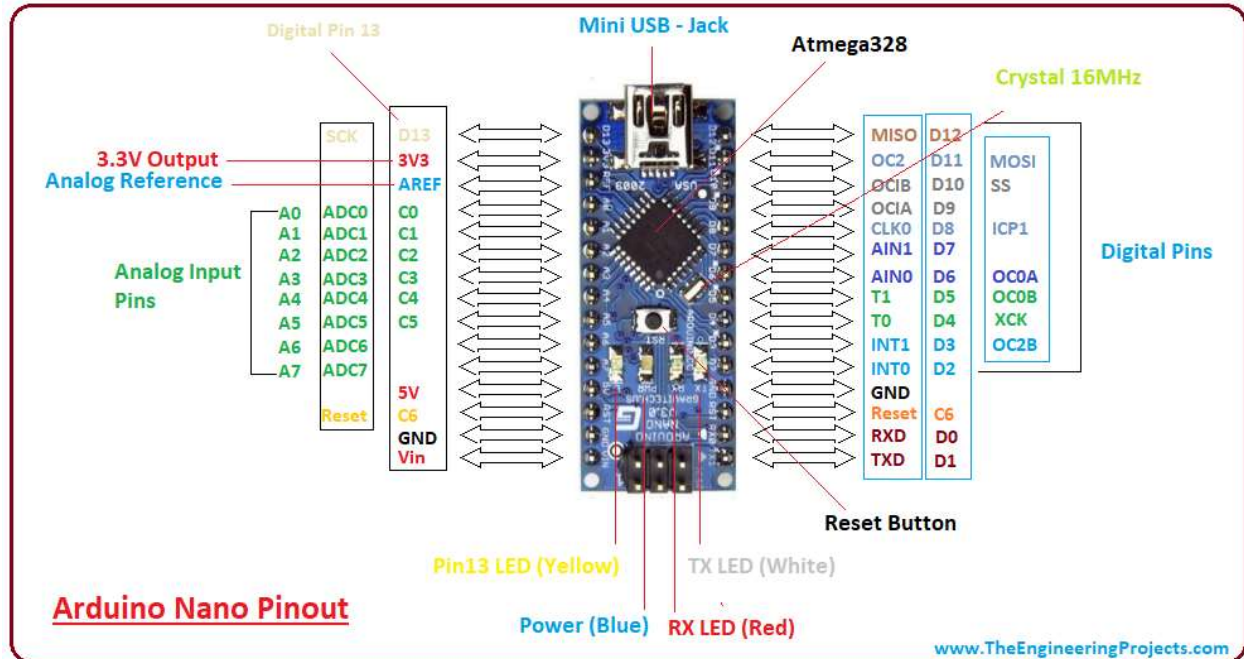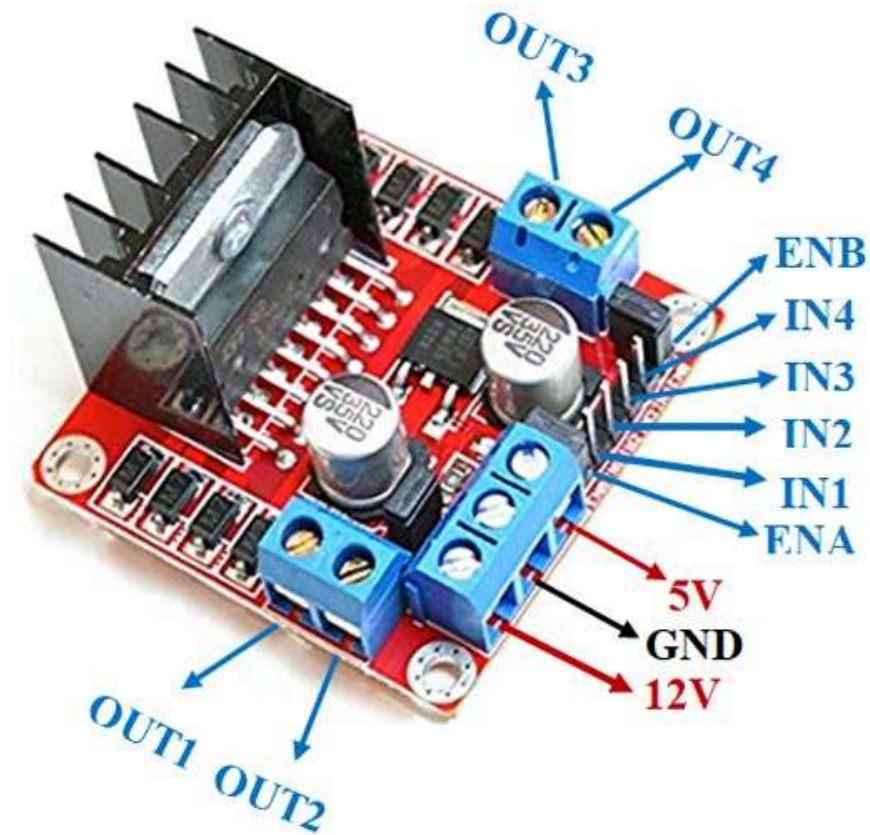# LFR Project:

Components:

- **Arduino Nano:**

Arduino Nano Overview

- **Microcontroller:** ATmega328P
- **Operating Voltage: 5V**
- **Input Voltage (VIN): 7–12V (recommended)**
- **Clock Speed: 16 MHz**
- **Digital I/O Pins: 14**
- **Analog Input Pins: 8**
- **PWM Pins: 6**

Pin	Function
VIN	Input voltage
5V	Regulated 5V output (or input if using external regulated 5V)
3.3V	3.3V output (max ~50mA)
GND	Ground (0V reference)
RESET	Resets the microcontroller when pulled LOW
D0 (RX)	Serial communication receive
D1 (TX)	Serial communication transmit
D2	External Interrupt (INT0)

D3	PWM(Pulse Width Modulation), External Interrupt (INT1)
D4–D7	General digital I/O
D8–D13	General digital I/O
D13	Connected to onboard LED
Avoid using D0 and D1 if you are using Serial Monitor.(Meaning not for serial print)	
Specific PWM PIN	**D3, D5, D6, D9, D10, D11**
	PWM pins simulate analog output using analogWrite().
	Used for: LED brightness control,Motor speed control,Buzzer tone generation etc
A0–A5	Analog pis but Also usable as digital pins
A6, A7	Analog-only (cannot be digital)
Special work of the pin	
A4	SDA (Data)
A5	SCL (Clock)
Used those pins for: LCD (I2C), RTC modules, Sensors (MPU6050, etc.)	
D10	SS (Slave Select)
D11	MOSI
D12	MISO
D13	SCK
Used it those pin for: SD card module, NRF24L01, TFT display	
D13	Is connected to Onboard LED

- **L298N H-Bridge Dual Motor Driver, Stepper Motor Driver**
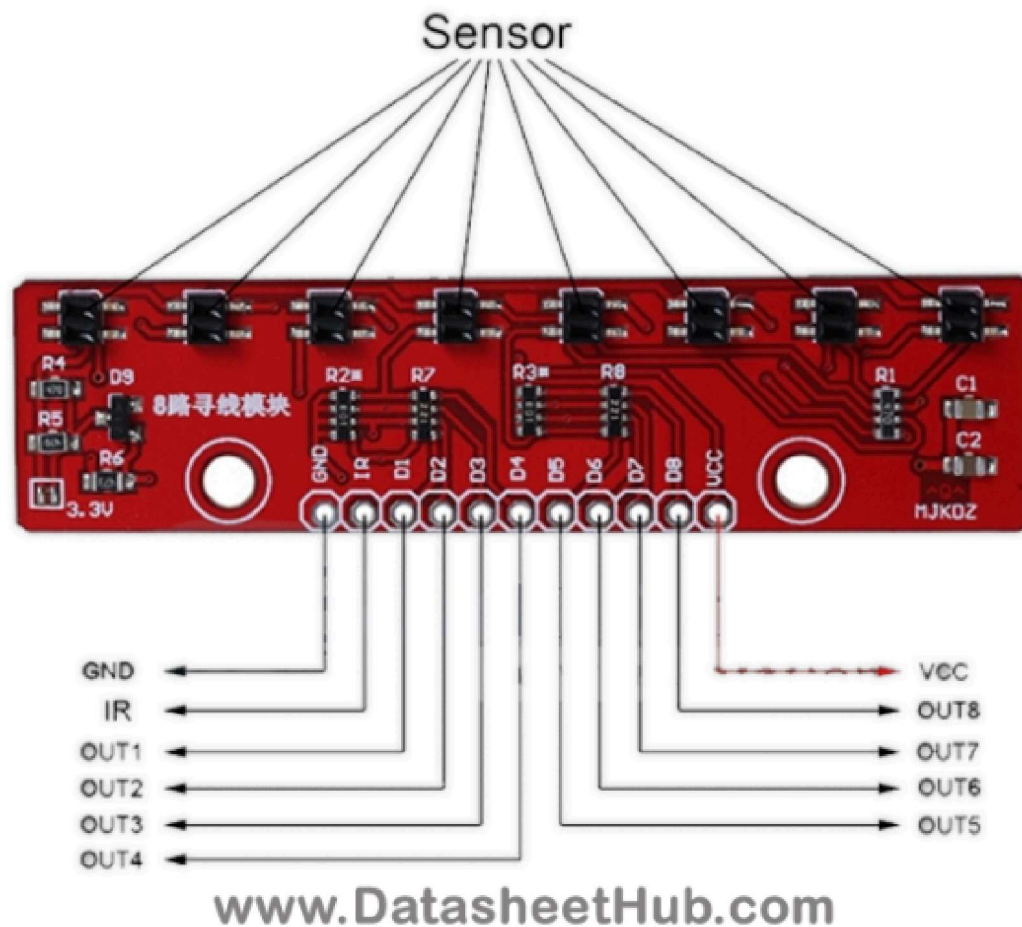

What is L298N?

- Controls **2 DC motors** independently **OR**

- Controls **1 bipolar stepper motor**

- Can control **direction + speed**

- Based on **H-Bridge principle**

Pin	Name	Meaning
12V	Motor supply	Power for motors (5–35V)
GND	Ground	Common ground with Arduino
5V	Logic supply	Powers L298N logic
OUT1, OUT2	Motor A	
OUT3, OUT4	Motor B	
IN1	Motor A direction	
IN2	Motor A direction	

IN3	Motor B direction	
IN4	Motor B direction	
Direction Logic (DC Motor)		
IN1	**IN2**	**Motor A**
1	0	Forward
0	1	Reverse
0	0	Stop
1	1	Brake
Enable Pins (Speed Control).....These pins enable motors and control speed using PWM.		
Pin	**Function**	
ENA	Enable Motor A	
ENB	Enable Motor B	

- **Line Follower Sensor 8 Array QTR-8RC Clone**

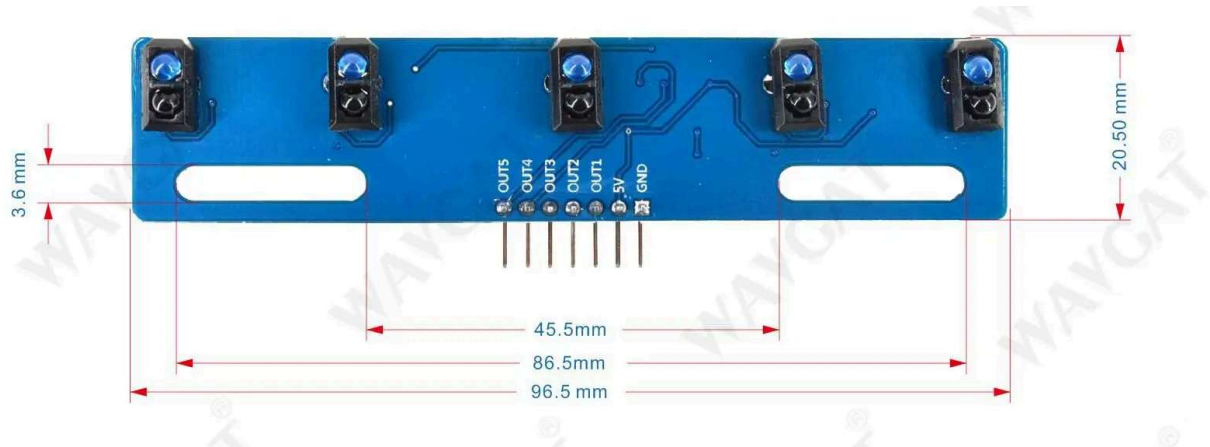# QTR-8A Pinout

Sensor

www.DatasheetHub.com

What is QTR-8RC?

- **Contains 8 infrared (IR) reflectance sensors**

- **Used to detect black/white lines**

- **Outputs digital-style signals using RC timing**

- **Works best at 5V**

Pin	Function
VCC	5V power supply
GND	Ground
IR (LEDON)	Turns IR LEDs ON/OFF

D1 to D8	sensors

Line Following Sensor 5 Array(Sensor TCRT5000)

Pin	Function
VCC	5V power supply
GND	Ground
OUT1 - OUT5	sensors

PIn connections:

- **Battery → Motor Driver**

  Battery + → Motor Driver VM / +12V

  Battery − → Motor Driver GND

- **Motor Driver → Arduino**

  Motor Driver GND → Arduino GND   (VERY IMPORTANT)

  Motor Driver 5V → Arduino **VIn** or **5V**   (if driver has 5V regulator)

- **Motors → Motor Driver**

  Left Motor → OUT1 & OUT2

  Right Motor → OUT3 & OUT4

- **Motor Driver → Arduino (Control Pins)**

  ENA (Left speed) → D5   (PWM) [PWM pins allow **speed control using analogWrite()**]

  IN1   → D6

  IN2   → D7

  ENB (Right speed) → D9   (PWM)

  IN3   → D10

  IN4   → D11

- **QTR-8RC Line Sensor → Arduino**

  VCC → Arduino 5V

  GND → Arduino GND

  D1 → A0

  D2 → A1

  D3 → A2

  D4 → A3

  D5 → A4

  D6 → A5

  D7 → D2

  D8 → D3

  IR → **Arduino 5V** or Digital pin like(A4)

- **IF you use Line Following Sensor 5 Array(Sensor TCRT5000)**

  Sensor → Arduino

  Out1 → A5

  Out2 → A4

  Out3 → A3

  Out4 → A2

  Out5 → A1

- **Start Button(if you use)**

  One side → Arduino D4

  Other side → GND

- **Calibrate Button(If you use) (It use for calibrate the line)**
  One side → Arduino D8
  Other side → GND