

1

YAHBOOM

4WD Smart Robot

Manual



Arduino

Raspberry Pi

- ① Please read this manual carefully before use
- ② The company reserves the right of interpretation for this manual
- ③ Product appearance, please prevail in kind
- ④ Please keep the manual properly after reading

Introduction

The G1 smart robot tank is an open source hardware platform educational robot that is compatible with two controllers. These two controllers have their own characteristics, and users can select the corresponding version according to different needs.

Arduino: Graphical programming, easy to program and design, suitable for low age learning.

Raspberry Pi: Micro-computer motherboard, powerful, suitable for makers to expand design and development.

At the same time, the G1 smart tank supports a number of customized sophisticated sensors, which can complete the functions of patrol and obstacle avoidance; support Bluetooth remote control.

About us

Shenzhen Yahboom Technology Co., Ltd. is a professional company specialized in open source hardware and maker education. We have two Enterprise Concept: turn ideas into reality and Let more children become maker. Company's products now have covered early childhood education, intelligent robot education, university automation technology education, and so on. In addition, the company provides long-term help and products for colleges and training institutions to develop a training program.

2

Package list

	Aluminum alloy Chassis		4wd breakout x 1
	Track x 2		18650 battery x 3
	18650 battery box x 1		12.6V battery charger x 1
	Screwdriver x 1		Bluetooth module x 1
	M3*16mm copper pillar x 12		M4*18mm short coupling x 2
	M3*8mm screw x 38		M4*8mm screws x 8
	M3 nut x 8		
	Driving gear x 4		370 motor (with 20cm wire) x 2
	Driving wheel baffle x 2		
	Plastic spacers x 2		
	Lash rivet x 2		
	Servo package x 1		4 pin cable x 1
	M2*10 copper pillar x 2		M3*8mm screw x 2
	M3*5mm screw x 2		M3*12mm copper pillar x 2
	M2*6 screw x 6		4 pin cable x 1
	RGB light x 1		4 channel patrol module x 1
	M3*8mm screw x 2		M3*8mm screw x 4
	M3*5mm screw x 2		M3*28mm copper pillar x 2
	4 pin cable x 1		6 pin cable x 1
Arduino version			
	M3*19 copper pillar x 4		Arduino UNO x 1
	M3*8 screw x 10		USB cable x 1
	Wire jumper x 5		
Raspberry Pi			
	M2*5*18 copper pillar x 4		Raspberry Pi 3B+ controller x 1
	M2*5*8 screw x 10		(Option)
	M3*9 copper pillar x 4		
	M3*5 screw x 10		
	Wire jumper x 5		
	40pin cable x 1		8G TF card x 1
			Heatsink x 1
			(Option)

3



Installation Step

Note: All screws are fitted with plastic spacer

01 Assemble driving gear



Design Sketch

02 Assemble driven gear



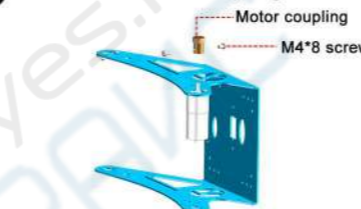
Design Sketch

03 Assemble baffle and motor



Design Sketch

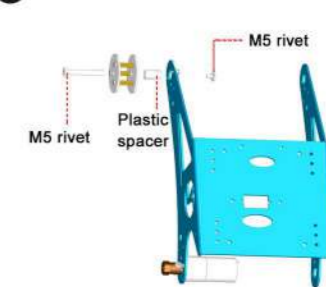
04 Assemble Motor coupling



Design Sketch

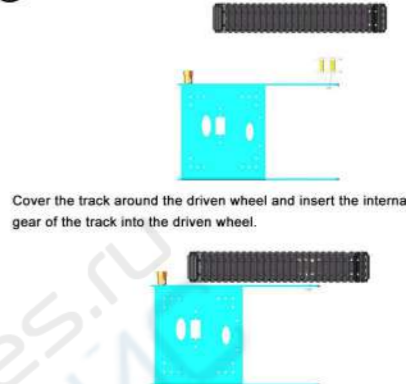
4

05 Assemble driven wheel



Design Sketch

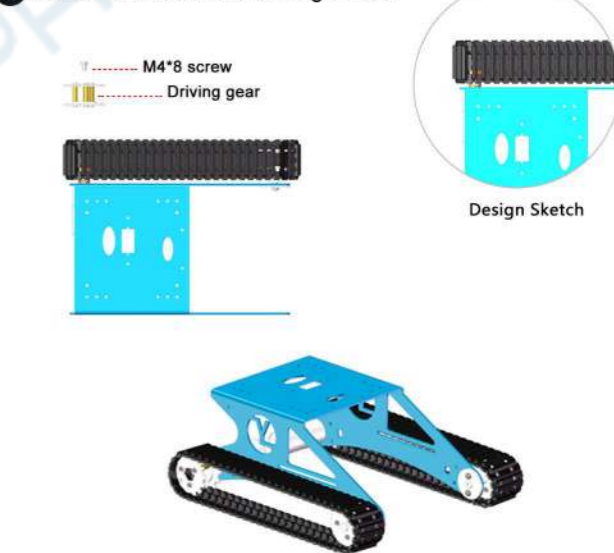
06 Assemble track



Cover the track around the driven wheel and insert the internal gear of the track into the driven wheel.

Design Sketch

07 Assemble track and driving wheel

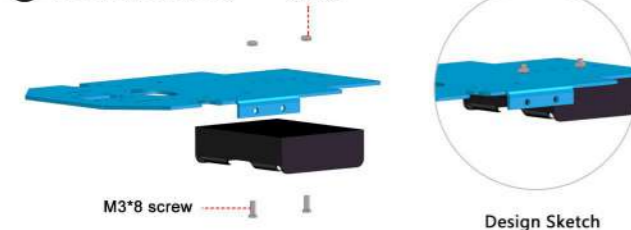


Design Sketch

The other side is also installed

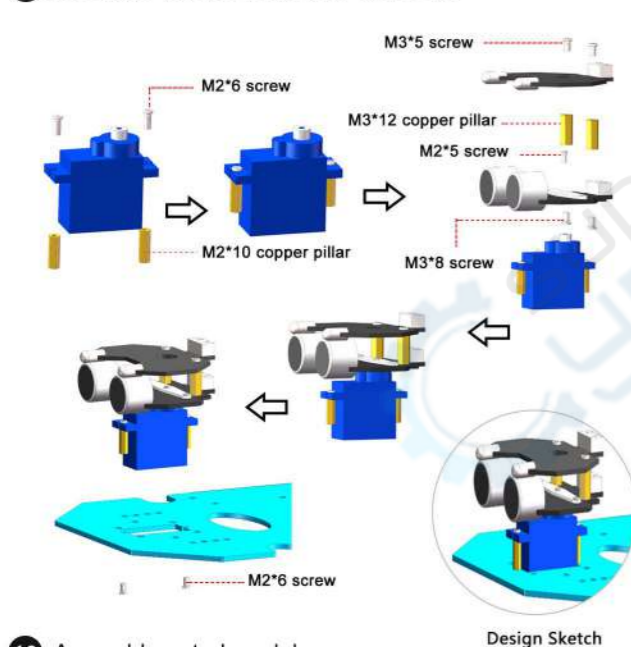
5

08 Assemble battery



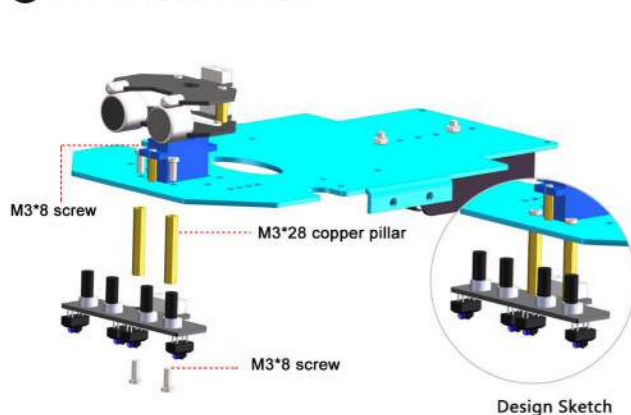
Design Sketch

09 Assemble ultrasonic module and servo



Design Sketch

10 Assemble patrol module

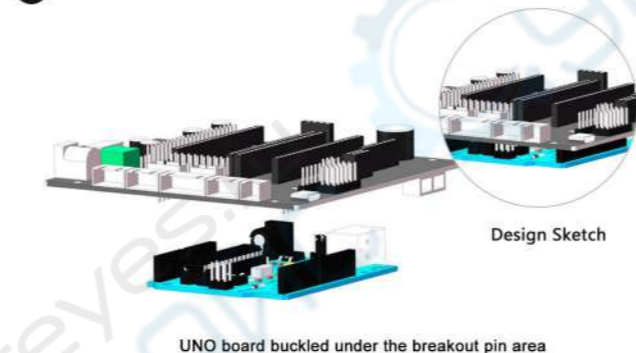


Design Sketch

6

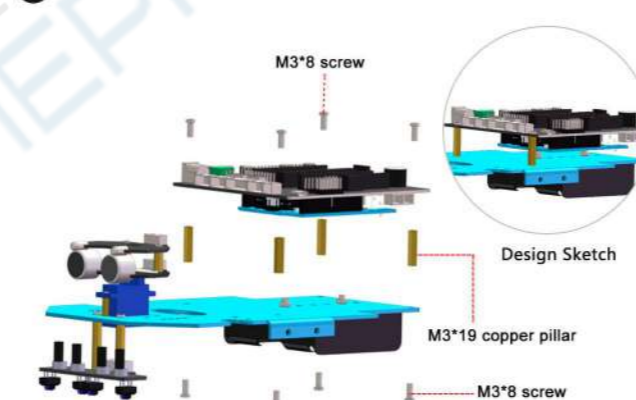
Arduino version

11 Assemble Arduino UNO board and breakout



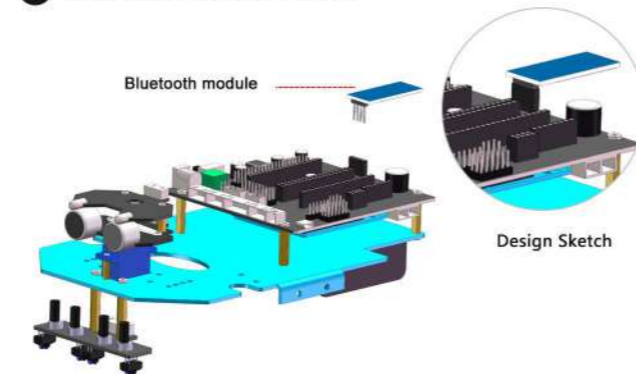
Design Sketch

12 Assemble breakout



Design Sketch

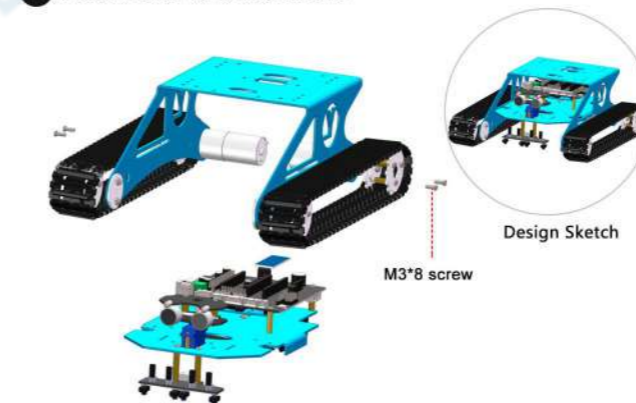
13 Assemble bluetooth module



Design Sketch

7

14 Assemble Arduino chassis

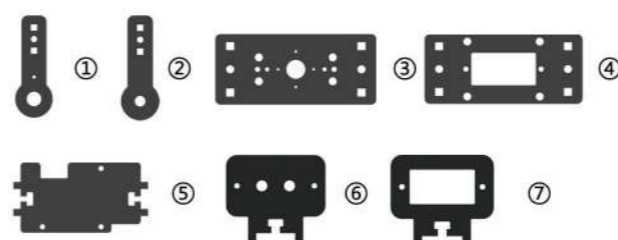


Design Sketch

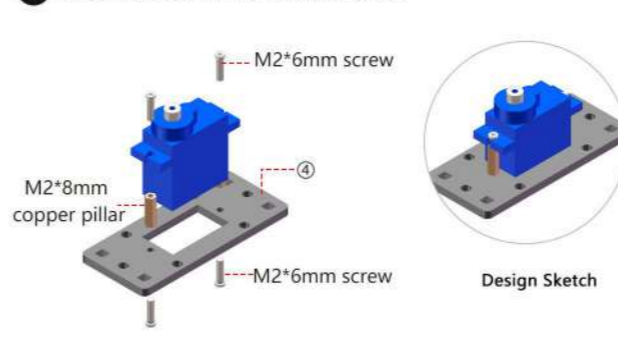
Raspberry Pi version

Assemble camera

Acrylic plate introduction



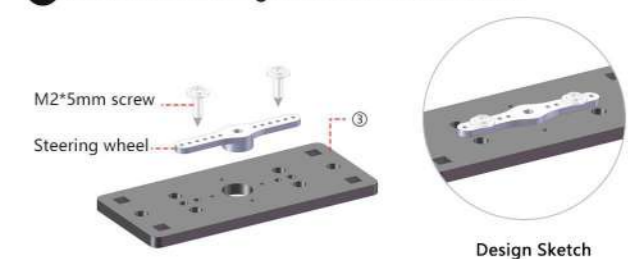
11 Assemble camera vertical servo



Design Sketch

8

12 Assemble steering wheel for vertical servo



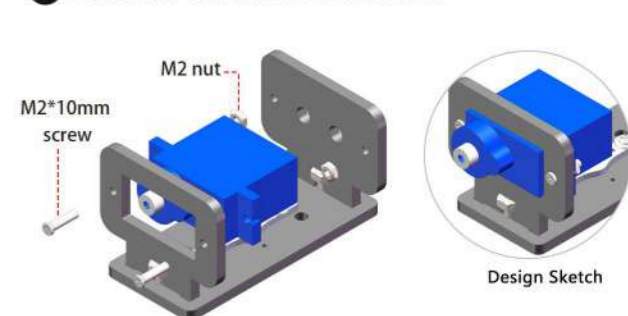
Design Sketch

13 Assemble camera horizontal servo stand



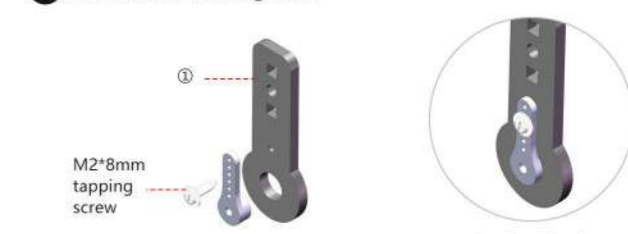
Design Sketch

14 Assemble camera horizontal servo



Design Sketch

15 Assemble rotating arm



Design Sketch

9 Assemble camera and plate

M2*6mm screw
M2*10mm copper pillar
Design Sketch

17 Assemble camera plate and rotating arm

M3*8mm screw
M3 nut
Design Sketch

18 Assemble horizontal servo and camera

M2*5mm screw
M5 rivet
Design Sketch

19 Assemble copper pillar for camera platform

M2*5mm screw
M3*8mm screw
M3*28mm copper pillar
Design Sketch

20 Assemble camera

M3*8mm screw
Design Sketch

21 Assemble bluetooth module

Bluetooth module
Design Sketch

22 Assemble Raspberry Pi board

M2.5*8 screw
M2.5*15 copper pillar
Design Sketch

23 Assemble main control board

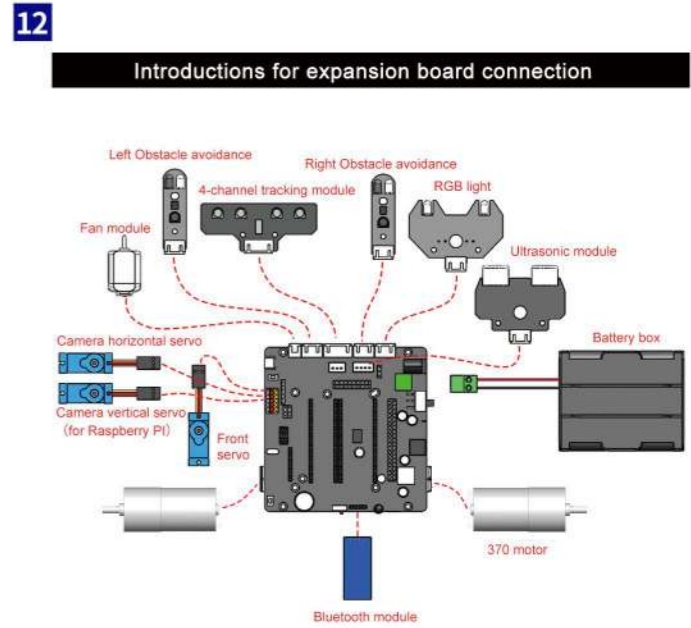
M3*5 screw
M3*8 copper pillar
Design Sketch

11 Assemble 40 pin cable

40pin cable
Design Sketch

25 Assemble baseboard

M3*8 screw
Design Sketch



[8.4V-12.6V] DC charging stand: 18650 lithium battery is used for charging. Note that this DC port is on the expansion board.

[L3] The power supply indicator light is always on after the power switch is turned on. If it is not lit, please check the power supply wiring (the power line red corresponds to [+]) and the black corresponds to [-].

[L1] Low voltage indicator. When the voltage is low, the light is off and the power supply indicator (L3) is still lit.

Jumper cap shorted (MVCC->5V) (factory default plug in Here.)

Put the switch to [OFF].

The front servo interface is [J1], in which brown is connected to GND, red is connected to VCC, and orange is connected to IO port.

The horizontal servo interface of camera is [J2], in which brown is connected to GND, red is connected to VCC, and orange is connected to IO port.

The vertical servo interface of the camera is [J3], in which brown is connected to GND, red is connected to VCC, and orange is connected to IO port.

Arduino: insert a jumper cap in this area.

Raspberry Pi version does not use this function.

13 Function debugging

1.Tracking mode :

Environmental requirements: indoors, where infrared light is not strong. The black line track width on the white bottom surface needs to be greater than 16mm.

4-channel track module (front)
4-channel track module (back)

Debugging:

- Adjust the potentiometer [SW1] so that when the photoelectric sensor [P1] is facing the white bottom surface, the LED light [L1] is off, and when facing the bottom of the black line, the LED light [L1] is on.
- Adjust the potentiometer [SW2] so that when the photoelectric sensor [P2] is facing the white bottom surface, the LED light [L2] is off, and when facing the bottom of the black line, the LED light [L2] is on.
- Adjust the potentiometer [SW3] so that when the photoelectric sensor [P3] is facing the white bottom surface, the LED light [L3] is off, and when facing the bottom of the black line, the LED light [L3] is on.
- Adjust the potentiometer [SW4] so that when the photoelectric sensor [P4] is facing the white bottom surface, the LED light [L4] is off, and when facing the bottom of the black line, the LED light [L4] is on.

Note: When adjusting the potentiometer, the rotation amplitude should not be too large, and the rotation amplitude is less than 30 degrees.

Bluetooth remote control

APK Download link:
<https://drive.google.com/open?id=16a0M7PjJMDYLz8ko7vyBgRIH8I9TNJcc>

Please download bluetooth APK with Android phone:
Turn on the Bluetooth on your mobile phone and open the application [Yabo Tank].
The Bluetooth module near the tail of the Tank can be connected automatically.
If you find that the search Bluetooth signal changes in the upper left corner, you can directly click CONNECT to connect
Note: [51/ARDUINO Burning Switch] on the expansion board toggles the switch to [OFF].

After the connection is successful, enter the main control interface.

14 Master interface

Rotary key
Remote mode selection
Tilt control of steering engine
Color debug area
Voltage display (not available for Raspberry Pi)
turn left and right
Ultrasonic distance display
Function selection
Gravity display

About servo: if used, it is found that the servo is not facing forward. You can click the [Middle] of the [servo pan/tilt control] to make servo to the midpoint. Then according to [Servo and ultrasonic module combination], place ultrasonic sensor facing forward, reassemble it.

15 Mode Choice

Colorful searchlight
Tracking
Obstacle avoidance

15 Mode description:

- Remote control mode: the default is remote control mode, after clicking [OK], can remote control by [master interface].
- Obstacle avoidance mode: before operation, place click the [Middle] of the [servo pan/tilt control] in the [master interface] to reset servo, making ultrasonic sensor facing forward. Then, debug the smart car according to the "Obstacle avoidance mode" in the "Function debugging", click [OK] of the [Obstacle avoidance mode] after debugging, the smart car will automatically drive and avoid the obstacle.
- Tracking mode: Please debug the smart car according to the "Tracking mode" in "Function Debugging". Place it on the black line after debugging (the two sensor probes in the middle of the four-way patrol module must be on the black line, otherwise the line cannot be patrolled). Click on the "Start" smart car in the "Tracking Mode" to track along the black line track.
- Colorful searchlight: click [OK] of the [Colorful searchlight], the smart car rotating the pan/tilt, searchlight random change color.
- Raspberry Pi video (camera version)

The Raspberry Pi main control board of the Raspberry Pi wifi smart car has been configured into router mode before the factory, boot from the start mjpeg Video server and bluetooth_control Bluetooth control process. The default router IP address is 192.168.0.1

Operation step:

- Connect to the Raspberry Pi wifi hotspot with your mobile phone: YahBoom_Car The initial password is: 12345678
- Enter the Raspberry Pi ip address: <http://192.168.0.1:8080/?action=snapshot>

Raspberry Pi port number: 8888, Click [\[Raspberry Pi video\]](#) (camera version)

The following Raspberry Pi video control interface appears.

Direction control
Ultrasonic servo platform control
Camera platform control and light

Note: The Raspberry Pi video display interface controls the car, using the Bluetooth transmission control command, and the video stream uses TCP communication. After the configuration, the Raspberry Pi SSH login user name is pi, the login password is yahboom, the SSH port number is 22, and the root user login password is yahboom.

16 Source code

Arduino source code link:
<https://drive.google.com/open?id=15RxAbPqaqz7HrgB0xFjJnEbqYRZjgO4>

Raspberry Pi source code link:
https://drive.google.com/open?id=1Fa_IXsUsVHAKBdBVFHyYtaliu7T3yB33

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