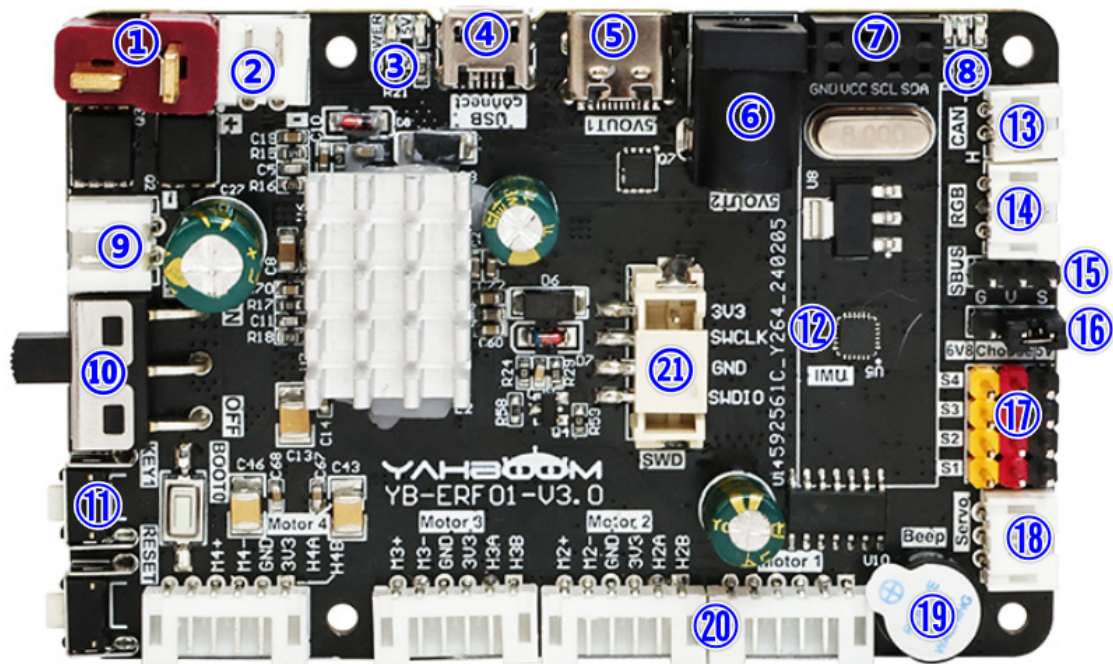


# 1. Introduction to expansion board

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- 1.1、 Schematic diagram of component distribution on the front of expansion board
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- 1.3、 Analysis of Frequently Asked Questions about Expansion Boards

## 1.1、 Schematic diagram of component distribution on the front of expansion board



①T-shaped DC 12V power input interface: used as the main power input of the expansion board, connected to the DC 12V power supply or 12V battery.

②DC 12V power output: Provides DC 12V power to the outside.

③Power indicator light: Indicates whether the power supply is normal.

④Micro USB data interface: connects to host communication and burning program.

⑤Type-C interface: Provides DC 5V to the outside, supports the Raspberry Pi 5 power supply protocol, and provides 5.1V/5A power supply to the Raspberry Pi 5. It only provides power but cannot communicate.

⑥DC 5V output interface: can power Jetson Nano.

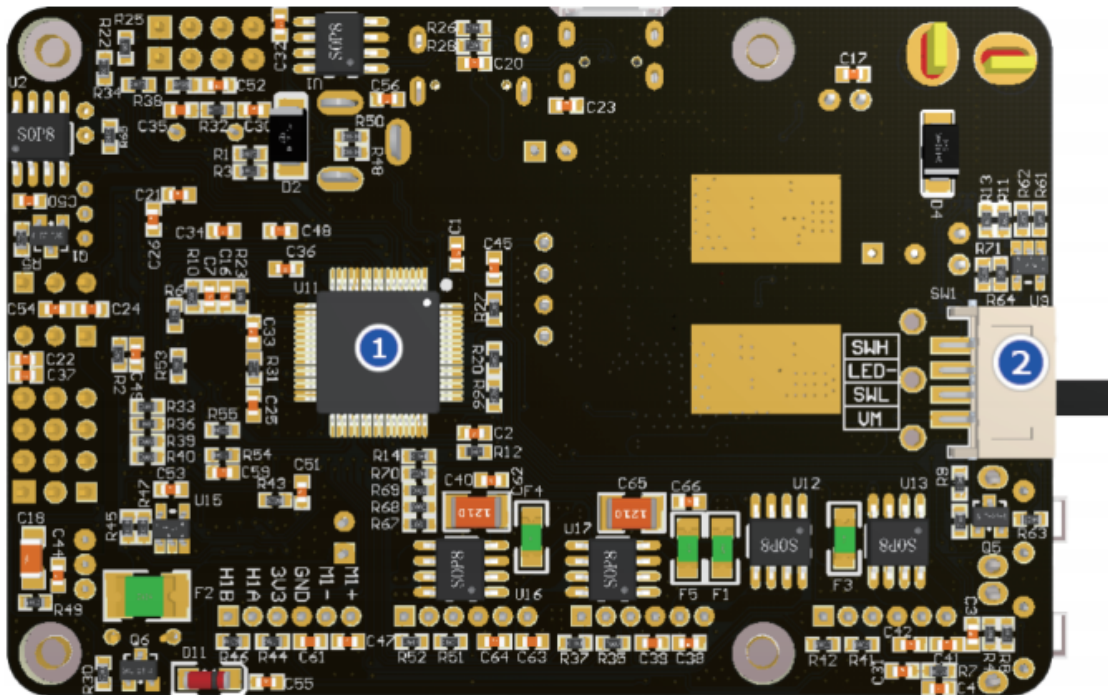
⑦I2C interface: can connect external I2C devices, such as OLED screens.

⑧Indicator light: data indicator light and 6.8V voltage indicator light.

⑩DC 12V power switch: main power switch.

- ⑪Button: Button KEY1: User function button, which can realize customized functions through programming. Button RESET: Onboard microcontroller reset button. Button BOOT0: The BOOT0 key of the onboard microcontroller is used to enter the programming mode of the microcontroller.
- ⑫Nine-axis attitude sensor: Provides the current attitude of the expansion board.
- ⑬CAN interface: Connect to CAN equipment.
- ⑭RGB colorful light strip interface: Connect to RGB colorful light strip.
- ⑮SBUS interface: Connect to the model aircraft remote control receiver.
- ⑯ PWM servo voltage switching: Change the position of the jumper cap to select 6.8V or 5V voltage to power the PWM servo.
- ⑰PWM servo interface: It can connect to 6.8V or 5V voltage PWM servo. You need to select the corresponding voltage in ⑯ according to the servo voltage.
- ⑱Serial servo interface: Connect to the serial servo mechanical arm.
- ⑲Buzzer: used to sound the alarm.
- ⑳Four-way motor connection port: Connect four motors. Please refer to the corresponding course documents according to the connection methods of different models.
- ㉑SWD debugging interface: Connect to the SW interface on ST-Link or J-Link, used to debug the microcontroller or download the microcontroller firmware.

## 1.2、Schematic diagram of component distribution on the back of the expansion board



- ①Onboard microcontroller: Mainly responsible for controlling peripherals on the expansion board, such as buzzers, motor drives, etc.

②Debug interface: Connect to the SW interface on ST-Link or J-Link, used to debug the microcontroller or download the microcontroller firmware. Note: There is no warranty after welding.

### 1.3、 Analysis of Frequently Asked Questions about Expansion Boards

A: How to control the expansion board of Jetson Nano? How to communicate with expansion board?

Answer: Jetson Nano sends serial port data and transmits it to the expansion board through the USB port. The expansion board integrates a microcontroller to receive and parse the serial port data and then process the specific commands to be executed.

B: How to power the robot? Does Jetson Nano need another power supply?

Answer: The car is equipped with a battery pack at the factory. Insert the battery pack into the DC 12V power T-port of the expansion board, turn on the main power switch, and the expansion board integrates a voltage conversion chip to provide DC 5V power, which is transmitted to the Jetson Nano through the DC 5V power line. powered by.

C: Which functions on the expansion board are managed by the microcontroller? ?

Answer: The parts managed by the microcontroller on the expansion board include: robotic arm, active buzzer, attitude sensor, PWM steering gear, motor, RGB colorful light bar, button KEY1, RESET button, SBUS interface, CAN interface, etc. .

D: How to update the microcontroller firmware of the expansion board? Why update microcontroller firmware?

Answer: The microcontroller integrated with the expansion board has already been programmed with firmware before leaving the factory. Please do not update the firmware unless necessary. If you need to update the firmware, please refer to the tutorial on updating firmware to update the firmware of the microcontroller.

E: What is the difference between expansion board hardware versions V1.0 and V3.0?

Answer: Hardware version V3.0 mainly upgrades the IMU chip to ICM20948, adds a SWD debugging interface and an external switch interface, supports the Raspberry Pi 5 power supply protocol, and can provide 5.1V/5A power supply for the Raspberry Pi 5. It has been modified and optimized. Part of the circuit, etc. Version V3.0 requires the use of Python library V3.3.X or above.