
DC MOTOR TO WORK BASED ON OBSTACLE DETECTOR AND USER COMMANDS

REQUIREMENTS:

The basic requirements, components necessary to build an obstacle detector are:

- ATmega 328p
- Arduino Uno
- DC motor
- HC-SR04 Sensor
- Jumper Wires

1. ATmega 328p

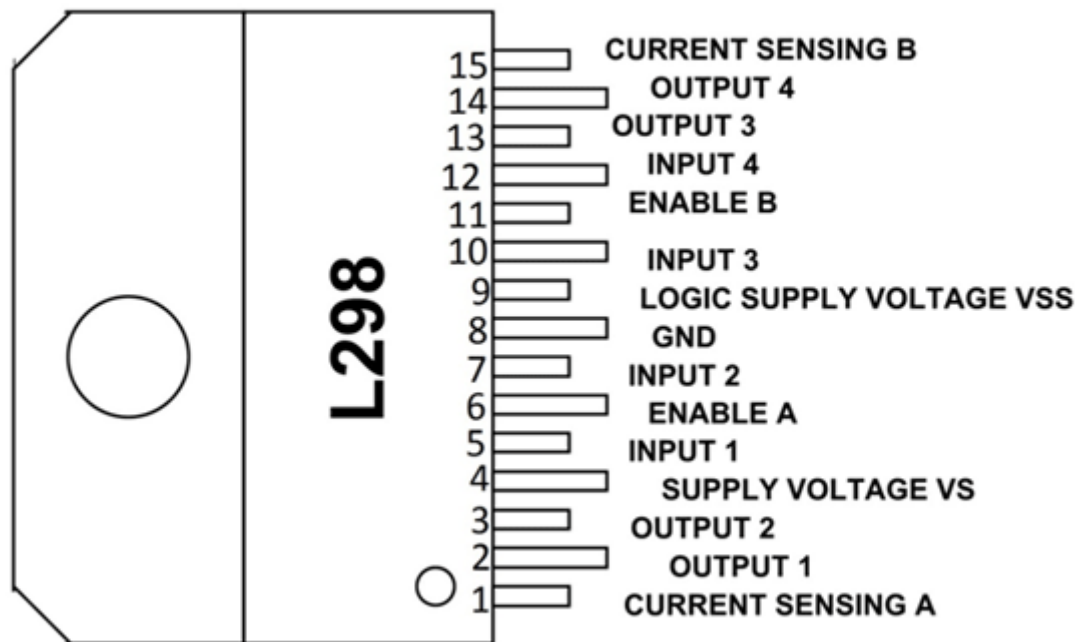
ATMEGA328P Pinout									
ARDUINO PINS		ATMEGA328P PIN DETAILS WITH ARDUINO FUNCTIONS						ARDUINO PINS	
Reset	(PCINT14/RESET)	PC6	Pin1		Pin28	PC5	(ADC5/SCL/PCINT13)	Analog Input 5	
Digital Pin 0 (RX)	(PCINT16/RXD)	PD0	Pin2		Pin27	PD4	(ADC4/SDA/PCINT12)	Analog Input 4	
Digital Pin 1 (RX)	(PCINT17/TXD)	PD1	Pin3		Pin26	PD3	(ADC3/PCINT11)	Analog Input 3	
Digital Pin 2	(PCINT18/INT0)	PD2	Pin4		Pin25	PC2	(ADC2/PCINT10)	Analog Input 2	
Digital Pin 3 (PWM)	(PCINT19/OC2B/INT1)	PD3	Pin5		Pin24	PC1	(ADC1/PCINT9)	Analog Input 1	
Digital Pin 4		PD4	Pin6		Pin23	PC0	(ADC0/PCINT8)	Analog Input 0	
Vcc		Vcc	Pin7		Pin22	GND		GND	
GND		GND	Pin8		Pin21	AREF		Analog Reference	
Crystal	(PCINT6/XTAL1/TOSC1)	PB6	Pin9		Pin20	AVCC		Vcc	
Crystal	(PCINT7/XTAL2/TOSC2)	PB7	Pin10		Pin19	PB5	(SCK/PCINT5)	Digital Pin 13	
Digital Pin 5 (PWM)	(PCINT21/OC0B/T1)	PD5	Pin11		Pin18	PB4	(MISO/PCINT4)	Digital Pin 12	
Digital Pin 6 (PWM)	(PCINT22/OC0A/AIN0)	PD6	Pin12		Pin17	PB3	(MOSI/OC2A/PCINT3)	Digital Pin 11(PWM)	
Digital Pin 7	(PCINT23/AIN1)	PD7	Pin13		Pin16	PB2	(SS/OC1B/PCINT2)	Digital Pin 10(PWM)	
Digital Pin 8	(PCINT0/CLKO/ICP1)	PB0	Pin14		Pin15	PB1	(OC1A/PCINT1)	Digital Pin 9(PWM)	

ATmega328P Features / Technical Specifications:

- High performance design
- Low power consumption
- Total number of Analog Input pins are 6
- Contains 32 kilobytes of flash memory
- Contains 2 kilobytes of SRAM
- Contains 1 kilobytes of EEPROM
- 16 megahertz clock speed
- Minimum & maximum temperature -40 degree centigrade to 105 degree centigrade

- Total number of Digital I/O pins are 14
- Advance RISC
- Lock program functionality for programming code security
- Contains total three timers two 8-bit and one 16 bit
- Total number of I/O pins are 23
- Total number of PWM channels are 6
- Minimum and maximum operating voltage from 1.8V DC to 5.5V DC

2. L298p-53



3. DC motor

A DC motor is an electrical machine that converts electrical energy into mechanical energy. In a DC motor, the input electrical energy is the direct current which is transformed into the mechanical rotation.

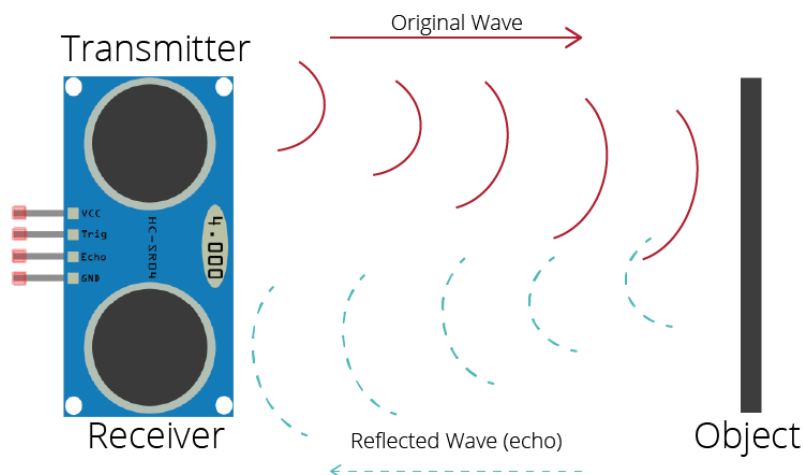


4. Ultrasonic Sensor

FEATURES:

sensor's datasheet:

- Power Supply :+5V DC
- Quiescent Current : <2mA
- Working Current: 15mA
- Effectual Angle: <15°
- Ranging Distance : 2cm – 400 cm/1" – 13ft
- Resolution : 0.3 cm
- Measuring Angle: 30 degree
- Trigger Input Pulse width: 10uS TTL pulse
- Echo Output Signal: TTL pulse proportional to the distance range
- Dimension: 45mm x 20mm x 15mm



An optical sensor has a transmitter and receiver, whereas an ultrasonic / level sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic / level sensor, a single oscillator emits and receives ultrasonic waves alternately. This enables miniaturisation of the sensor head.

Distance calculation

The distance can be calculated with the following formula:

$$\text{Distance } L = \frac{1}{2} \times T \times C$$

where L is the distance, T is the time between the emission and reception, and C is the sonic speed. (The value is multiplied by 1/2 because T is the time for go-and-return distance.)



Pin 1 - VCC

Pin 2 - Trigger Pin

Pin 3 - Echo Pin

Pin 4 - GND