# Brief introduction of microROS control board

The MicroROS control board is a ROS2 driver controller and an ESP32S3 dual-core development board. On board ESP32S3 core module control unit, motor driver, servo driver, six-axis IMU attitude sensor and other important peripherals. It supports WiFi, Bluetooth, serial port and other communication functions, and supports 4-channel encoder motors, 2-channel PWM servos, 1-channel lidar and 1-channel ESP32 WiFi camera module, Type-C power interface supports Raspberry Pi 5(5.1V/5A) PD power supply protocol. And it comes with peripheral driver firmware, users can directly access the ROS2 environment for use.

Description of onboard resources
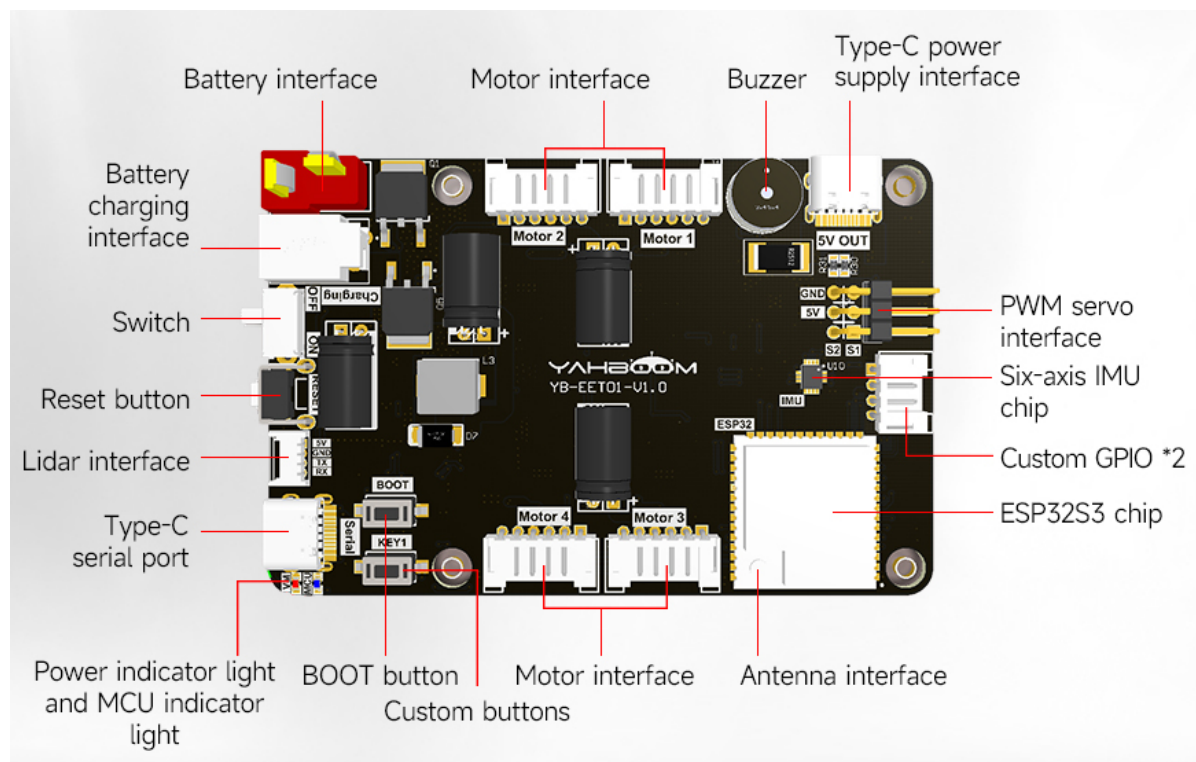
Battery power interface: connect 7.4V battery (T-type interface) to power the robot.

Battery charging interface: Connect DC8.4V charger to charge the robot.

Power switch: robot power main switch.

Reset button: The reset button of the ESP32S3 control chip.

Lidar interface: Connect the MS200 lidar.

Type-C serial port: used for burning firmware, configuration parameters, serial communication and other functions.

BOOT button: The BOOT button of the ESP32S3 control chip can also be used with custom keys.

Custom button: ESP32S3 control chip GPIO, programmable custom function.

Motor interface: Connect 310 encoder motor.

Antenna interface: Connect the external antenna.

ESP32S3 control chip: The main control chip of the microROS control board is responsible for managing all peripheral functions on the board.

Six-axis IMU chip: provides the current pose information of the robot.

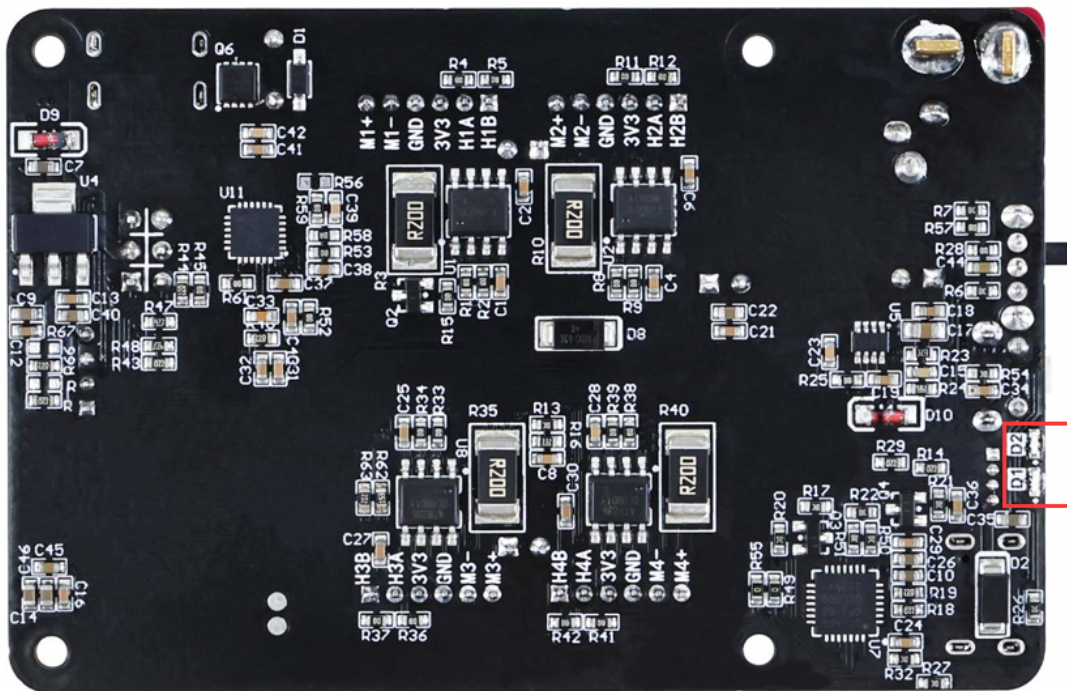Custom GPIO *2: UART port, can be used connect WiFi camera module.

PWM servo interface: used to connect two PWM servo.

Type-C Power supply interface: Connect the Type-C interface of the Raspberry PI 5 to power the Raspberry PI 5.

Buzzer: Active buzzer for low voltage alarm prompt.

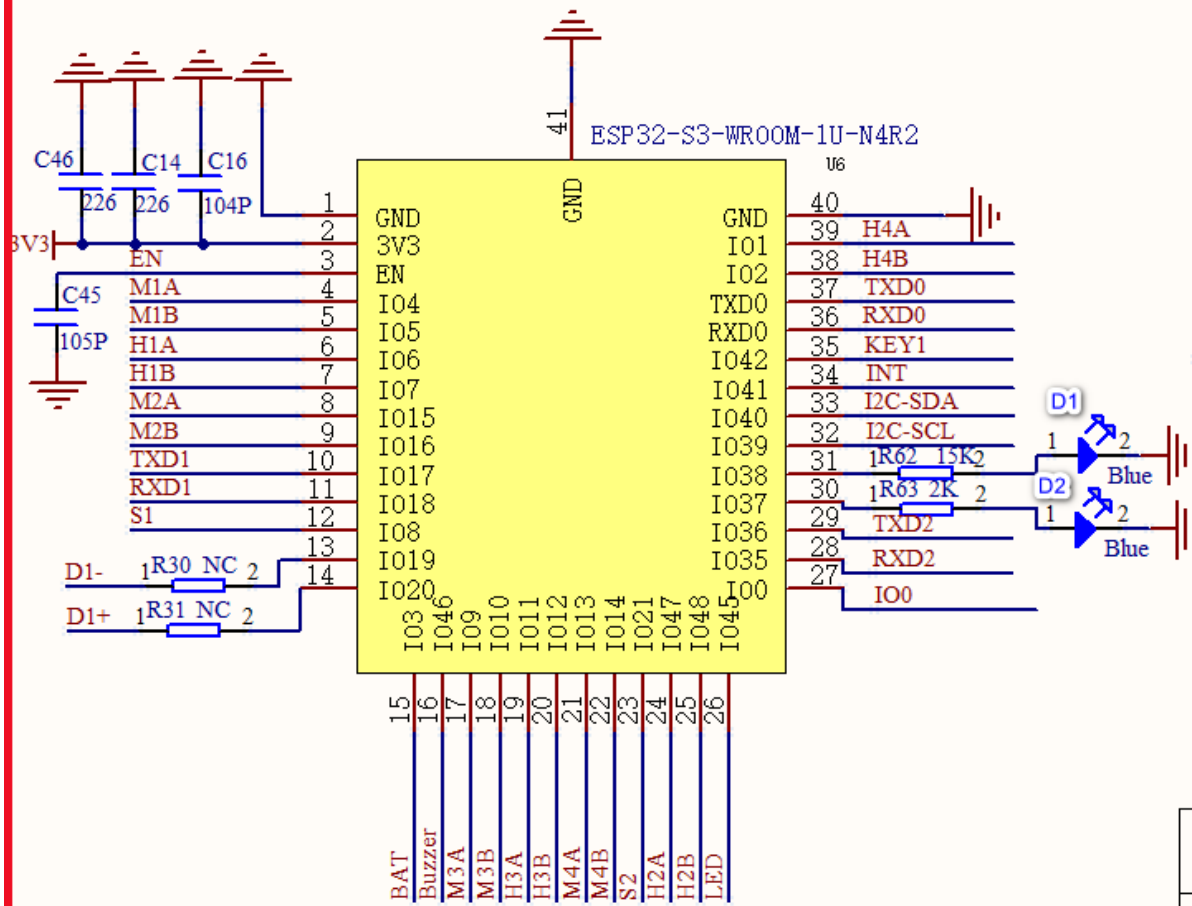Power indicator: red constant light means normal.

MCU indicator light: under normal circumstances, it will always flash in a cycle (the frequency is two flashes every three seconds); Flash at low voltage (every 100 ms); In configuration mode, it flashes slowly (once per second). In test mode, it will blink continuously (three flashes every three seconds).

D1 and D2: Custom indicators.

GPIO Pin Assignment

ESP32-S3-WROOM-1U-N4R2

U6

Pin	Left Signal		Right Signal	Pin
1	GND	GND	40	
2	3V3	IO1	39	H4A
3	EN	IO2	38	H4B
4	IO4	TXD0	37	TXD0
5	IO5	RXD0	36	RXD0
6	IO6	IO42	35	KEY1
7	IO7	IO41	34	INT
8	IO15	IO40	33	I2C-SDA
9	IO16	IO39	32	I2C-SCL
10	IO17	IO38	31	
11	IO18	IO37	30	
12	IO8	IO36	29	TXD2
13	IO19	IO35	28	RXD2
14	IO20	IO0	27	IO0

41 GND

C46 226
C14 226
C16 104P

3V3

C45 105P

EN
M1A
M1B
H1A
H1B
M2A
M2B
TXD1
RXD1
S1

D1- R30 NC
D1+ R31 NC

H4A
H4B
TXD0
RXD0
KEY1
INT
I2C-SDA
I2C-SCL
R62 15K2
R63 2K
TXD2
RXD2
IO0

D1 Blue
D2 Blue

Bottom pins:
15	IO3	BAT
16	IO46	Buzzer
17	IO9	M3A
18	IO10	M3B
19	IO11	H3A
20	IO12	H3B
21	IO13	M4A
22	IO14	M4B
23	IO21	S2
24	IO47	H2A
25	IO48	H2B
26	IO45	LED

Name of peripheral device	ESP32-S3-GPIO
Motor M1-PWM-M1A	GPIO4
MotorM1-PWM-M1B	GPIO5
MotorM1-encoder-H1A	GPIO6
MotorM1-encoder-H1B	GPIO7
MotorM2-PWM-M2A	GPIO15
MotorM2-PWM-M2B	GPIO16
MotorM2-encoder-H2A	GPIO47
MotorM2-encoder-H2B	GPIO48
MotorM3-PWM-M3A	GPIO9
MotorM3-PWM-M3B	GPIO10
MotorM3-encoder-H3A	GPIO11
MotorM3-encoder-H3B	GPIO12
MotorM4-PWM-M4A	GPIO13
MotorM4-PWM-M4B	GPIO14
MotorM4-encoder-H4A	GPIO1
MotorM4-encoder-H4B	GPIO2
BOOT button-IO0	GPIO0
Custom key-KEY1	GPIO42
Battery voltage detection-BAT	GPIO3
MCU indicator light-LED	GPIO45
Buzzer	GPIO46
Servo interface -S1	GPIO8
Servo interface -S2	GPIO21
IMU interrupts -INT	GPIO41
IMU-I2C-SCL	GPIO39
IMU-I2C-SDA	GPIO40
Radar RX-serial port 1-TXD1	GPIO17
Radar TX-serial port 1-RXD1	GPIO18
Type-C serial port RX-TXD0	GPIO43

Name of peripheral device	ESP32-S3-GPIO
Type-C serial port TX-RXD0	GPIO44
Custom GPIO	GPIO35
Custom GPIO	GPIO36
Custom indicator lights	D1
Custom indicator lights	D2