

Lesson 2 Introduction of the 4WD Control Board

1. Appearance of Robot Control Board	2
2. Overview	3
3. Introduction	3
4. Specification parameters of the main chip	7
4.1 ATmega328P Specification	7
4.2 DRV8833 Specification	9
5. Summaries	10

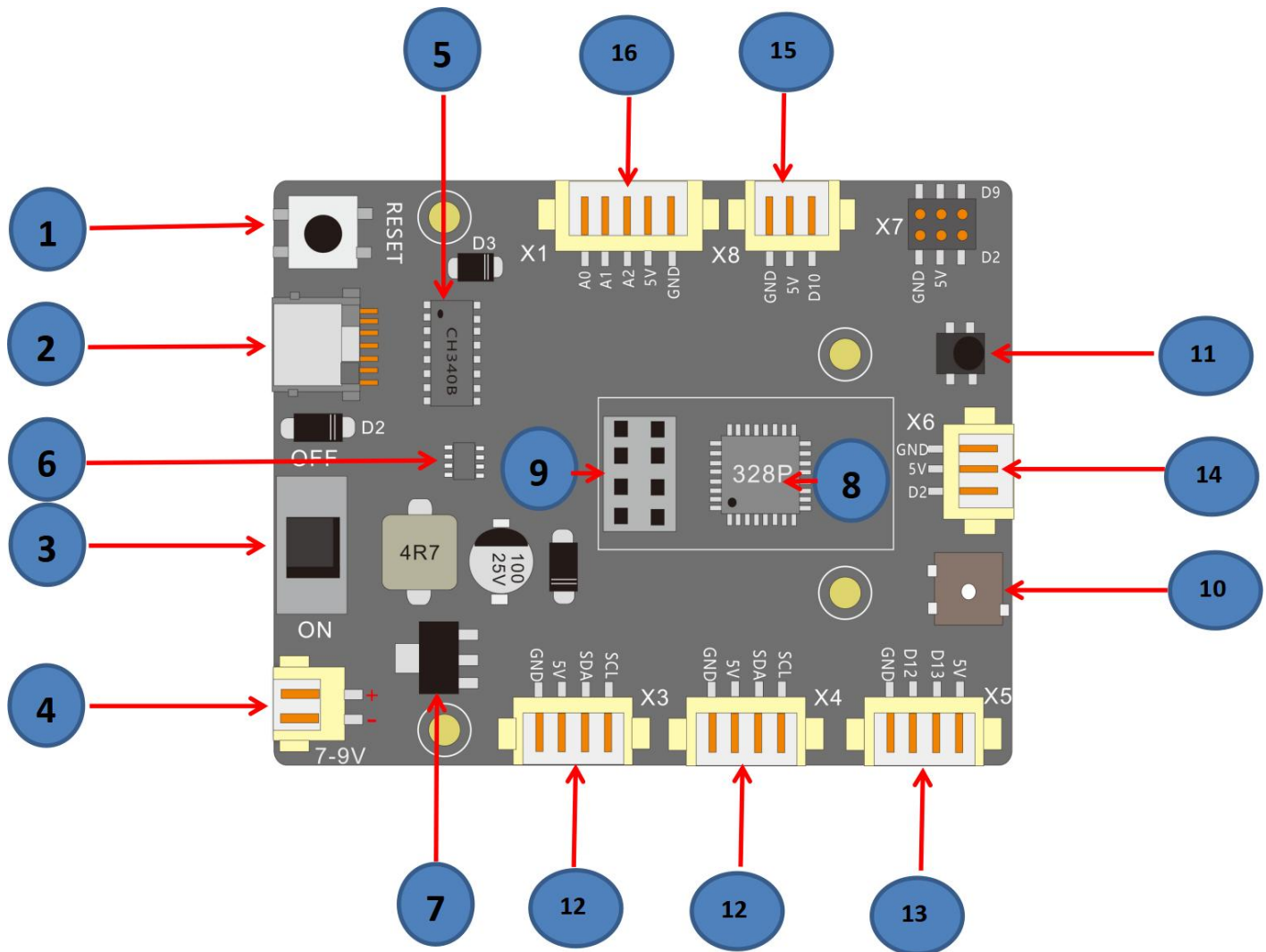
2. Overview

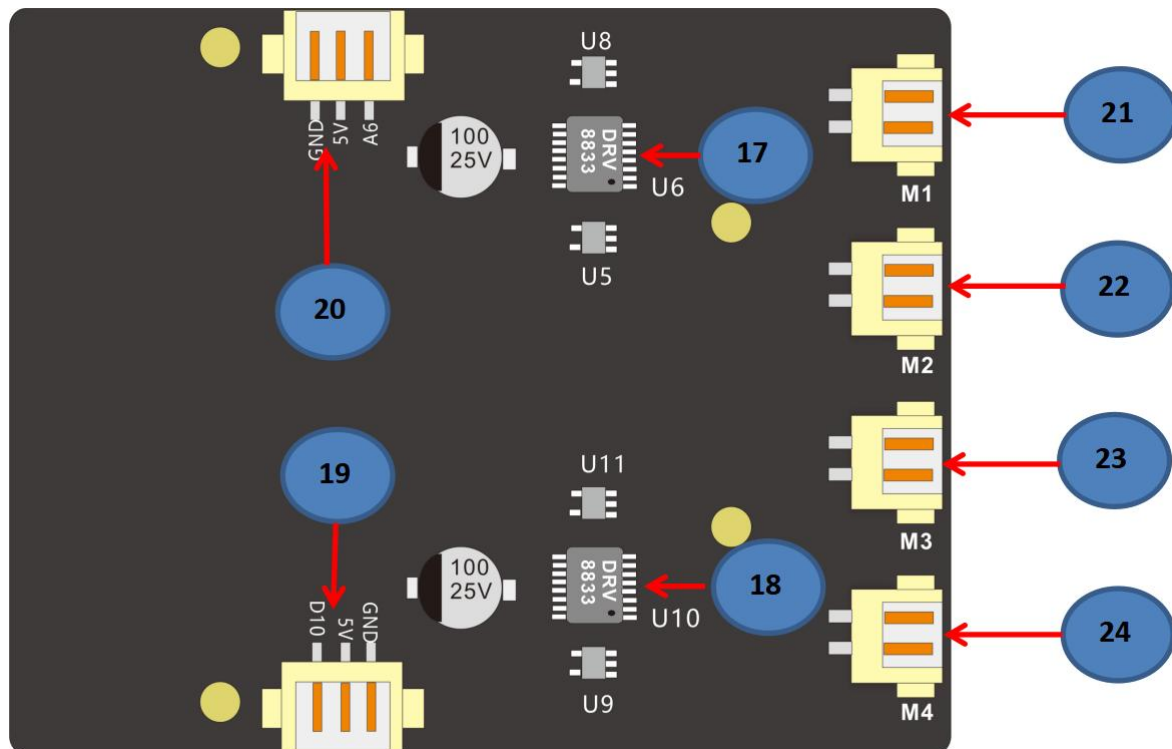
It is a powerful control board, which is compatible with arduino UNO R3 and more powerful than it, its features are as follows:

- 1) Use the most popular type C USB interface, it is easier to plug and unplug.
- 2) Use CH340B USB to serial chip so that it can be compatible with various PC systems.
- 3) Use DC to DC 5V power supply regulator system, make it not easy to heat up and save more power, and it can reach a maximum output 5A current.
- 4) Use more powerful DC3.3V voltage regulator chip, its maximum load up to 3.3V\500mA
- (5) Add A6 analog input port, it can be connected to analog signal module
- (6) Add two DRV8833 motor driver chips, it can drive four motors
- (7) Add a buzzer
- (8) Add a infrared receiver, you can use the infrared remote control function
- (9) Add an ESP8266 expansion interface, it can be connected to the ESP8266 module, to use WIFI control functions

3. Introduction

For the main components and functions of the Robot Control Board, please refer to the following table.





1	Reset button	The reset button of the system, press it to trigger the reset of the control board (reset the main control IC).
2	Type C USB Port	Burn the code on the IDE to the control board
3	Power Switch	Dial to ON to power on, dial to OFF to power off
4	Power Port	2.54*2pin Port, pay attention to the positive and negative when connecting the external power supply, power supply range: 7-9V DC
5	USB to serial port system	The chip is CH340B, which enables the control board to communicate with the PC
6	5V Voltage Regulator System	DC to DC 5V voltage regulator system to convert external power supply to DC5V
7	5V to 3.3V chip	DC to DC 3.3V regulator system, convert 5V to DC3.3V
8	Control IC	Mega328P model, it is the core processor, just like the human brain, which handles receiving, sending, judging, interrupting, timing, driving and other events.

9	ESP8266 shield	Plug ESP8266 Module and reach ESP8266 function
10	Buzzer	Passive buzzer, Occupy D11 IO Port of 328p chip
11	Infrared receiver	Occupy D3 IO port of 328P chip, used to receive signals from an external infrared remote control
12	IIC port	SDA: IIC data port (multifunction IO port, common pin with A4) SCL: IIC clock port (multifunction IO port, common pin with A5)
13	Digital IO port	12: The digital IO port of the control board, which is also used for the MISO of the SPI 13: The digital IO port of the control board, which is also used for the SCK of the SPI
14	Digital IO port	D2: The digital IO port of the control board
15	Digital IO port	D10: The digital IO port of the control board, it is also used for the PWM output port (using timer1) and the SS of the SPI.
16	Digital IO port	A0、A1、A2: Analog input port, it is also used for digital IO port
17	DRV8833	It is motor driver chip that can drive two DC Motors
18	DRV8833	It is motor driver chip that can drive two DC Motors
19	Digital IO port	D10: The digital IO port of the control board, it is also used for the PWM output port (using timer1) and the SS of the SPI.
20	Digital IO port	A6: Analog input port, multi-function IO port
21	Port to connect motor	M1 Port to connect 5V DC Motor
22	Port to connect motor	M2 Port to connect 5V DC Motor
23	Port to connect motor	M3 Port to connect 5V DC Motor
24	Port to connect motor	M4 Port to connect 5V DC Motor

4. Specification parameters of the main chip

4.1 ATmega328P Specification

Microcontroller: ATmega328P

Operating Voltage: 5V

Input Voltage (recommended): 6-12V

Input Voltage (limit): 6-18V (Is not recommended to use)

Digital I/O Pins: 14 (of which 6 provide PWM output)

PWM Digital I/O Pins: 6 (D3, D5, D6, D9, D10, D11)

Analog Input Pins: 6 (A0~A7)

DC Current per I/O Pin: 20 mA

DC Current for 3.3V Pin: 500mA

Flash Memory: 32 KB (ATmega328P) of which 0.5 KB used by bootloader

SRAM: 2 KB (ATmega328P)

EEPROM: 1 KB (ATmega328P)

Clock Speed: 16 MHz

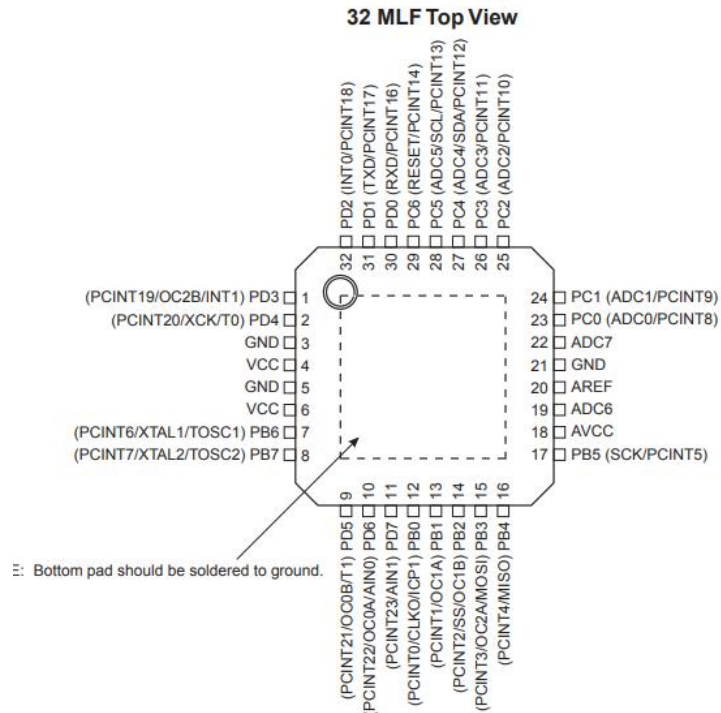
LED_BUILTIN: 13 (IO)

size: 69.5mm*55.0mm

Bootloader: UNO REV3

Input and Output

See the mapping between Arduino pins and ATmega328P ports. The mapping for the Atmega328 is identical.



The idle digital pins on the control board can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm. A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.

4.2 DRV8833 Specification

DRV8833 Dual H-Bridge Motor Driver

1 Features

- Dual-H-Bridge Current-Control Motor Driver
 - Can Drive Two DC Motors or One Stepper Motor
 - Low MOSFET ON-Resistance: HS + LS 360 mΩ
- Output Current (at $V_M = 5\text{ V}$, 25°C)
 - 1.5-A RMS, 2-A Peak per H-Bridge in PWP and RTY Package Options
 - 500-mA RMS, 2-A Peak per H-Bridge in PW Package Option
- Outputs can be in Parallel for
 - 3-A RMS, 4-A Peak (PWP and RTY)
 - 1-A RMS, 4-A Peak (PW)
- Wide Power Supply Voltage Range: 2.7 to 10.8 V
- PWM Winding Current Regulation and Current Limiting
- Thermally Enhanced Surface-Mount Packages

2 Applications

- Battery-Powered Toys
- POS Printers
- Video Security Cameras
- Office Automation Machines
- Gaming Machines
- Robotics

3 Description

The DRV8833 device provides a dual bridge motor driver solution for toys, printers, and other mechatronic applications.

The device has two H-bridge drivers, and can drive two DC brush motors, a bipolar stepper motor, solenoids, or other inductive loads.

The output driver block of each H-bridge consists of N-channel power MOSFETs configured as an H-bridge to drive the motor windings. Each H-bridge includes circuitry to regulate or limit the winding current.

Internal shutdown functions with a fault output pin are provided for overcurrent protection, short-circuit protection, undervoltage lockout, and overtemperature. A low-power sleep mode is also provided.

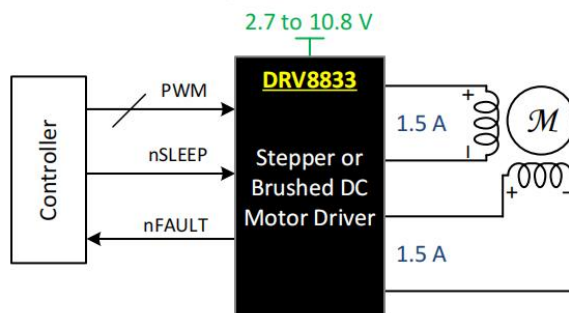
The DRV8833 is packaged in a 16-pin WQFN package with PowerPAD™ (Eco-friendly: RoHS & no Sb/Br).

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
DRV8833	TSSOP (16)	5.00 mm × 4.40 mm
	HTSSOP (16)	5.00 mm × 4.40 mm
	WQFN (16)	4.00 mm × 4.00 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Simplified Schematic



5. Summaries

The Arduino 4WD Control Board is very powerful, it not only has the function of Arduino UNO R3, but also expands the interface for infrared receiver, ESP8266 module, DRV8833 motor driver, etc. It can be used as a UNO board for some sensor module experiments, and also as a control board to drive a 4-wheel car. Alternatively, you can DIY more interesting projects with ESP8266 on the Arduino 4WD Control Board .

We also provide rich examples, and you can refer to them to learn and play.