

Ultrasonic avoid

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This tutorial is a comprehensive experiment combining multiple peripherals. You can understand individual peripherals before conducting this experiment.

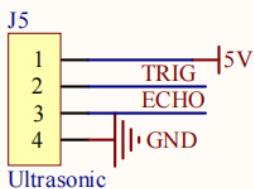
1. Software-Hardware

- **KEIL5**
- **MSPM0G3507 Robot Development Board**
Ultrasonic module, TT encoded motor*2: external
- **Type-C data cable or DAP-Link**
For program download or simulation to the development board

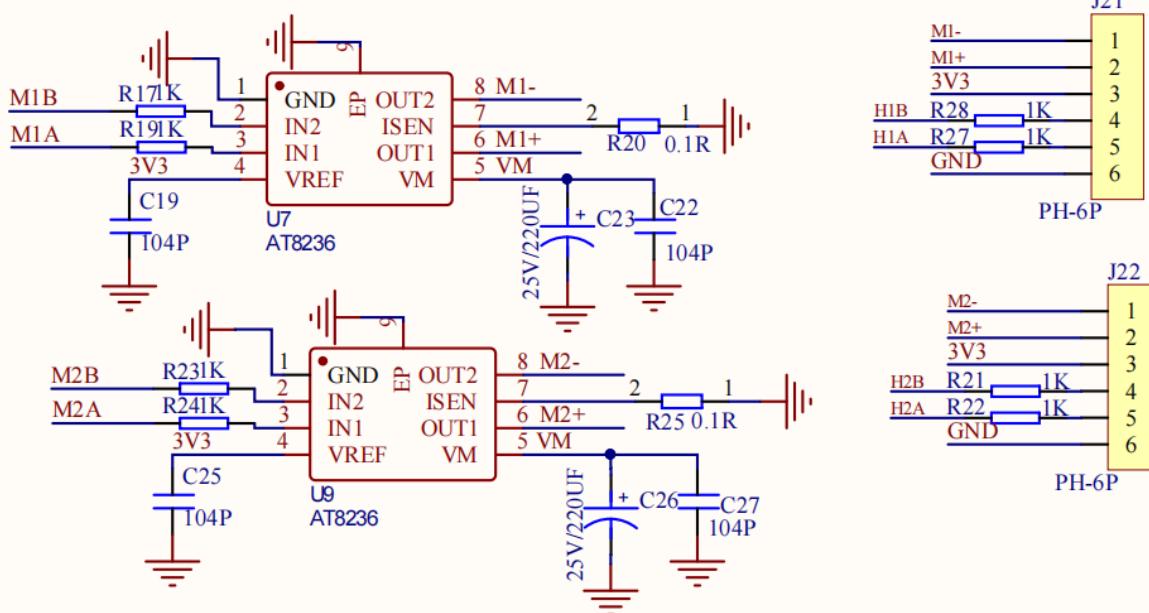
2. Brief Principle

2.1 Hardware Schematic Diagram

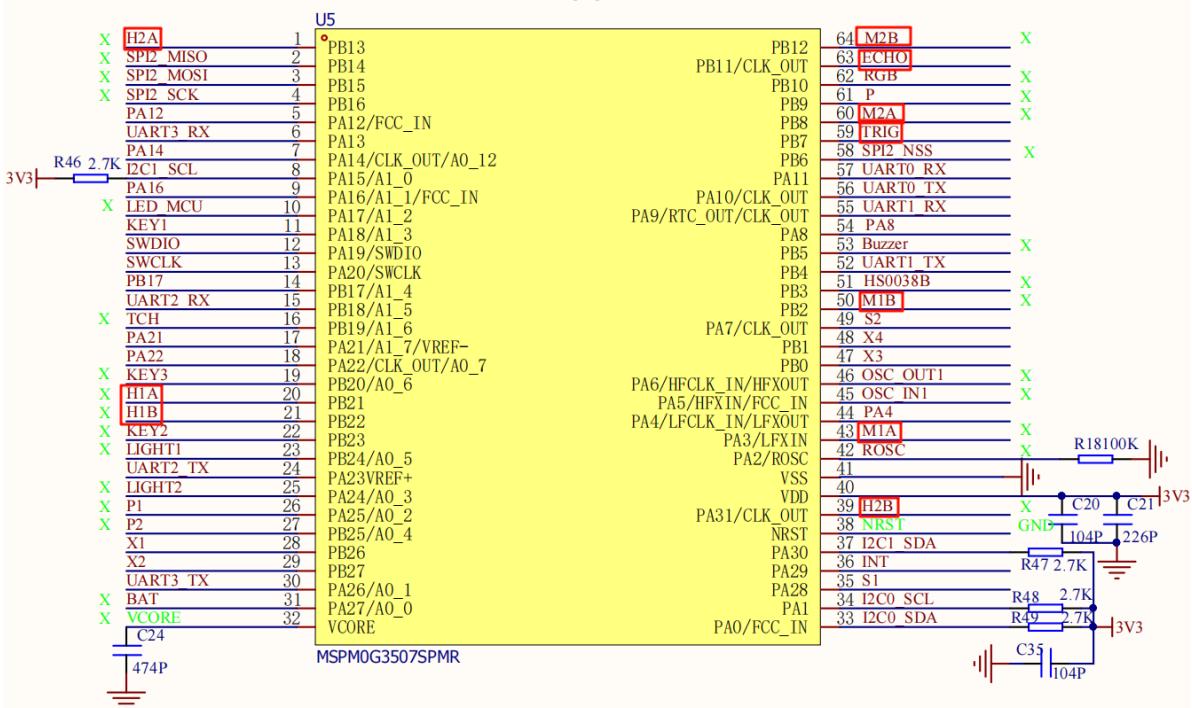
Ultrasonic Interface

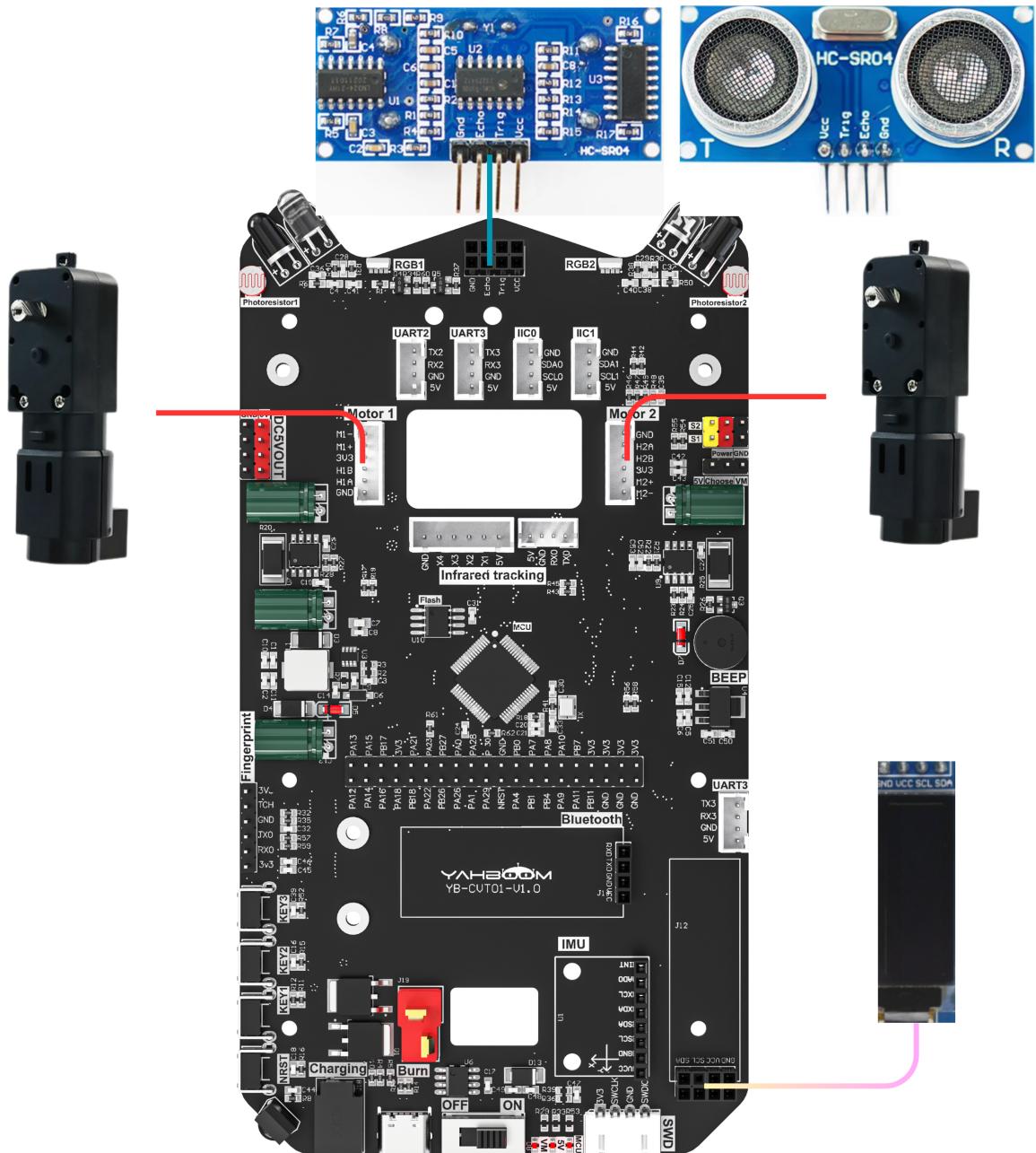


Motor Drive



MCU





Ultrasonic Module:

Note: When using servo PTZ, you need to add jumper cap to connect 5v and choose, see white line.

2.3 Control Principle

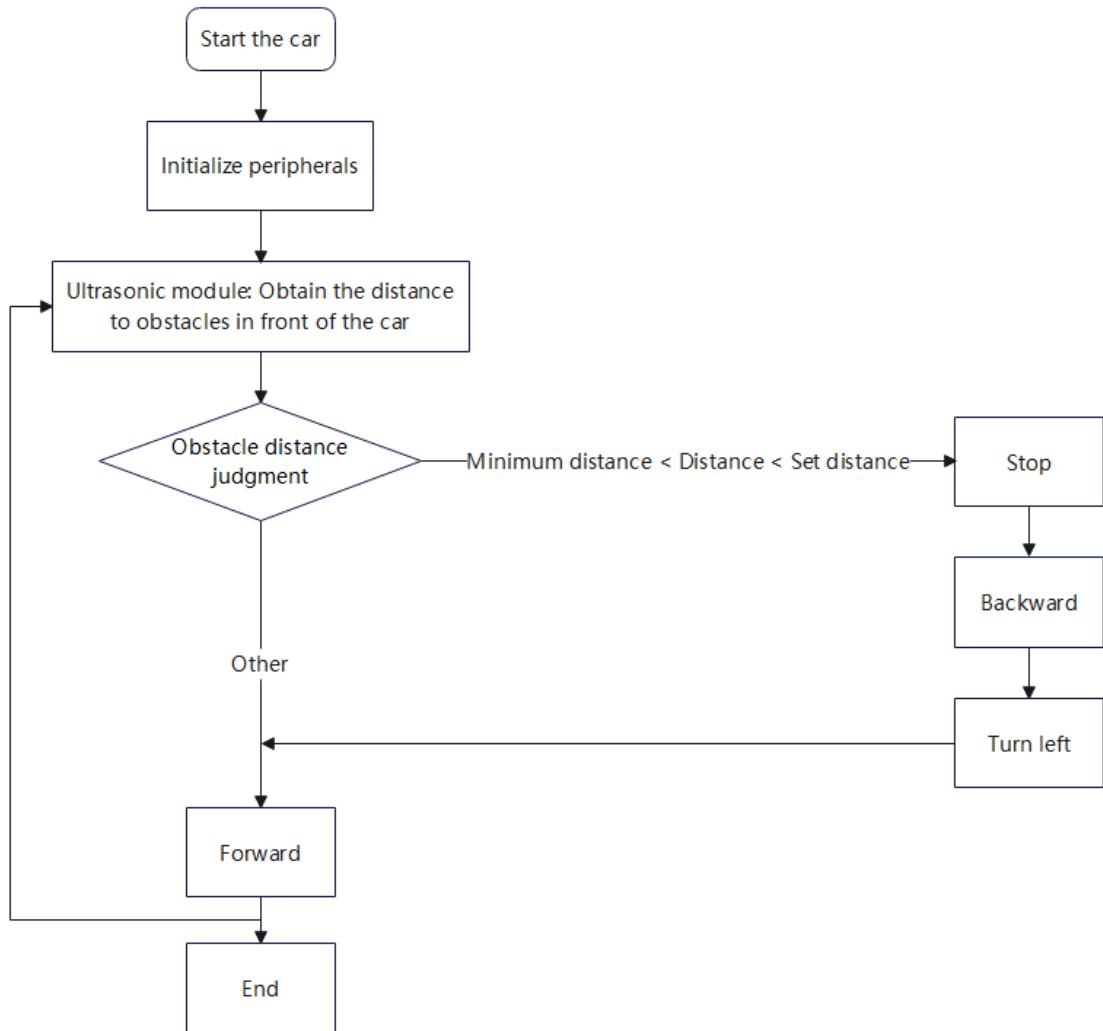
Obtain the distance of objects in front through the ultrasonic module, and control the car to move forward, backward, turn left, and stop based on the distance.

The ultrasonic module can obtain the distance of obstacles in front. We use this distance to determine the obstacle position relative to the car:

If the obstacle is within the set distance range of the car, we call the car's stop, reverse, and turn left functions in the corresponding judgment function;

If the obstacle is not within the set distance range of the car, we control the car to move forward.

- **Program Flowchart**



Module	Function
Ultrasonic Module	External information collection: obtain obstacle distance
Motor	Motion control

3. Main Functions

This tutorial does not use PID control for car movement

Functions introduced before will not be explained again!

Function: get_distance

Function Prototype	<code>void get_distance(uint16_t distance)</code>
Function Description	Ultrasonic obstacle avoidance program
Input Parameters	distance: maximum distance for ultrasonic steering
Return Value	None

4. Experimental Phenomenon

After successfully downloading the program, press the RESET button on the development board and observe the car's effect!

For program download, refer to [3. Development Environment Setup and Usage:
3.Uniflash Programming]

Phenomenon:

With obstacle: The car first stops, then judges the distance, and turns left based on the distance

Without obstacle: The car moves forward

For specific judgment, refer to the flowchart or code.