

Stepper Motor Drivers

The diagram illustrates the wiring for six stepper motor drivers (R, L, F, B, U, D) connected to a Raspberry Pi 4. Each driver is an A4988 module. The connections are as follows:

- Module R:** EN to D_51, MS1 to D_50, MS2 to D_49, MS3 to D_48, -RESET to D_47, -SLEEP to D_46, STEP to D_45, DIR to D_44. VMOT to V_R, GND to GND_1, 2B to 2A, 1A to 1B, VDD to V_R, GND to GND_1.
- Module L:** EN to D_49, MS1 to D_48, MS2 to D_47, MS3 to D_46, -RESET to D_45, -SLEEP to D_44, STEP to D_43, DIR to D_42. VMOT to V_L, GND to GND_2, 2B to 2A, 1A to 1B, VDD to V_L, GND to GND_2.
- Module F:** EN to D_53, MS1 to D_52, MS2 to D_51, MS3 to D_50, -RESET to D_49, -SLEEP to D_48, STEP to D_47, DIR to D_46. VMOT to V_F, GND to GND_3, 2B to 2A, 1A to 1B, VDD to V_F, GND to GND_3.
- Module B:** EN to D_47, MS1 to D_46, MS2 to D_45, MS3 to D_44, -RESET to D_43, -SLEEP to D_42, STEP to D_41, DIR to D_40. VMOT to V_B, GND to GND_4, 2B to 2A, 1A to 1B, VDD to V_B, GND to GND_4.
- Module U:** EN to D_42, MS1 to D_41, MS2 to D_40, MS3 to D_39, -RESET to D_38, -SLEEP to D_37, STEP to D_36, DIR to D_35. VMOT to V_U, GND to GND_5, 2B to 2A, 1A to 1B, VDD to V_U, GND to GND_5.
- Module D:** EN to D_45, MS1 to D_44, MS2 to D_43, MS3 to D_42, -RESET to D_41, -SLEEP to D_40, STEP to D_39, DIR to D_38. VMOT to V_D, GND to GND_6, 2B to 2A, 1A to 1B, VDD to V_D, GND to GND_6.

Driver Power Supply

The diagram illustrates a Driver Power Supply configuration. It features two vertical buses. The left bus is connected to a +5V_ard supply, and the right bus is connected to a GND_ard supply. Both buses have six red connection points, each connected to a blue rectangular component. The components on the left are labeled V_R, V_L, V_F, V_B, V_U, and V_F from top to bottom. The components on the right are labeled GND_1, GND_2, GND_3, GND_4, GND_5, and GND_6 from top to bottom.

Arduino Mega 2560 R3

The diagram illustrates the pin configuration of the Arduino Mega 2560 R3. It features four main sections: Power, Analog Input, Digital, and Communication.

- Power:** Includes pins for IOREF, RESET, 3V3, 5V, GND, VIN, and AREF.
- Analog In:** Consists of 16 pins labeled A0 through A15.
- Digital:** Comprises 54 pins labeled D_53 down to D_0. The bottom six pins (D_49 to D_42) are shown as headers.
- Communication:** Includes TX0, RX0, TX3, RX3, TX2, RX2, TX1, RX1, SDA, and SCL.

Additional labels include "ARDUINO MEGA 2560" and "DIGITAL".

Stepper Motor power supply

The diagram illustrates a power supply circuit for a stepper motor. A 12V 10A power source is connected to a common rail. Six decoupling capacitors, each rated at 16V 100uF, are connected in parallel between the common rail and the motor's phase lines (VMOT_R, VMOT_L, VMOT_F, VMOT_B, VMOT_U, VMOT_D). The other side of the capacitors is connected to a common ground rail, labeled GND_motor.

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graph TD
    V12V[12V 10A] --- Rail1
    Rail1 --- VMOT_R
    Rail1 --- VMOT_L
    Rail1 --- VMOT_F
    Rail1 --- VMOT_B
    Rail1 --- VMOT_U
    Rail1 --- VMOT_D
    Rail1 --- Rail2
    Rail2 --- GND_motor
    VMOT_R --- C1[16V 100uF] --- Rail2
    VMOT_L --- C2[16V 100uF] --- Rail2
    VMOT_F --- C3[16V 100uF] --- Rail2
    VMOT_B --- C4[16V 100uF] --- Rail2
    VMOT_U --- C5[16V 100uF] --- Rail2
    VMOT_D --- C6[16V 100uF] --- Rail2
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