Motor Driver Shield for Arduino

Module: EB0016 / 180830

Introduction

Motor Driver Shield is a board which gives possibility to control 4 DC motors or 2 step motors (unipolar or bipolar) and 2 servo motors additionaly by stacking on Arduino.

There are 2 L293D motor driver IC on board which means it can drive 0.6A 4 seperate DC motors or 0.6A 2 seperate step motors. You can control speed and direction of motors independently. Motor controls are done by AF Motor Library.

Power:

Motor Shield must be feeded only externaly. Because necessary motor current will mostly be over the maximum current which USB can give.

External feeding can be done with adapter or battery. Adapter can be connected to 2.1mm centre positive power socket on Arduino or EXT_PWR screw terminals on driver - be carefull about polarity. But it is always advised to give power through screw terminal on driver. Because when it is given through power socket on Arduino, current which is drawing by motors will reach driver through Arduino. Since, Arduino Vin route is made for maximum 1A current when current is above 1A, Arduino board might get damaged. That is way external power should always be given through screw terminal on driver.

EXT_PWR screw terminal on driver is connected to Vin pin through header which means when power connection is made through screw terminal, Arduino will get the power through Vin pin and step down it to 5V with the regulator on itself. This way, you do not need 2 different power source. But as you know Vin pin on Arduino only accepts inputs between 7V and 12V. In that case if voltage given to driver card is between 5V and 7V, Arduino will not work properly since the input voltage is below the regulator's minimum operating value.To avoid this, there is a power jumper under the driver card. This jumper connects EXT_PWR screw terminal on driver and Arduino Vin pin. If the voltage on driver is between 5V and 7V, jumper will be removed. EXT_PWR and Arduino Vin pin will be seperate and Arduino is feeded with 5V externally. If voltage given to driver card is between 7V and 12V, jumper stays the same and boards can be used.

There is 3-pin servo socket on board to drive two servo motor. Servos get their 5V through 5V pin on Arduino. Small servo motors such as SG90 can be used with direct connection. But if larger servo motors will be used, 5V regulator on Arduino will not be enough. In that case, + route which goes through 3-pin servo socket should be cut and external 5V should be given to servos.

Input and Output:

Hence Motor Shield is capeable of driving number of motors, it uses a lot of pins. Shield uses all pins except this 8 pins; Pin 2, 13, A0-5. The ones who will use extra sensors with motor driver must be carefull with the pins which are left.

L293 motor drivers -on board-' Dir pins controls are done by 75HC595 shift register on board. PWM pins and servos are connected directly to Arduino. AFMotor Library which is used with motor driver do all pin setting operations. So there is no need to do anything extra on those pins. Servo 1 socket is connected to Arduino Pin 10 and Servo 2 socket is connected to Arduino Pin 9.

Documents:

Users Guide	https://learn.adafruit.com/adafruit-motor-shield/overview
AFMotor Library	https://github.com/adafruit/Adafruit-Motor-Shield-library
Board Schematic	https://learn.adafruit.com/system/assets/assets/000/009/769/original/mshieldv1-schem.png
Board Drawing (Eagle)	https://github.com/adafruit/Adafruit-Motor-Shield-for-Arduino
Useage of Servo Motor	https://learn.adafruit.com/adafruit-motor-shield/using-rc-servos
Useage of Step Motor	https://learn.adafruit.com/adafruit-motor-shield/using-stepper-motors
Useage of DC Motor	https://learn.adafruit.com/adafruit-motor-shield/using-dc-motors