L298 H-Bridge Dual Bidirectional Motor Driver (2 x 2A)

Cana✦Kit

www.canakit.com

Manufacturer of High Quality Electronic Kits & Modules

This dual bidirectional motor driver is based on the very popular L298 Dual H-Bridge Motor Driver Integrated Circuit. The circuit will allow you to easily and independently control two motors of up to 2A each in both directions.

It is ideal for robotic applications and well suited for connection to a microcontroller requiring just a couple of control lines per motor. It can also be interfaced with simple manual switches, TTL logic gates, relays, etc.

The circuit incorporates 4 direction LEDs (2 per motor), a heat sink, screw-terminals, as well as eight Schottky EMF-protection diodes. Two high-power current sense resistors are also incorporated which allow monitoring of the current drawn on each motor through your microcontroller.

An onboard user-accessible 5V regulator is also incorporated which can also be used to supply any additional circuits requiring a regulated 5V DC supply of up to about 1A.

The circuit also offers a bridged mode of operation allowing bidirectional control of a single motor of up to about 4A.

Step-by-step Assembly

Refer to the General Assembly Guide included with the kit for detailed instructions on installation of each component.
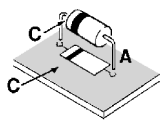
(1) Resistors:

☐ R3, R4   1 KΩ   Brown, Black, Red
☐ R5   470 Ω   Yellow, Violet, Brown

(2) Schottky Diodes:

☐ D1 – D8   FR107

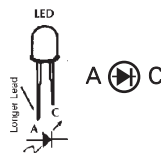*** Note orientation of D1 – D4 are opposite of D5 – D8.**

(3) 10-Pin Right Angle Header

☐ Install the 10-pin right-angle header at its corresponding location.

(4) Light Emitting Diodes (LEDs):

☐ LED1, LED3   Yellow LED
☐ LED2, LED4   Red LED
☐ POW   Green LED

Note that the anode (A) lead of the LED is longer than its cathode (C) lead. Make sure you insert each LED lead through the appropriate hole in the PC board.

(5) 3-Pin Jumper Header:

☐ Install the 3-pin jumper header at locations marked "J1". Then place the small plastic jumper head on the rightmost two pins (position "A").

(6) 2-pin Screw Terminals:

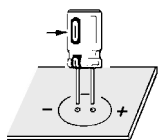☐ Install the three 2-pin Screw Terminals at locations marked "MOT1", "MOT2" and "MOT DC".

(7) Ceramic Capacitors:

☐ C3, C5   104 / 0.1 µF / 100nF
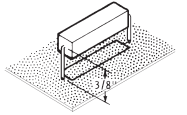
(8) Electrolytic Capacitors:

☐ C1   100 µF / 50V
☐ C2, C6   10 µF / 50V
☐ C4   100 µF / 16V

(9) Power Resistors:

☐ R1, R2   0.5 Ω / 3 W

It is recommended to leave a space of about 1/8" (3 mm) between the resistor and the PC board for better heat dissipation.

(10) 5V Regulator Integrated Circuit:

☐ Install the 7805 5V Regulator IC at location marked "U2". Make sure that the metallic side of the IC is lined up with the outline on the board (the metallic part should be facing towards "C4" electrolytic capacitor).

(11) L298 Integrated Circuit:

☐ Mount the L298 Integrated Circuit on the heat sink using the short screw provided. Make sure that you tightly fasten the heat sink to the integrated circuit so that the maximum amount of heat can be dissipated. If available, use a small amount of Silicon Grease (also known as Thermal Grease or Paste) between the heat sink and the L298 for even better heat dissipation. Then install the L298 with the heat sink attached at location marked "U1". **Be very careful when soldering the pins as to not cause any shorts between the pins since they are very close to each other.**
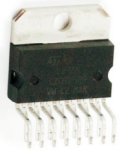
Testing

Before testing the kit, It is highly recommended to inspect the PC board carefully as explained below:

☐ Check for proper placement of all components.
☐ Check for proper orientation of the LEDs, diodes, electrolytic capacitors, and regulator IC.
☐ Check for protruding leads which could touch other leads or adjacent pads.
☐ Check all solder connections for cold solder joints.
☐ Examine the PC board solder side to see that there are no solder bridges causing shorts between tracks.

Once you are satisfied that everything is correct, proceed to do the test as follows:

1. The circuit can be supplied in two different ways. Since the circuit incorporates an onboard 5V DC regulator, the required supply voltage for the operation of the L298 Integrated Circuit can be tapped off of the motor supply voltage itself. Furthermore, this 5V DC regulated voltage is also available for any other circuitry you may want to drive. The jumper setting and wiring diagram for this way of supplying the circuit is indicated in Wiring Diagram 1. **This is the recommended way of supplying the circuit.**

   Alternatively, if you would like to keep the motor supply voltage completely independent and isolated from the L298 5V supply voltage, then you would need to provide your own 5V DC regulated voltage to supply the L298 IC. The jumper setting and wiring diagram for this way of supplying the circuit is indicated in Wiring Diagram 2.

2. Each motor is controlled by setting to High "ENA" or "ENB" for the corresponding motor. You can then control the direction of each motor by enabling "IN1" or "IN2" for motor "A" and "IN3" or "IN4" for motor "B".

3. To "brake" a particular motor, you will need to set "ENA" or "ENB" to High and then set both direction pins to either High or Low.

4. To "coast" (i.e. let freely run) a particular motor, simply set "ENA" or "ENB" to Low. When the enable of a particular motor is set to Low, the corresponding motor "coasts".

5. The circuit also incorporates two current sense outputs, "CSA" and "CSB" for each motor which expose the corresponding current sense outputs of the L298 IC and incorporate the required high-power resistors. You can use these outputs to monitor the current draw of each motor and detect stall conditions and take appropriate action. For more information on how to use these, you may refer to the L298 Datasheet which can be found at:
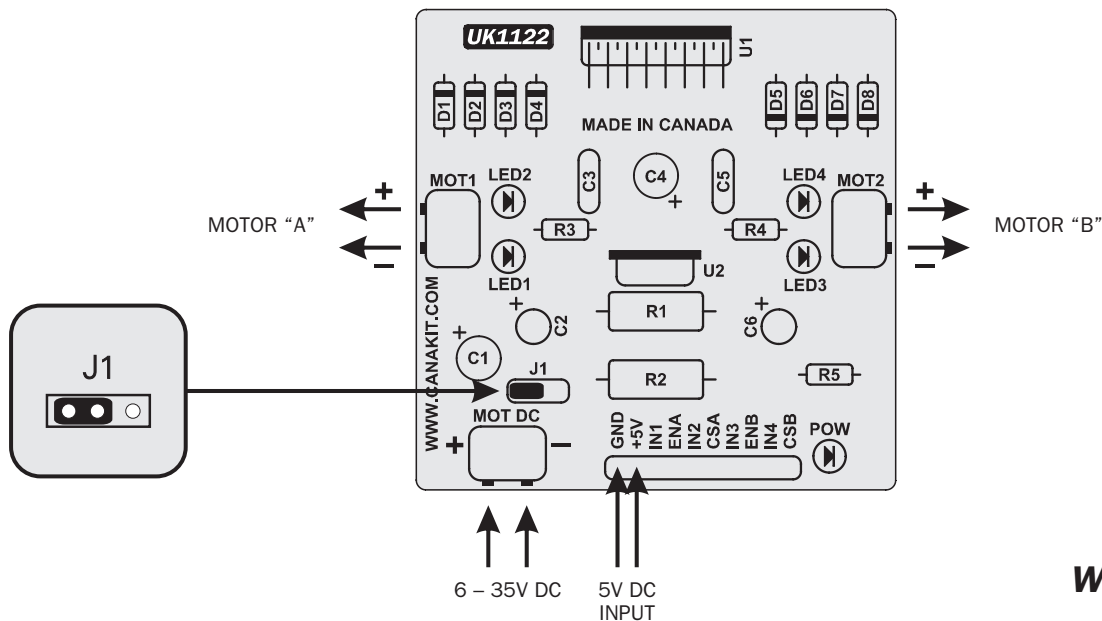
http://www.canakit.com/Media/Datasheets/L298.pdf

USING THE MOTOR SUPPLY VOLTAGE FOR THE L298 SUPPLY VOLTAGE (RECOMMENDED)
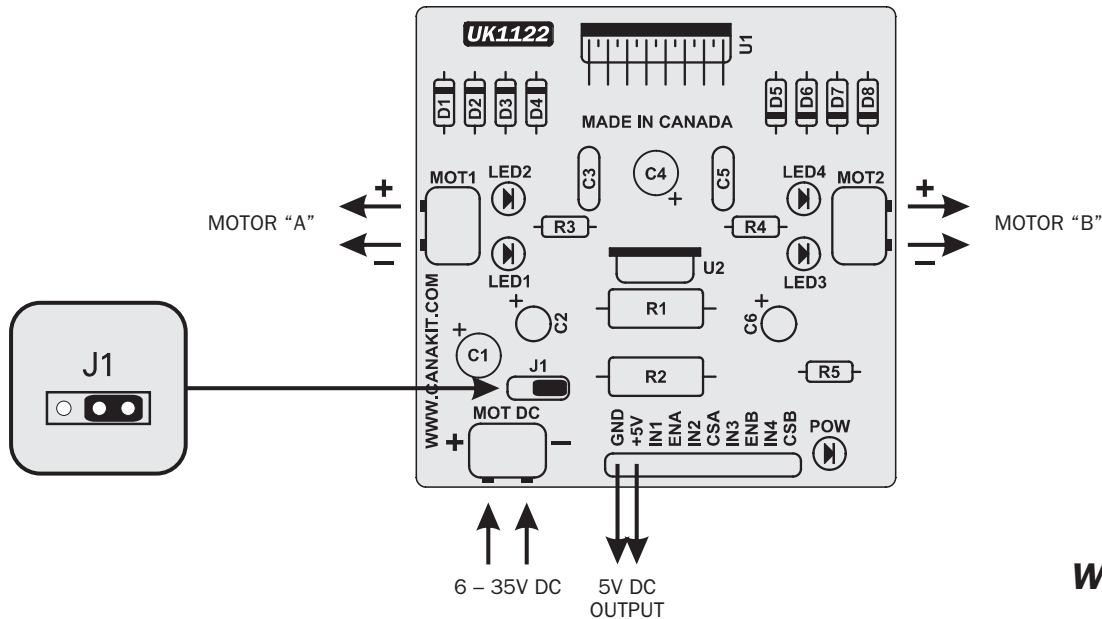
Wiring Diagram 1

USING AN INDEPENDENT SUPPLY VOLTAGE FOR L298 SUPPLY VOLTAGE
(NOTE: IN THIS MODE THE ONBOARD 5V DC REGULATOR IS DISABLED)

Wiring Diagram 2

Manufactured by:
Cana Kit Corporation
(Unikit is a division of Cana Kit Corporation)
#118 – 2455 Dollarton Highway
North Vancouver • BC • V7H 0A2 • Canada
Tel: (604) 298-3305 • Fax: (604) 298-3390
Email: info@canakit.com
Web Site: www.canakit.com

Cana★Kit
www.canakit.com

CK1122 SCHEMATIC
L298 H-Bridge Dual Bidirectional Motor Driver (2 x 2A)
WWW.CANAKIT.COM

Schematic Diagram