DC Motor Speed, Direction and Brake Control with NRF24L01 RF Module – Arduino Compatible

This is Arduino compatible hardware that can control a single DC motor speed, direction and brake using an RF remote control. The project is based on an ATMEGA328 microcontroller, H-Bridge DC motor driver chip LM18201, NRF24L01 RF module, 5V Regulator, 3.3V regulator and other components. This board can drive a DC Motor up to 24V DC with a load current up to 3A. Arduino pin configuration details are provided below, the user may write their own code and use this hardware. The ATMEGA328 is the heart of the project, the LMD18201 chip drives the motor, LM317-ADJ provides 5V to the microcontroller, LM1117 3.3V regulator power the 3.3V to NRF24L01.

Note 1: This project is compatible with our two RF transmitters published in past: Single Joystick Remote Control and Dual Joystick Remote over NRF24L01 RF link.
Note 2: The project drives 12V to 24V DC motor with single supply 12V to 24V, LMD18201 can support higher voltage motor up to 48V, in case of 48V supply, remove VCC Jumper J2, apply 48V to CN3 for motor and apply 5V DC separately to CN1 for the microcontroller power.
Note 3: It is advisable to use large size of heatsink on LMD18201 chip.
Note 4: Close Jumper J1 and J2 for normal operations of 12V to 24V DC Motor Speed and Direction Control using Joystick remote transmitter.

Arduino Pins

- ***LMD18201 Motor Driver Chip:*** PWM-Pin5>> Arduino Digital Pin D5, Direction-Pin3>>Arduino Digital Pin D6, Brake-Pin4>> Arduino Digital Pin 7
- ***NRF24L01 RF Module:*** GND>>GND, 3.3V>>3.3V Regulator, CE>> Arduino Digital Pin D9, CSN>> Arduino Digital Pin D10, MOSI>>Arduino Digital Pin D11, MISO>> Arduino Digital Pin D12, CSK>>Arduino Digital Pin D13

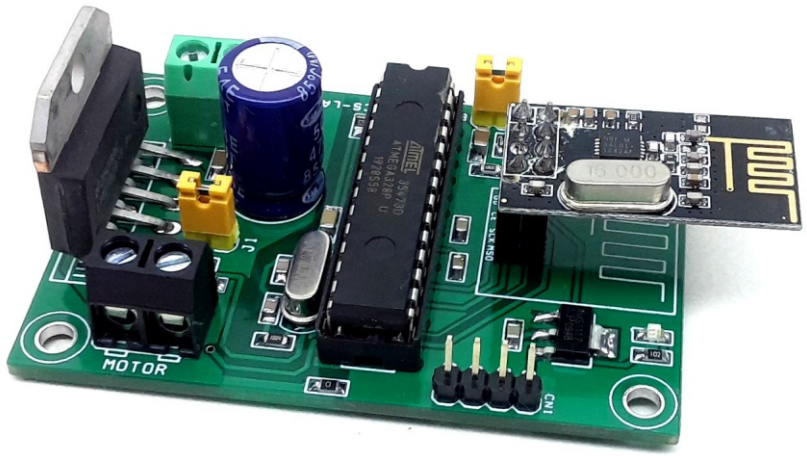
Arduino code is available as a download, it is a modified code from the original author www.forbiddenbit.com. Make sure RX code is uploaded to the ATMEGA328 chip, TX code is for transmitter chip, follow the link bellow to learn more about programming and bootloader burning to the ATMEGA328 microcontroller. Users will be able to run DC motor with speed and direction with help of our One Joystick NRF24L01 Transmitter.
https://www.arduino.cc/en/Tutorial/BuiltInExamples/ArduinoToBreadboard

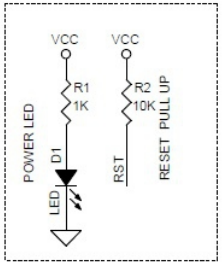
Testing the Project

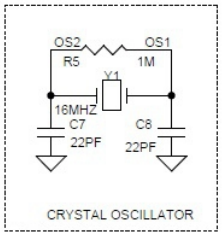
Connect the 24V DC Motor to MG1 (Motor connector), connect 24V power supply to CN3, Close Jumper J2 and Jumper J1, Switch on the power, switch on the On Joystick NRF24L01 Transmitter, motor should run with Joystick.

Features

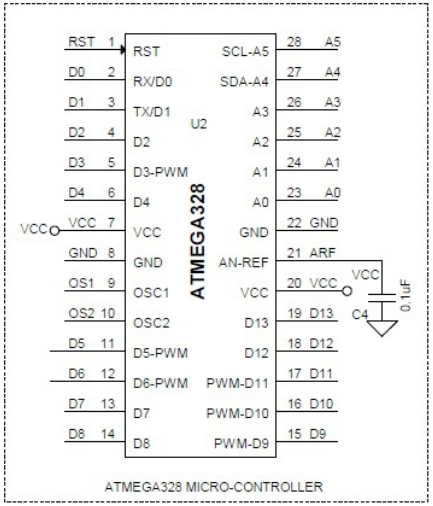
- Operating Power Supply 12V to 24V DC (Also supports Higher Voltages Read Note 2)
- DC Motor Load up to 3Amps 12V to 24V DC
- LMD18201 Supports PWM Duty Cycle 0 to 100%
- LMD18201 Chip Supports Frequency up to 20Khz (With Example Code Frequency 900Hz)
- Motor Speed, Direction, Brake control using RF Transmitter
- D1 Power LED
- PCB Dimensions 63.82 X 43.18 mm



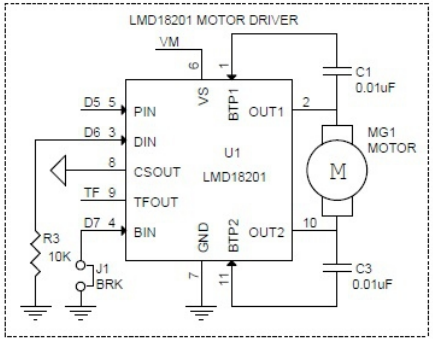


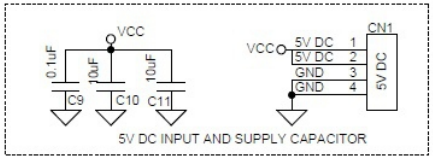


CRYSTAL OSCILLATOR

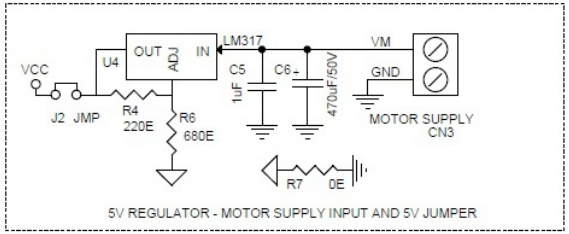


ATMEGA328 MICRO-CONTROLLER

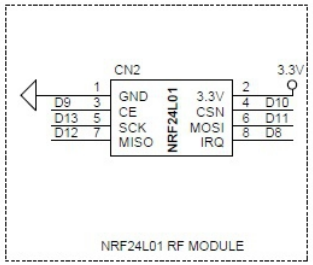




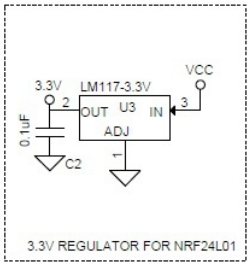
5V DC INPUT AND SUPPLY CAPACITOR



5V REGULATOR - MOTOR SUPPLY INPUT AND 5V JUMPER

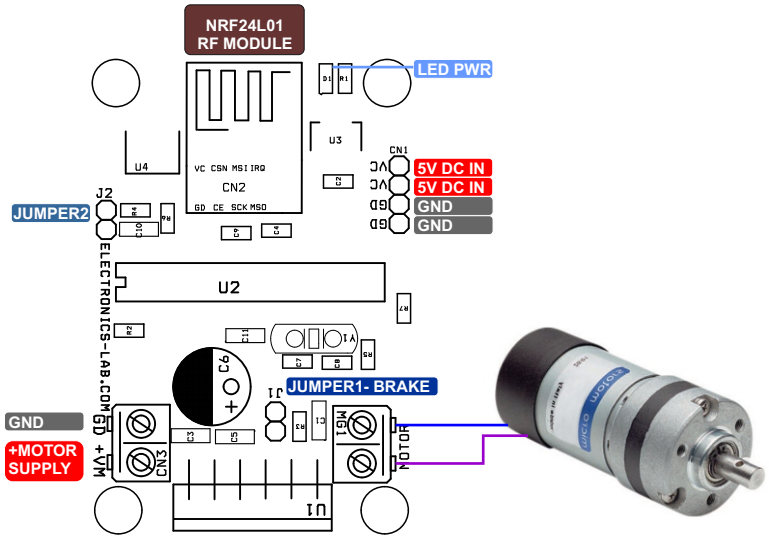


NRF24L01 RF MODULE

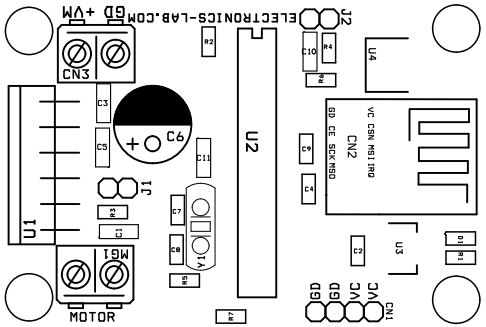


3.3V REGULATOR FOR NRF24L01

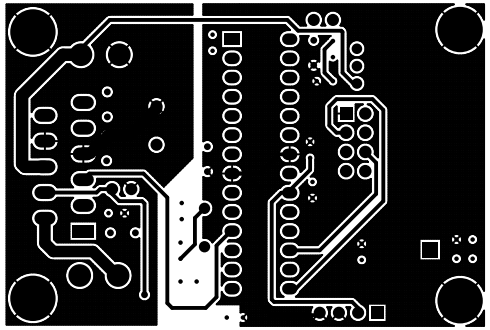
BOM						
NO	QNTY	REF	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	4 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5317-ND
2	1	CN2	NRF24L01	AMAZON/ALIEXPRESS	DIGIKEY	
3	1	CN3	2 PIN SCREW TERMINAL	PHOENIX	DIGIKEY	277-1247-ND
4	2	C1,C3	0.01uF/50V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
5	3	C2,C4,C9	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
6	1	C5	1uF/50V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
7	1	C6	470/50V	WURTH	DIGIKEY	732-9194-1-ND
8	2	C7,C8	22PF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
9	2	C10,C11	10uF/6.3V SMD SIZE 1206	MURATA/YAGEO	DIGIKEY	
10	1	D1	LED RED SMD SIZE 0805	LITE-ON	DIGIKEY	160-1427-1-ND
11	1	J1	2 PIN HEADER WITH SHUNT	WURTH	DIGIKEY	732-5315-ND
12	1	J2	2 PIN HEADER WITH SHUNT	WURTH	DIGIKEY	732-5315-ND
13	1	MG1	2 PIN SCREW TERMNINAL	PHOENIX	DIGIKEY	277-1247-ND
14	1	R1	1K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
15	2	R2,R3	10K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
16	1	R4	220E 1% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
17	1	R5	1M 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
18	1	R6	680E 1% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
19	1	R7	0E SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
20	1	U1	LMD18201	TI	DIGIKEY	LMD18201T/NOPB-ND
21	1	U2	ATMEGA328 DIP 28	MICROCHIP	DIGIKEY	ATMEGA328-PU-ND
22	1	U3	LM117-3.3V	TI	DIGIKEY	LM1117MP-3.3/NOPBCT-ND
23	1	U4	LM317-ADJ DPAK SMD	TI	DIGIKEY	LM317MDTNS/NOPB-ND
24	1	Y1	16MHZ	ECS INC	DIGIKEY	X1103-ND
25	2	J1,J2	SHUNT	SULLINS	DIGIKEY	S9001-ND
26	1	SCK	28 PIN DIP IC SOCKET		DIGIKEY	ED3050-5-ND



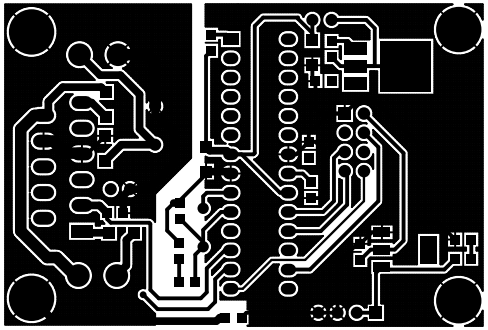
Author Rajkumar Sharma



SILK SCREEN TOP



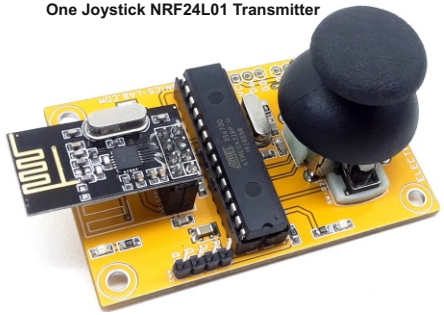
BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 63.82MM X 43.18MM

One Joystick NRF24L01 Transmitter



OR

2 X Joystick NRF24L01 Transmitter

LMD18201 + NRF24L01 + ATMEGA328 Board

12 to 24v DC Motor