1. Expansion board introduction
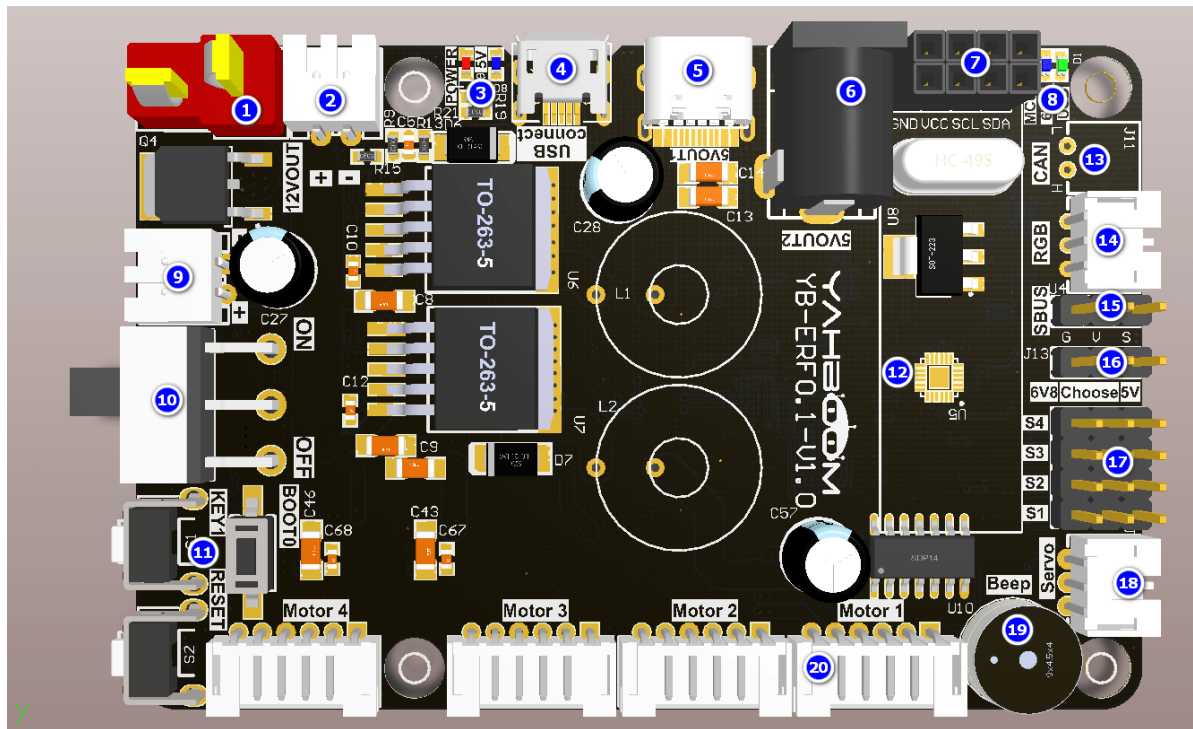
1.1 Schematic distribution of components on the front of the expansion board

① T-type DC 12V power input connector: as the main power input of the expansion board, connect to DC 12V power supply or 12V battery.

② ⑨DC 12V power output: Provides DC 12V power supply to the outside.

③ Power indicator: indicates whether the power supply is normal or not.

④ micro USB data interface: connect to the host computer for communication and burning programme.

⑤ type-C interface: provide DC 5V to the outside, only power supply, not communication.

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

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

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

⑩DC 12V power switch: Power master switch.

⑪Key: Key KEY1: User function key, can be programmed for customised function. Key RESET: On-board microcontroller reset key. Key BOOT0: On-board microcontroller BOOT0 key for the microcontroller to enter burn-in mode.

⑫ Nine-axis Attitude Sensor: Provide the current attitude of the expansion board.

⑬ CAN interface: connect to CAN devices.

⑭ RGB colourful light bar interface: connect to RGB colourful light bar.

⑮SBUS interface: connect to the receiver of the air model remote control.

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: can be connected to 6.8V or 5V voltage PWM servo, need to select the corresponding voltage in ⑯ according to the servo voltage.

⑱ Serial servo interface: connect to serial servo robot arm.

⑲Buzzer: used to sound the alarm.

⑳ Four-way motor connection port: connect to four motors, according to different models connection method please refer to the corresponding course documents.

1.2 Schematic diagram of the distribution of components on the back of the expansion board
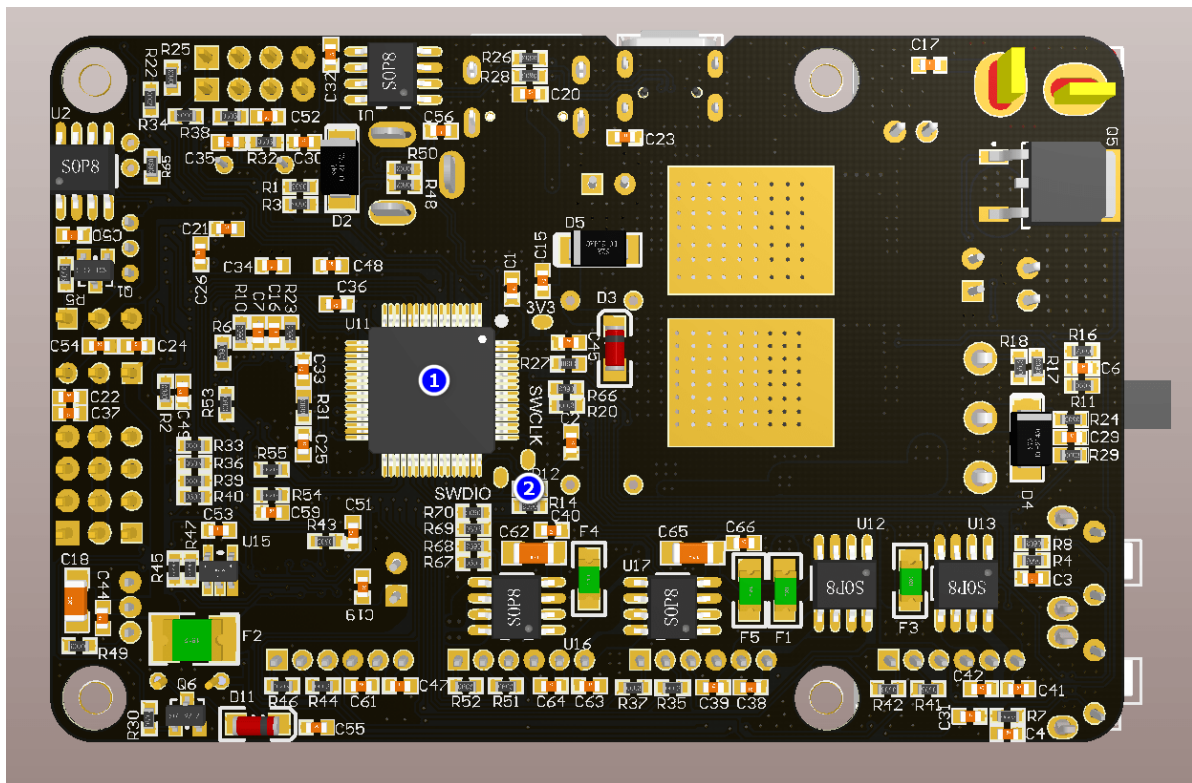
① On-board microcontroller: mainly responsible for controlling peripherals on the expansion board, such as buzzer, motor driver, etc.

② Debugging interface: connected to the SW interface on ST-Link or J-Link for debugging the microcontroller or downloading the microcontroller firmware. Note: No warranty after soldering.

1.3 FAQ with expansion boards

QA : How does Jetson Nano control the expansion board? How to communicate with the expansion board?

A : Jetson Nano sends serial data and transmits it to the expansion board through the USB port, which has an integrated microcontroller that receives and parses the serial data and then processes the specific commands to be executed.

QB : How is the robot powered and does Jetson Nano need to be powered separately?

A: The trolley is equipped with a battery pack, insert the battery pack into the DC 12V power T-type connector of the expansion board, turn on the main power switch, the expansion board integrates a voltage converter chip to provide DC 5V power supply, which is transmitted to the Jetson Nano through the DC 5V power cable.

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

A : The parts managed by the microcontroller on the expansion board include: robotic arm, active buzzer, attitude sensor, PWM servo gimbal, motors, RGB colorful light bar, key KEY1, RESET key, SBUS interface, CAN interface, and so on.

QD : How to update the microcontroller firmware on the expansion board? Why do I need to update the MCU firmware?

A : The integrated microcontroller of the expansion board has already burned the firmware when it is shipped from the factory, so there is no need to update the firmware if it is not necessary. If you need to update the firmware, please refer to the tutorial of updating firmware to update the firmware of the microcontroller.