A5	RX<-0		21 PWMA



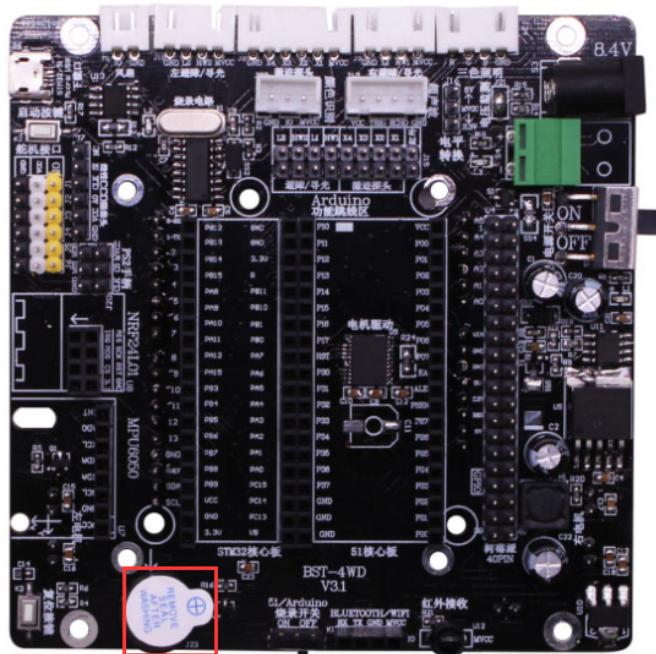
9-2 Schematic diagram

The interface has six pins: VCC, GND, MOS, MIS, CS, SCK. Under normal working conditions, VCC is 5V, and the SPI communication method is adopted between the receiver and the core controller.

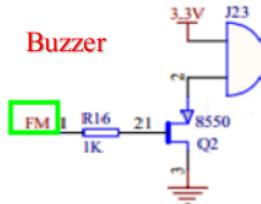
Pin table:

Module interface	Arduino	51controller	STM32	Raspberry Pi
CS	A4	P0.1	PA8	IO25
SCK	A1	P0.4	PB13	IO11
MOS	A3	P0.2	PB15	IO10
MIS	A2	P0.3	PB14	IO9

10.Buzzer

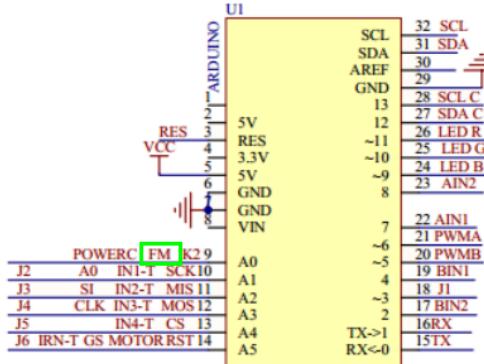


10-1 Position

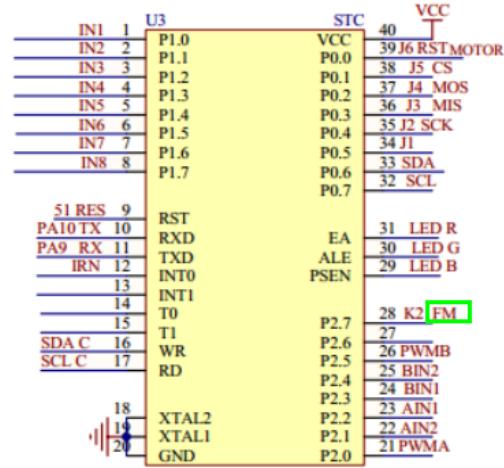
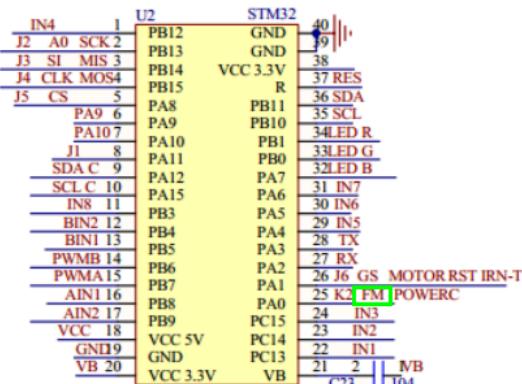


51 mcu core board interface

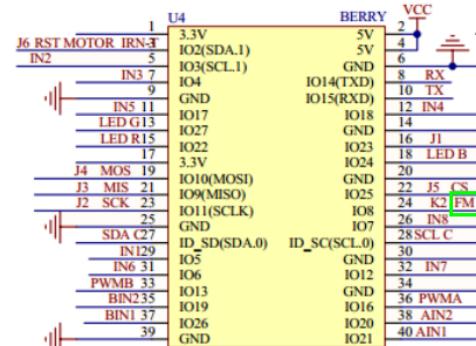
Arduino UNO interface



STM32 core board interface



Raspberry pi interface



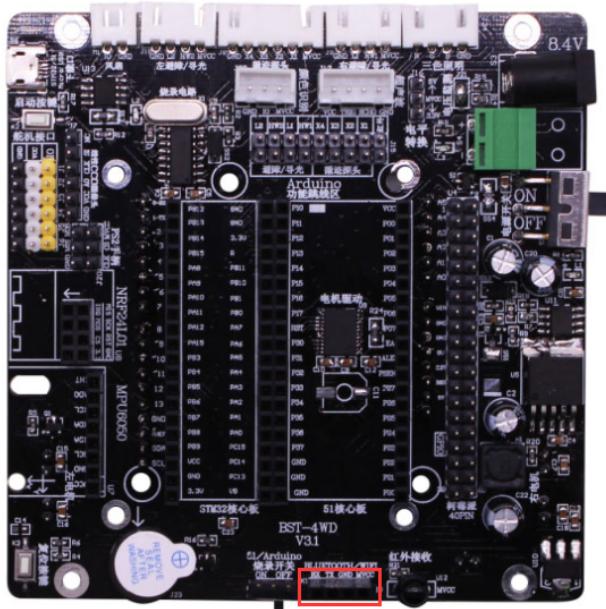
10-2 Schematic diagram

The active buzzer is used here.

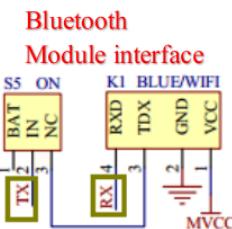
Pin table:

Module interface	Arduino	51controller	STM32	Raspberry Pi
FM	A0	P2.7	PA0	IO8

11.Bluetooth/WIFI module interface



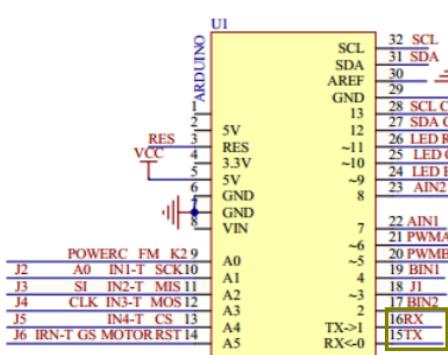
11-1 Position



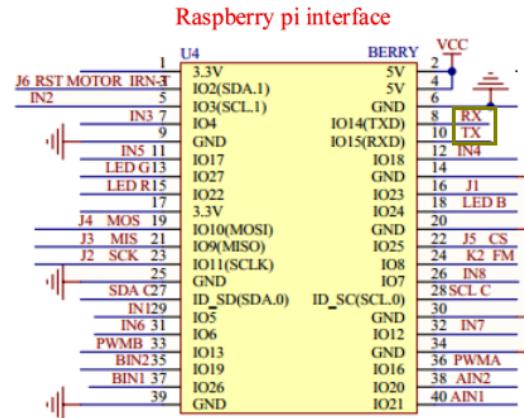
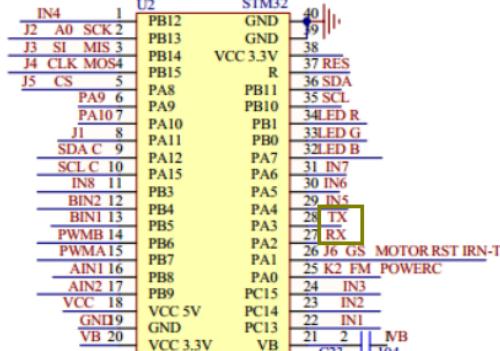
51 mcu core board interface

IN1	U3	STC	VCC
IN2	P1.0	VCC	39 J6 RSTMOTOR
IN3	P0.0	38 J5 CS	
IN4	P1.2	P0.1	37 J4 MOS
IN5	P1.3	P0.2	36 J3 MIS
IN6	P1.4	P0.3	35 J2 SCK
IN7	P1.5	P0.4	34 J1
IN8	P1.6	P0.5	33 SDA
	P1.7	P0.6	32 SCL
		P0.7	
	51 RES	RST	31 LED R
	PA10 TX	RXD	30 LED G
	PA9 RX	TXD	29 LED B
	IRN	INTO	
	12	INT1	
	13	T0	28 K2 FM
	27 SDA C	T1	27
	26 LED R	WR	26 PWMB
	~11		25 BIN2
	~10		24 BIN1
	24 LED G		23 AIN1
	~9		22 AIN2
	23 AIN2		21 PWMA
	8		
	7		
	22 AIN1		
	21 PWMA		
	A0		
	5V		
	RES		
	4		
	3.3V		
	5		
	5V		
	GND		
	VIN		
	POWERC FM K2 9		
J2	A0 IN1-T SCK10		
J3	SI IN2-T MIS 11		
J4	CLK IN3-T MOS 12		
J5	IN4-T CS 13		
J6	IRN-T GS MOTOR RST 14		

Arduino UNO interface



STM32 core board interface



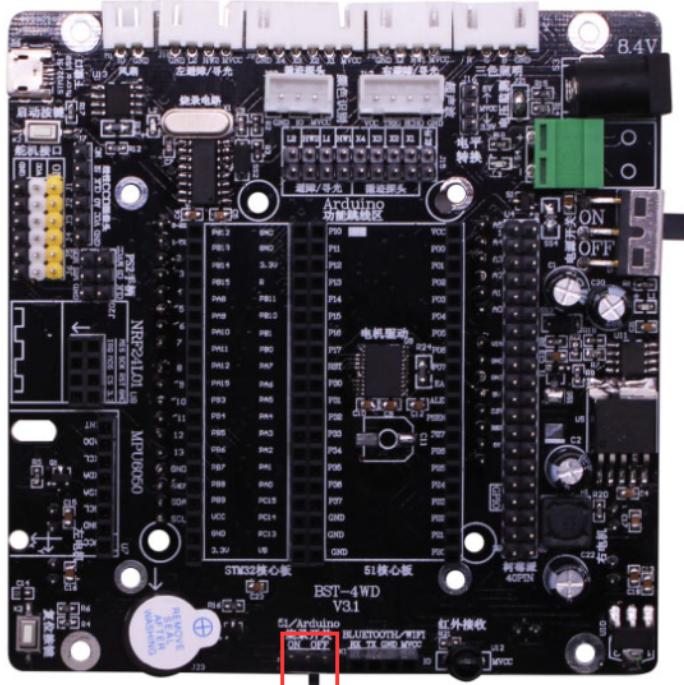
11-2 Schematic diagram

The interface has four pins: VCC, GND, TX, RX. VCC is 5V under normal working conditions, where Bluetooth uses serial communication.

Pin table:

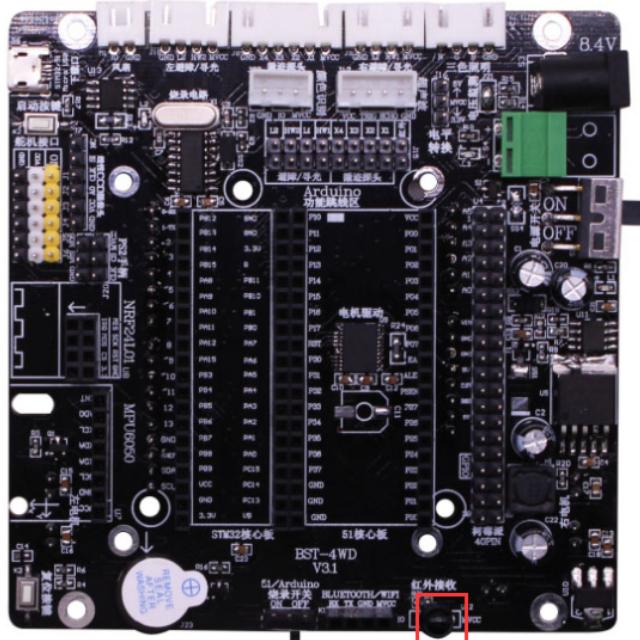
Module interface	Arduino	51controller	STM32	Raspberry Pi
TX	0	P3.0	PA3	IO15
RX	1	P3.1	PA2	IO14

Note: When using the serial port, for example: print data, burn the program through the CH340 serial port, you need to unplug the Bluetooth module. When using the Bluetooth module, you need to turn the programming switch next to the interface to OFF.



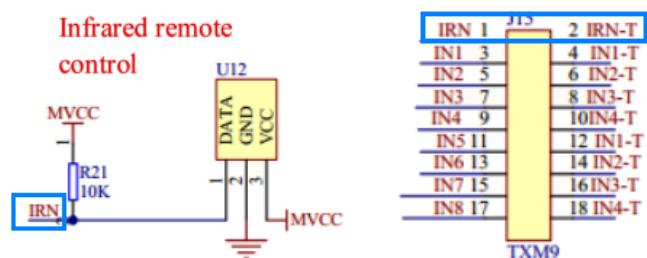
11-3 Switch position for burning

12. Infrared receiver

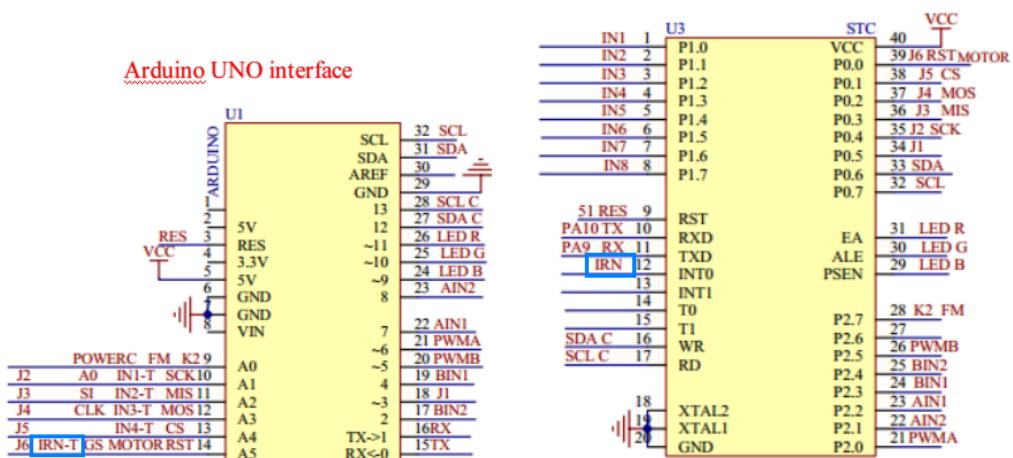


12-1 Position

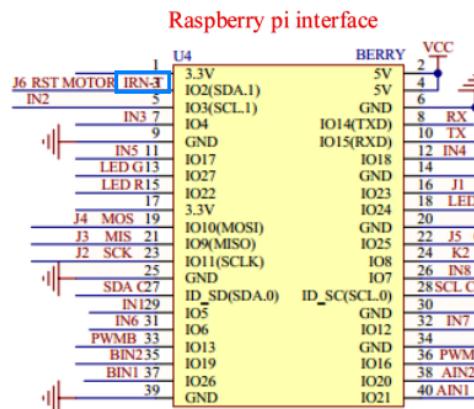
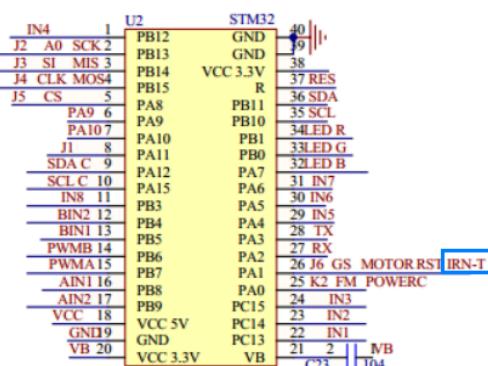
Arduino function switch



51 mcu core board interface



STM32 core board interface



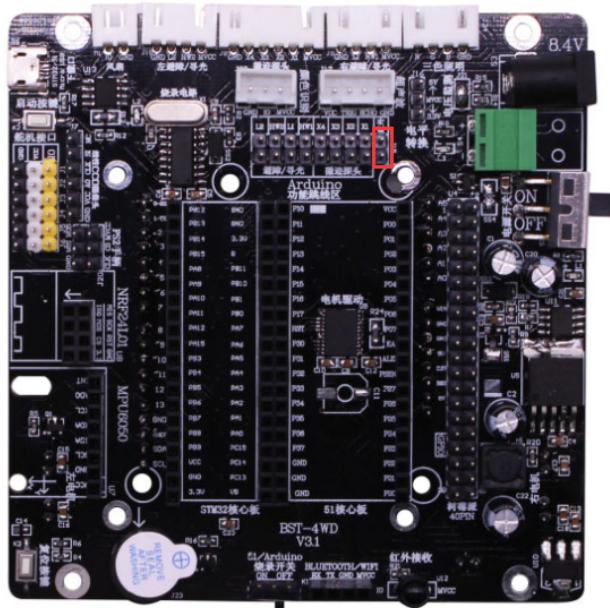
12-2 Schematic diagram

The infrared remote control function needs to use our dedicated remote control to be implemented normally.

Pin table:

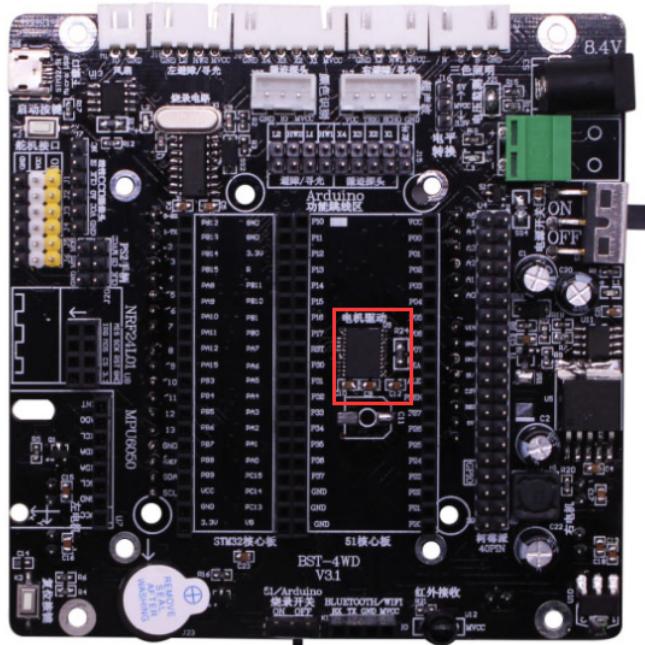
Module interface	Arduino	51controller	STM32	Raspberry Pi
IRN	A5	P3.2(INT0)	PA1	IO2

Note: When using the infrared remote control, you need to connect the infrared jumper cap on the expansion board. And unplug the grayscale (color recognition module) and the small fan.

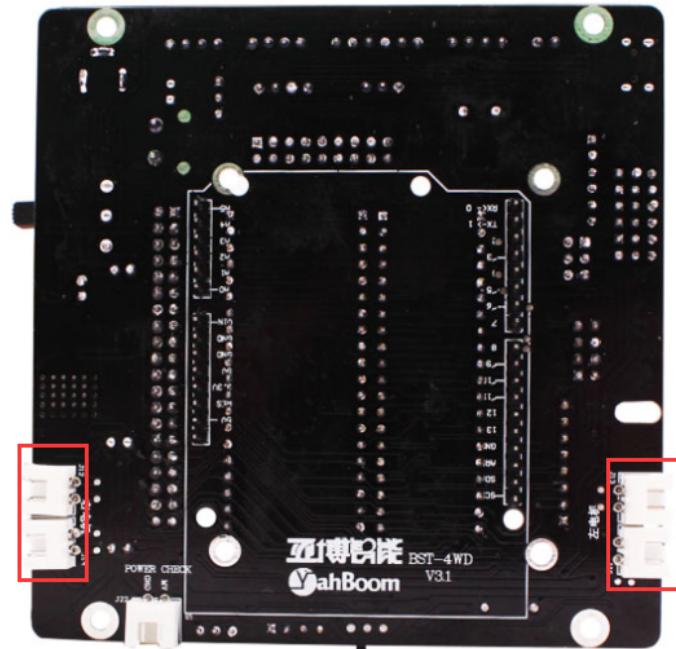


12-3 Position with jumper cap

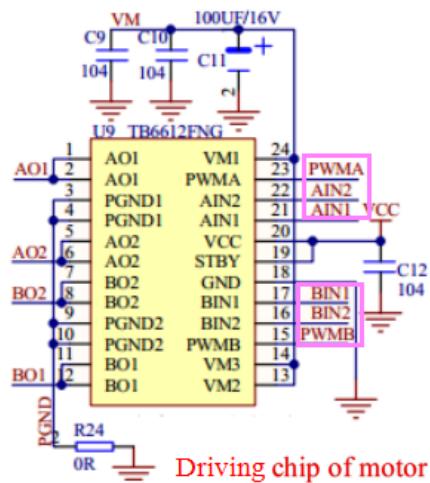
13. Motor driver circuit/interface



13-1 Motor driver chip position

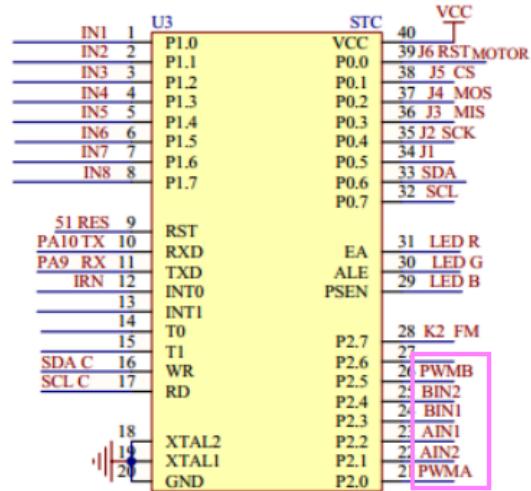
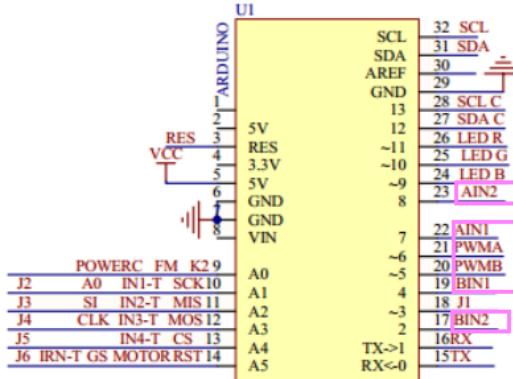


13-1 Motor interface position

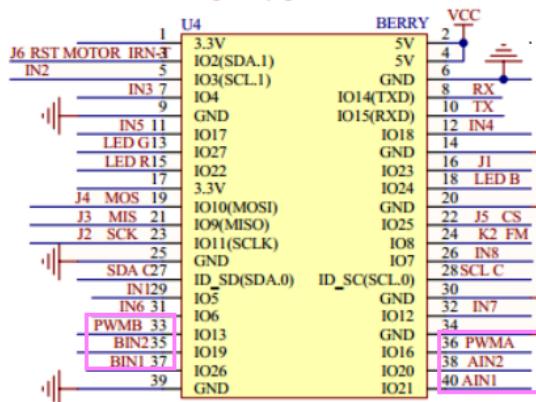
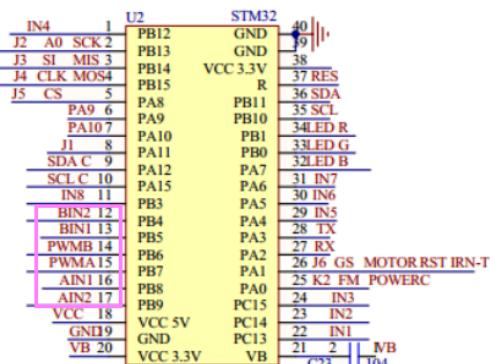


51 mcu core board interface

Arduino UNO interface



STM32 core board interface



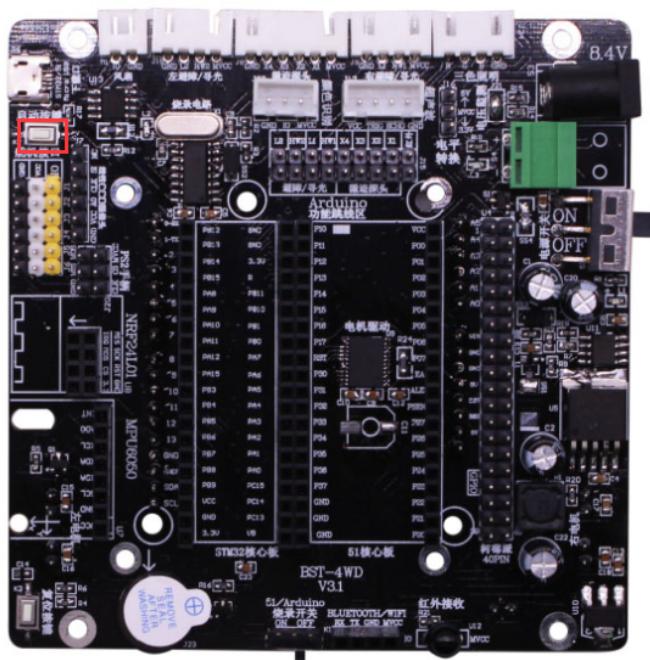
13-3 Schematic diagram

Control two motors with two PWM to adjust the direction and speed of the motor.

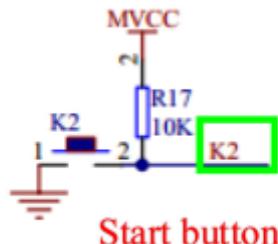
Pin table:

Module interface	Arduino	51controller	STM32	Raspberry Pi
PWMA	~6	P2.0	PB7	IO16
PWMB	~5	P2.5	PB6	IO13
AIN1	7	P2.2	PB8	IO21
AIN2	8	P2.1	PB9	IO20
BIN1	4	P2.3	PB5	IO26
BIN2	2	P2.4	PB4	IO19

14. Start button



14-1 Position



Start button

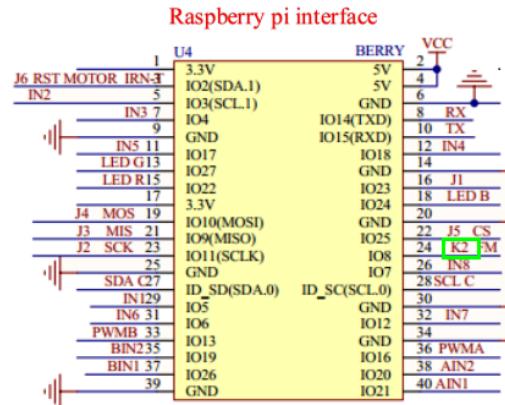
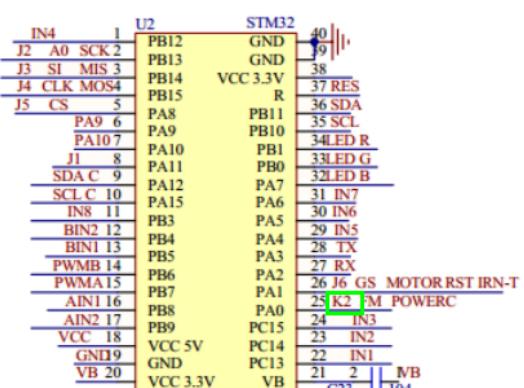
51 mcu core board interface

	IN1	1	U3	STC	40
	IN2	2	P1.0	VCC	
	IN3	3	P1.1	39 J6 RST MOTOR	
	IN4	4	P1.2	38 J5 CS	
	IN5	5	P1.3	37 J4 MOS	
	IN6	6	P1.4	36 J3 MIS	
	IN7	7	P1.5	35 J2 SCK	
	IN8	8	P1.6	34 J1	
			P1.7	P0.4	33 SDA
				P0.5	32 SCL
				P0.6	
				P0.7	
			RST	31 LED R	
			RXD	30 LED G	
			TXD	29 LED B	
			PA10 TX	EA	
			PA9 RX	ALE	
			IRN 12	PSEN	
			INT0		
			INT1		
			T0	P2.7	
			SDA C	P2.6	28 K2 FM
			16	P2.5	27
			SDA C	P2.4	26 PWMB
			17	P2.3	25 BIN2
			XTAL2	P2.2	24 BIN1
			XTAL1	P2.1	23 AIN1
			GND	P2.0	22 AIN2
					21 PWMA

Arduino UNO interface

POWERC	FM	K2.9	U1	SCL	32
J2	A0	IN1-T	ARDUINO	SDA	31
J3	SI	IN2-T		AREF	30
J4	CLK	IN3-T		GND	29
J5	IN4-T	CS		13	28
J6	IRN-T	GS		12	27
	MOTOR	RST		26	LED R
		14		25	LED G
		15		24	LED B
		16		23	AIN2
		17		22	AIN1
		18		21	PWMA
		19		20	PWMB
		20		19	BIN1
		21		18	J1
		22		17	J1
		23		16	BIN2
		24		15	TX>1
		25		14	RX<0
		26		13	TX
		27		12	
		28		11	
		29		10	
		30		9	
		31		8	
		32		7	
		33		6	
		34		5	
		35		4	
		36		3	
		37		2	
		38		1	
		39		0	

STM32 core board interface



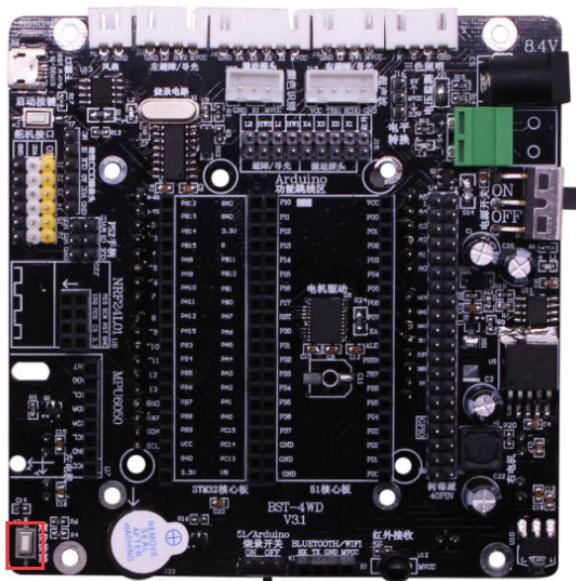
14-2 Schematic diagram

This is a start button that can be defined to turn on a feature.

Pin table:

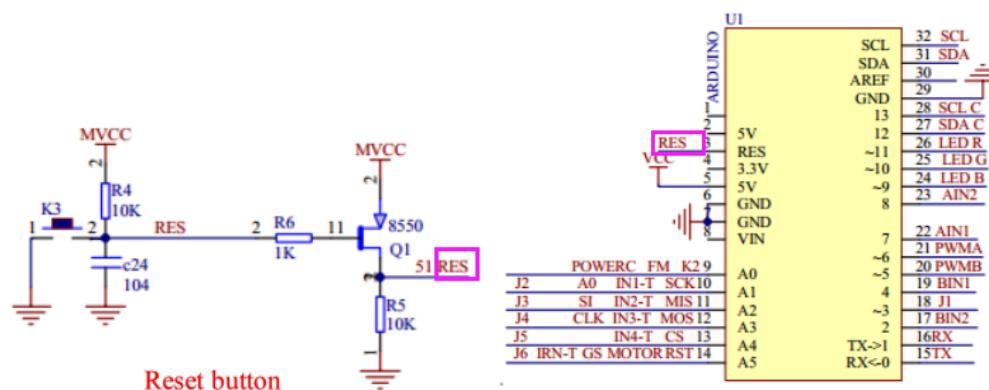
Module interface	Arduino	51controller	STM32	Raspberry Pi
K2	A0	P2.7	PA0	IO8

15. Reset button



15-1 Position

Arduino UNO interface



51 mcu core board interface

IN1	1	U3	STC	40	VCC
IN2	2	P1.0	VCC	39 J6 RST MOTOR	
IN3	3	P1.1	P0.0	38 J5 CS	
IN4	4	P1.2	P0.1	37 J4 MOS	
IN5	5	P1.3	P0.2	36 J3 MIIS	
IN6	6	P1.4	P0.3	35 J2 SCK	
IN7	7	P1.5	P0.4	34 J1	
IN8	8	P1.6	P0.5	33 SDA	
		P1.7	P0.6	P0.7	32 SCL
51 RES	9	RST			
PA10 TX	10	RXD	EA	31 LED R	
PA9 RX	11	TXD	ALE	30 LED G	
IRN	12	INT0	PSEN	29 LED B	
	13	INT1			
	14	T0			
SDA C	16	T1	P2.7	28 K2 FM	
SCL C	17	WR	P2.6	27	
	18	RD	P2.5	26 PWMB	
	19	XTAL2	P2.4	25 BIN2	
	20	XTAL1	P2.3	24 BIN1	
		GND	P2.2	23 AIN1	
			P2.1	22 AIN2	
			P2.0	21 PWM_A	

STM32 core board interface

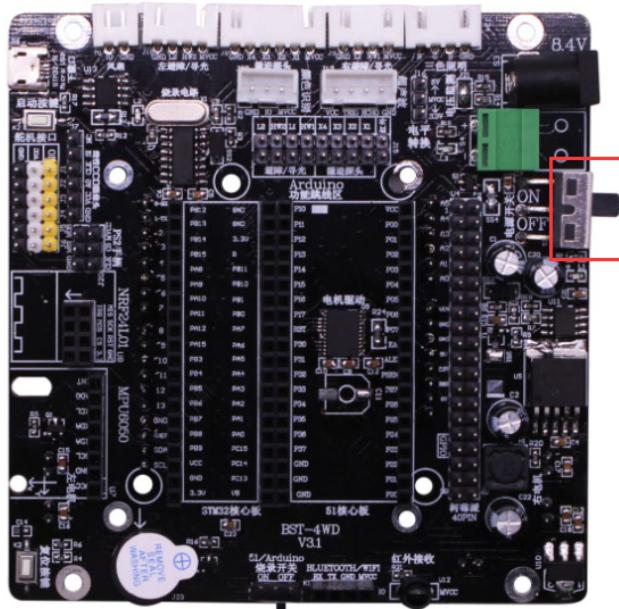
IN4	1	U2	STM32	40
J2	A0	SCK 2	PB12	GND
J3	SI	MIS 3	PB13	GND
J4	CLK	MOS4	PB14	VCC 3.3V
J5	CS	5	PB15	R
			PA9	37 RES
			PA8	36 SDA
			PA9	35 SCL
			PA10	34 LED R
			PA11	33 LED G
			PA12	32 LED B
			PA15	31 IN7
			PA16	30 IN6
			PA5	29 IN5
			PA4	28 TX
			PA3	27 RX
			PA2	26 J6 GS MOTOR RST IRN-T
			PA1	25 K2 FM POWERC
			PA0	24 IN3
			PC15	23 IN2
			PC14	22 IN1
			PC13	21 2 WB
			VB	C23 T04
			VB	
			VCC 3.3V	
			GND	
			VCC 5V	
			VB 20	

15-2 Schematic diagram

This is a reset button that re-energizes the expansion board, which is equivalent to restarting the expansion board and the core controller.

Note: The Raspberry Pi core controller does not need to connect to this button.

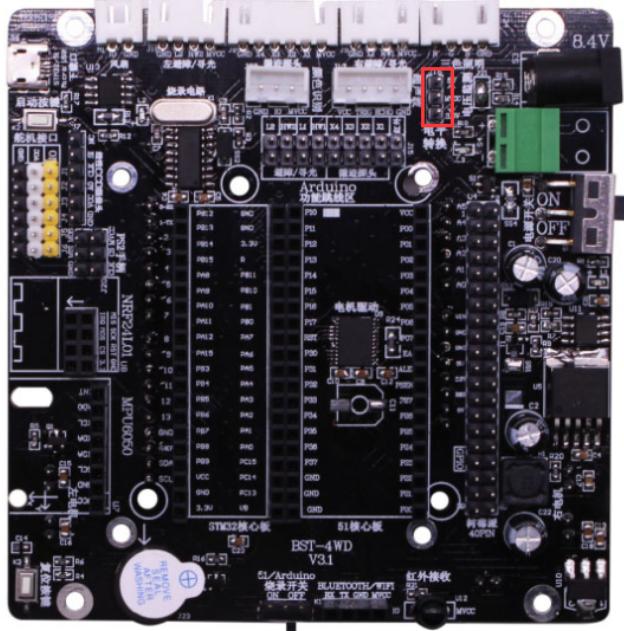
16. Power button



16-1 Position

It is used to control the power switch of the expansion board.

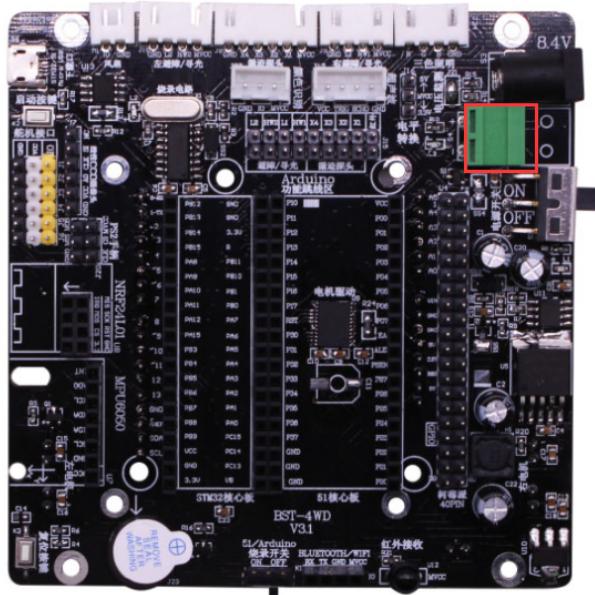
17. 5V/3.3V power switch



17-1 Position

If the top two pin headers are connected by a jumper cap, it is a 5V power supply; if the lower two pin headers are connected, it is a 3.3V power supply.

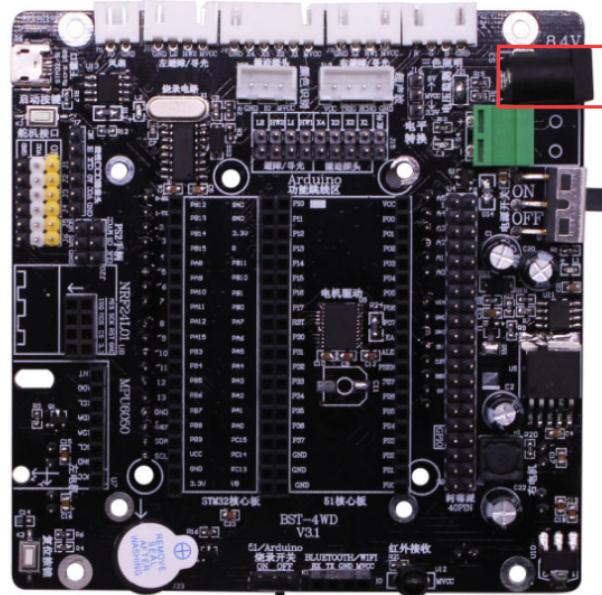
18. Battery box interface



18-1 Position

Plug the special battery box here to supply power to the expansion board. The power supply voltage of the expansion board cannot exceed 12.6v.

19. Charging socket



19-1 Position

Here you can charge the battery with a 12.6V in-line charger.