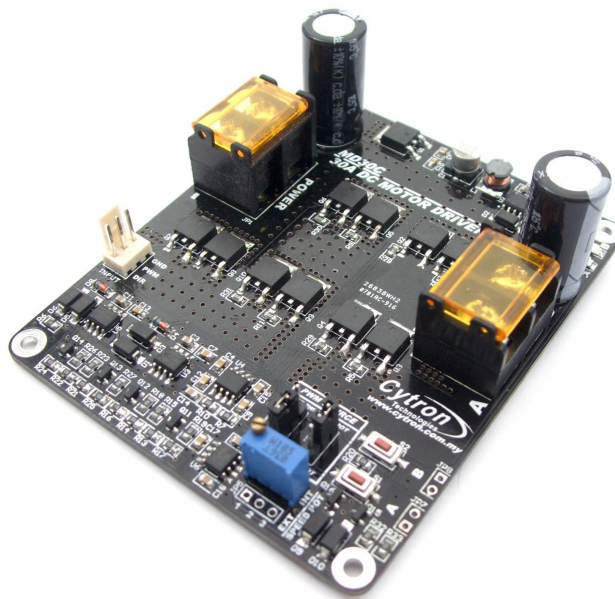




## MD30C 30A DC Motor Driver



## User's Manual

V1.4

December 2017

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# Index

|    |   |    |
|----|---|----|
| 1. | <a href="#">Introduction</a>                          | 3  |
| 2. | <a href="#">Packing List</a>                          | 4  |
| 3. | <a href="#">Product Specification and Limitations</a> | 5  |
| 4. | <a href="#">Board Layout</a>                          | 6  |
| 5. | <a href="#">Dimension</a>                             | 8  |
| 6. | <a href="#">Hardware Installation</a>                 | 9  |
| 7. | <a href="#">Warranty</a>                              | 16 |

## 1.0 INTRODUCTION

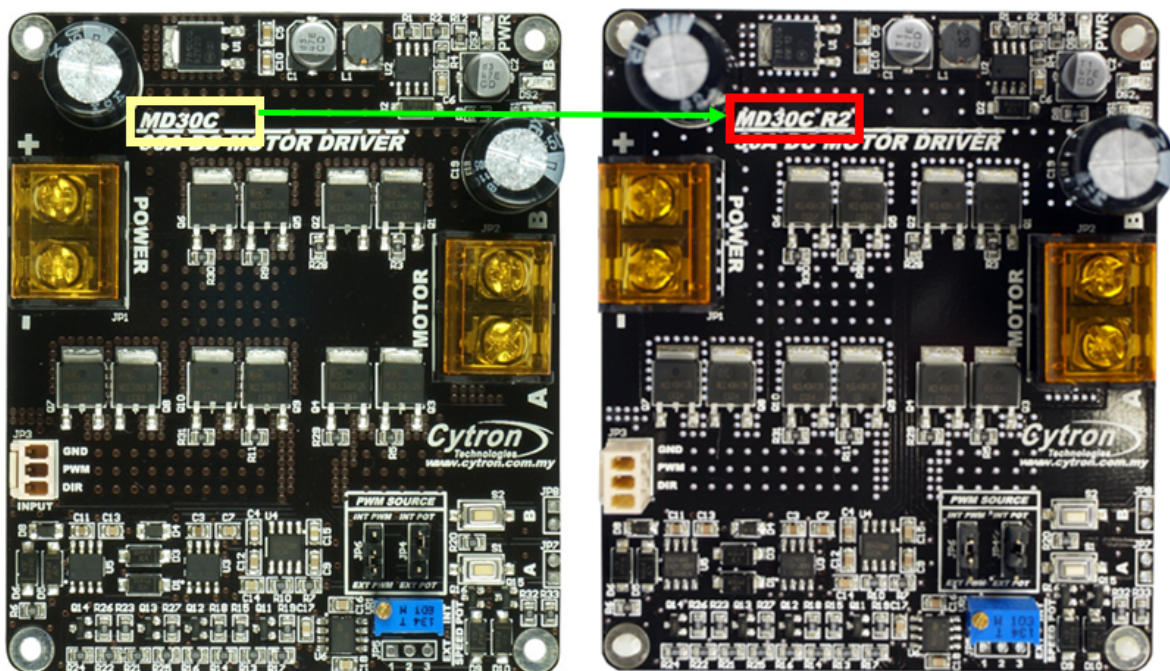
[MD30C](#) is the successor of MD30B which is designed to drive medium to high power DC Brushed motor with current capacity up to 80A peak and 30A continuously. Fully NMOS design not only provides faster switching time, it is also more efficient and no heatsink or fan is required.

Besides, MD30C also incorporates some user friendly features such as reverse polarity protection and onboard PWM generator which allows it to operate without a host controller. The motor can simply be controlled with the onboard switches and speed potentiometer. External switches and potentiometer can also be used.

Features:

- Bi-directional control for 1 brushed DC motor.
- Motor Voltage: 5V - ~~25V~~ 30V.
- Maximum Current: 80A peak (1 second), 30A continuously.
- Reverse polarity protection.
- 3.3V and 5V logic level input.
- Fully NMOS H-Bridge for better efficiency and no heatsink is required.
- Speed control PWM frequency up to 20KHz (Actual output frequency is same as input frequency when external PWM is selected).
- Onboard PWM generator with switches and potentiometer for standalone operation.
- Support both locked-antiphase and sign-magnitude for external PWM operation.

**MD30C is Revision 2.0 since January 2016.**

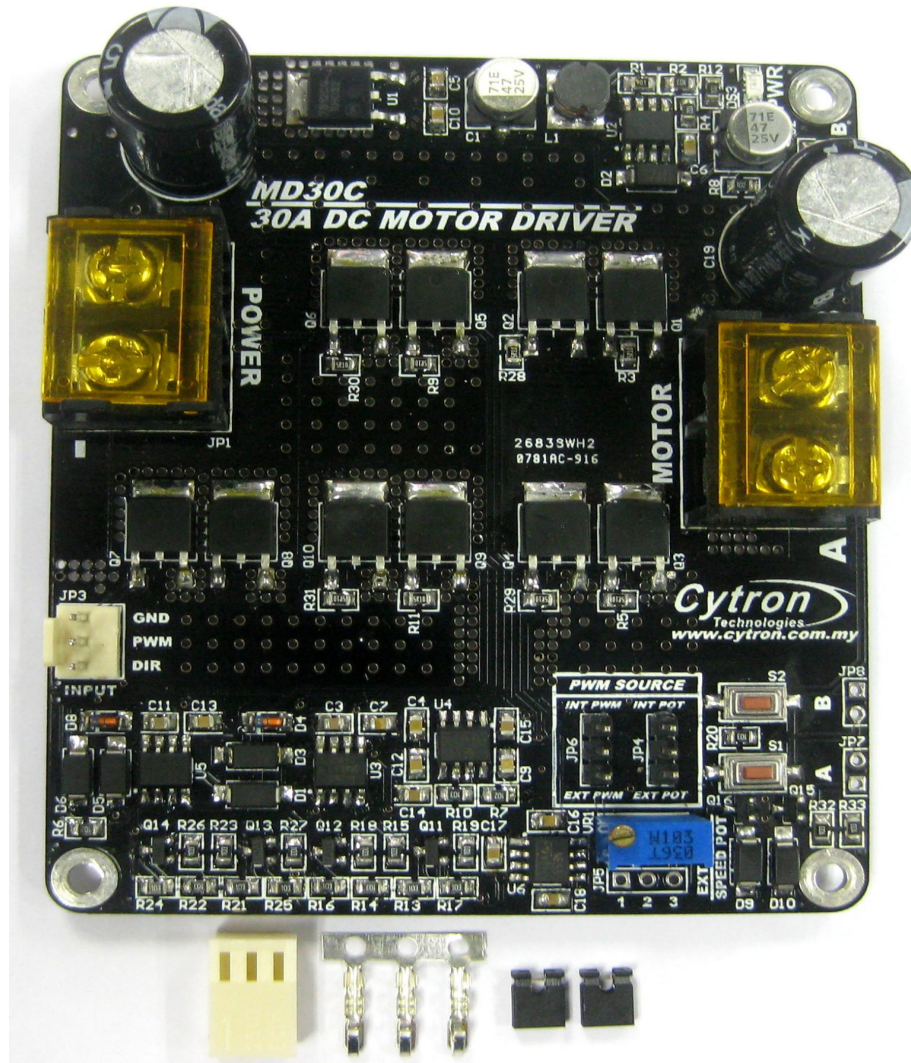


REV 1.0

REV 2.0

## 2.0 PACKING LIST

Please check the parts and components according to the packing lists. If there are any parts missing, please contact us at [sales@cytron.com.my](mailto:sales@cytron.com.my) immediately.



1. 1 x [MD30C 30A DC Motor Driver](#)
2. 2 x [Mini Jumper](#)
3. 1 x [2510 PCB Connector](#) - 3 Ways (Female)
4. 3 x [2510 Terminal Pin](#)

### 3.0 PRODUCT SPECIFICATION AND LIMITATIONS

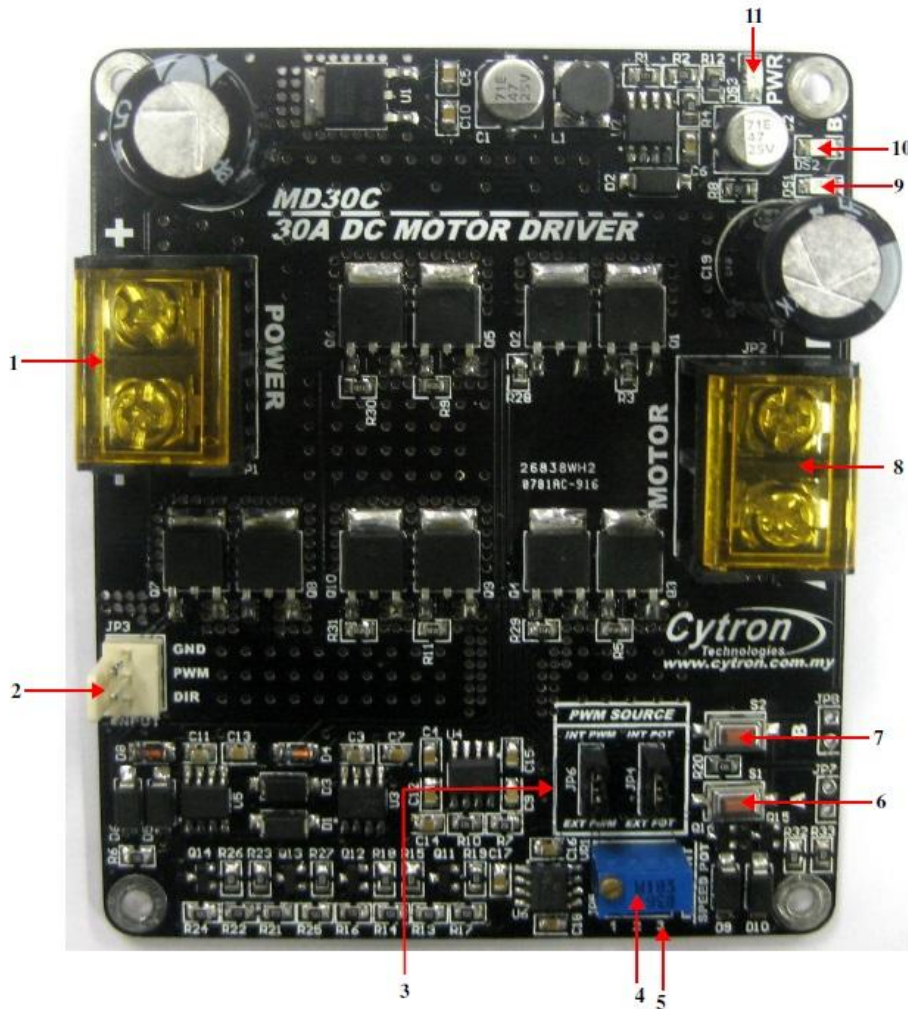
#### Absolute Maximum Rating

| Parameter   | Min | Typical | Max | Unit |
|---|-----|---------|-----|------|
| Power Input Voltage (Motor supply voltage)          | 5   | -       | 30  | V    |
| I <sub>MAX</sub> (Maximum Continuous Motor Current) | -   | -       | 30  | A    |
| I <sub>PEAK</sub> (Peak Motor Current)*             | -   | -       | 80  | A    |
| I <sub>IDLE</sub> (Idle Current)                    | -   | -       | 100 | mA   |
| V <sub>IOH</sub> (Logic Input-High Level)           | 3   | -       | 5.5 | V    |
| V <sub>IOL</sub> (Logic Input - Low Level)          | 0   | -       | 0.5 | V    |
| Maximum PWM Frequency**                             | -   | -       | 20  | KHz  |

**\*Must not exceed 1 second.**

**\*\*Actual output frequency is same as input frequency when external PWM is selected.**

## 4.0 BOARD LAYOUT



### 1. Power Terminal Block

Connect to power source. For high current application, please solder the wire directly to the pad at bottom layer.

### 2. Input

| Pin No. | Pin Name | Description                   |
|---------|----------|-------------------------------|
| 1       | GND      | Ground                        |
| 2       | PWM      | *PWM input for speed control. |
| 3       | DIR      | Direction Input.              |

\*Note this is not RC (Radio Control) PWM

### 3. PWM Source Selector

Select the source of the speed control PWM.

| PWM Source             | JP4            | JP6     |
|------------------------|----------------|---------|
| Internal Potentiometer | INT POT        | INT PWM |
| External Potentiometer | EXT POT        | INT PWM |
| External PWM Signal    | X (Don't Care) | EXT PWM |

4. **Internal PWM Potentiometer**

Used to control the motor speed when PWM source is internal potentiometer.

5. **External PWM Potentiometer Port**

Connect to the external potentiometer (**10K Ohm**). Used to control the motor speed when PWM source is external potentiometer.

6. **Test Button A**

When this button is pressed, current flows from output A to B and motor will turn CW (or CCW depending on the connection). External switch can also be connected for the ease of access.

7. **Test Button B**

When this button is pressed, current flows from output B to A and motor will turn CCW (or CW depending on the connection). External switch can also be connected for the ease of access.

8. **Motor Terminal Block**

Connect to motor. For high current application, please solder the wire directly to the pad at bottom layer.

9. **Red LED A.**

Turns ON when the output B is low and output A is high. Indicates the current flows from output A to B.

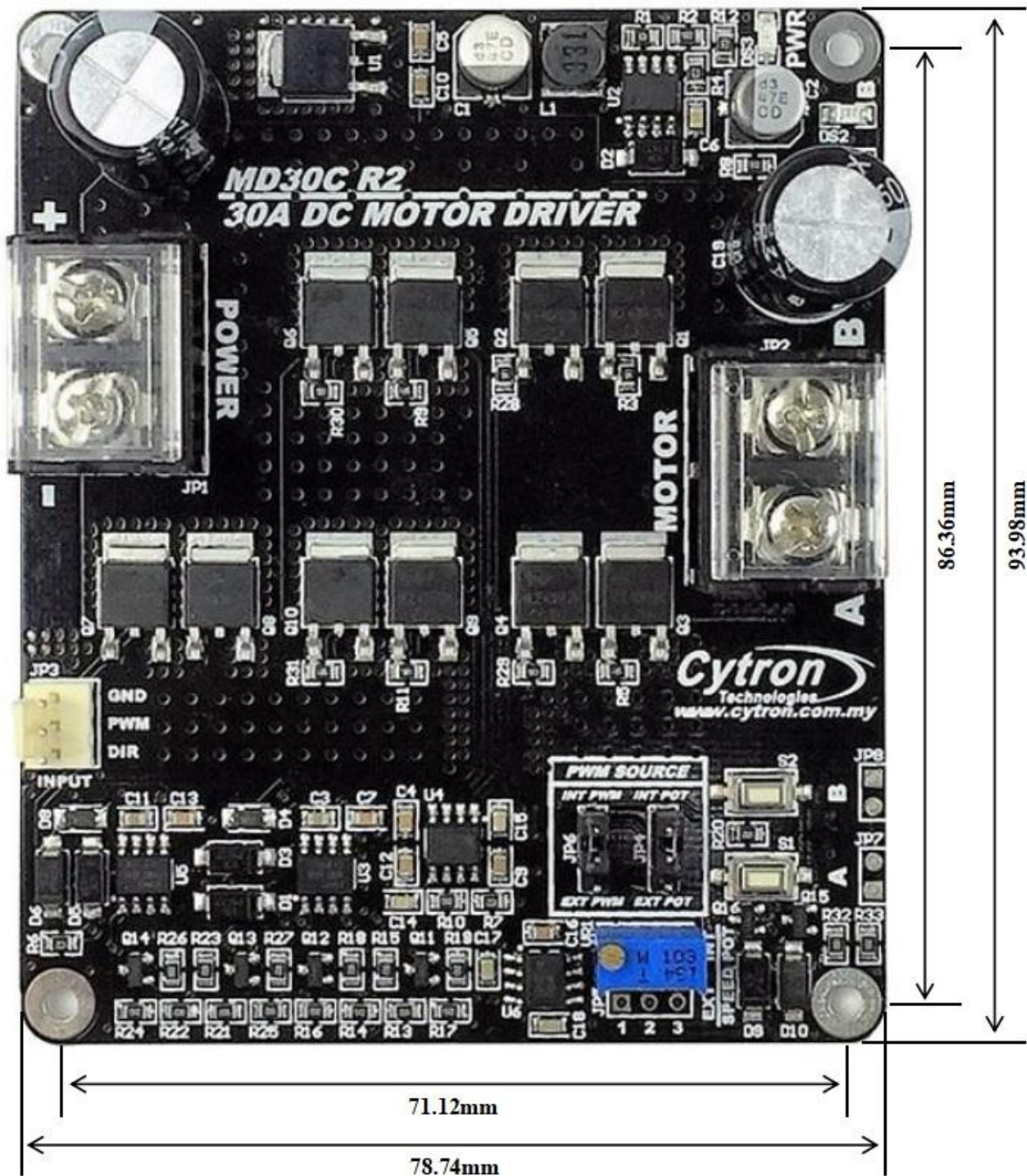
10. **Red LED B**

Turns ON when the output A is low and output B is high. Indicates the current flows from output B to A.

11. **Green Power LED**

Turn on when the MD30C is powered up.

5.0 DIMENSION





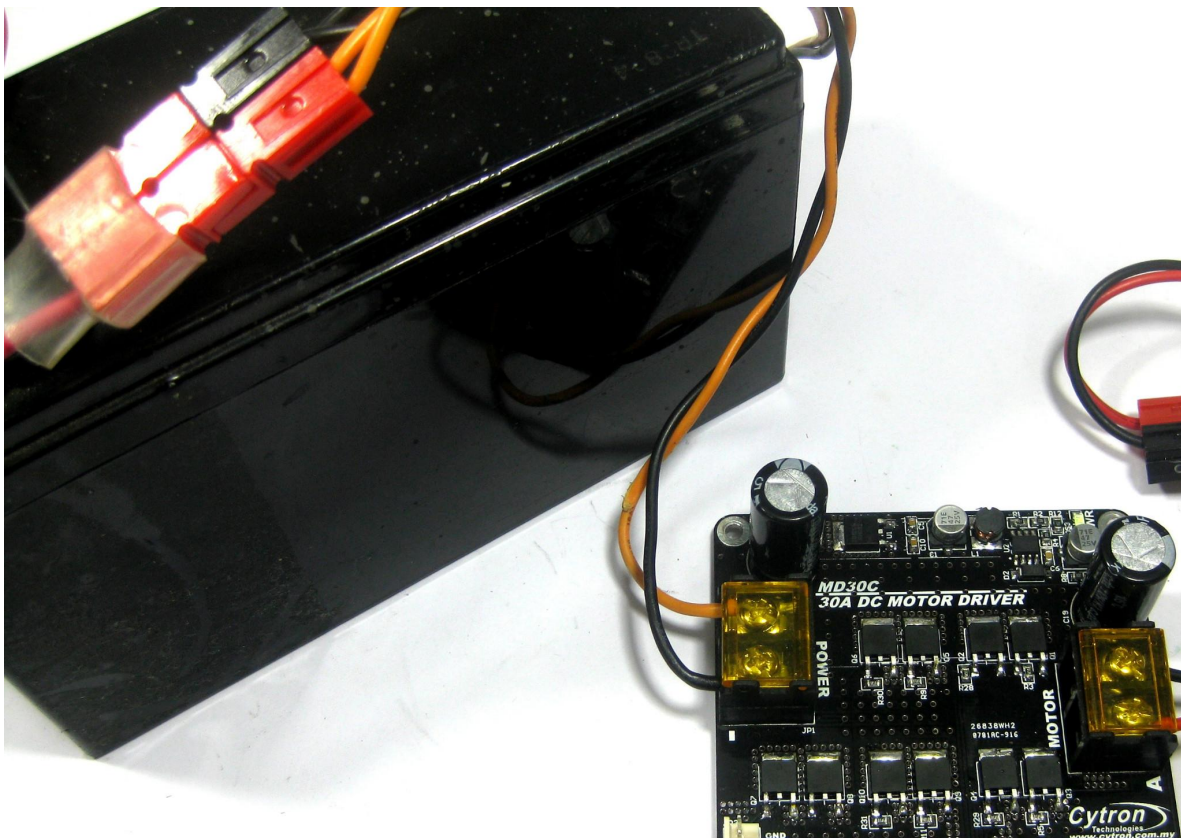
## 6.0 HARDWARE INSTALLATION AND GETTING STARTED

### 6.1 Power and Motor Connection

We recommend to use battery as power source to MD30C. The battery and motor can be connected to the [MD30C](#) either via the screw terminal block, or it can be soldered directly to the pad at the bottom layer of the PCB. Make sure the battery and motor are connected to the correct port. Connecting battery to the motor port will burn the MOSFETs on MD30C and this is not covered under warranty.

**NOTE:**

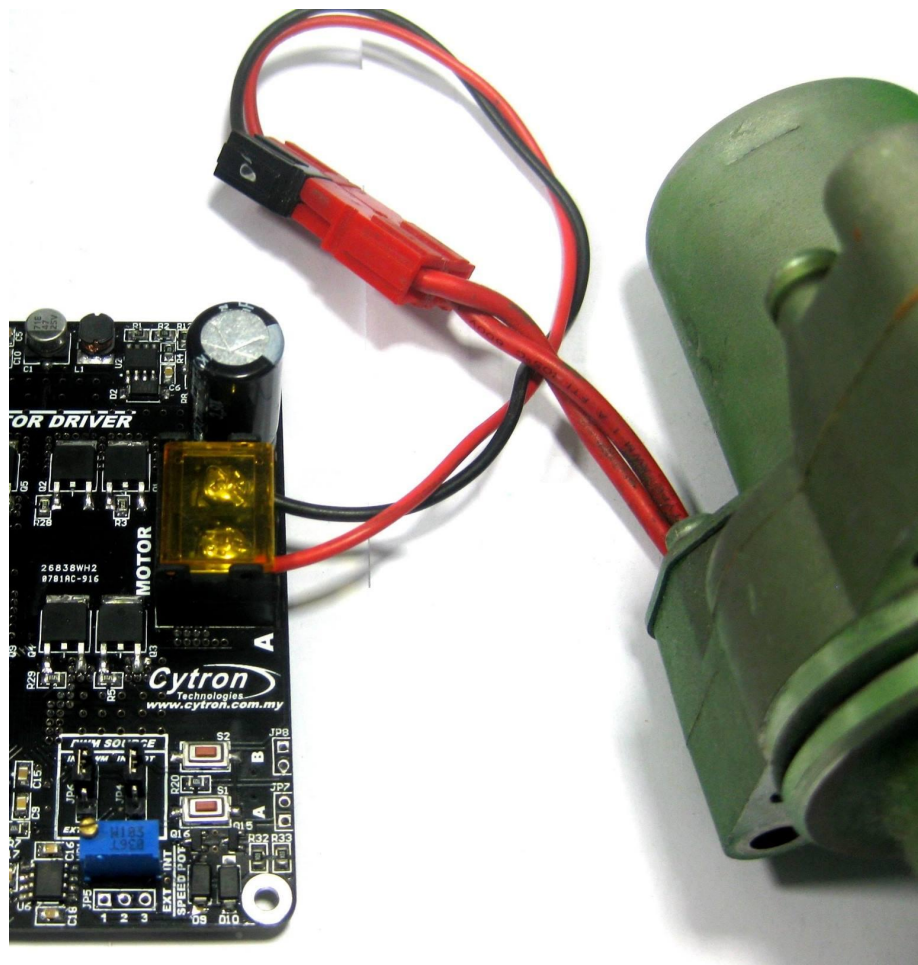
For application where the current is  $> 20A$ , it's recommended to solder the wire directly to the pad at bottom layer.



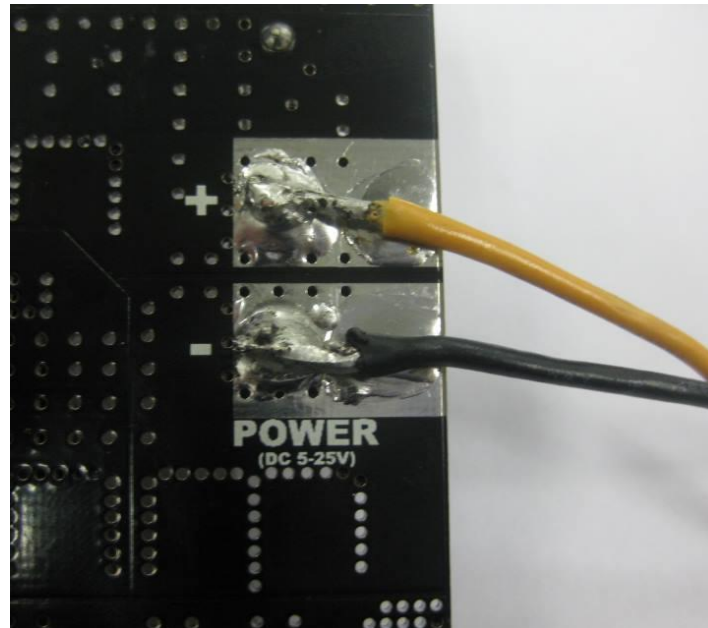
Battery is connected to MD30C via terminal block

**NOTE:**

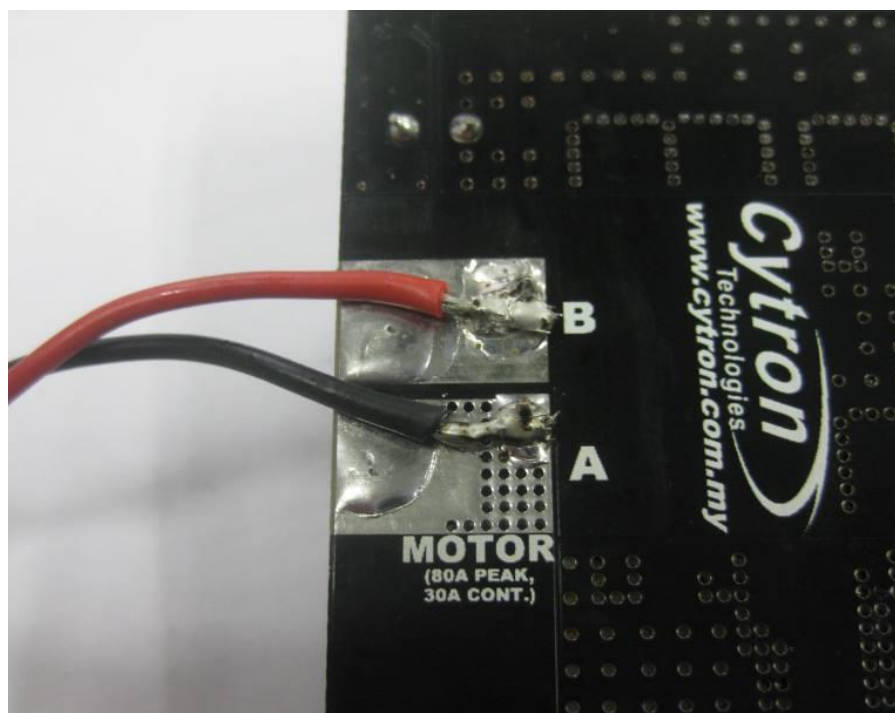
If Switching Power Supply is being used as power source for MD30C, we recommend parallel it with same voltage battery. This is to absorb the re-gen power from motor. DC brushed motor will become generator when it is slow down and rotate by external force.



Motor is connected to MD30C via terminal block



Battery is soldered directly to MD30C



Motor is soldered directly to MD30C

## 6.2 Standalone Operation

The MD30C can operate in standalone mode. In this mode, the motor is controlled by the onboard switches and speed potentiometer. Alternatively, external switches and potentiometer can be used to control the motor. This allow the switches and potentiometer to be mounted at easy to reach place.

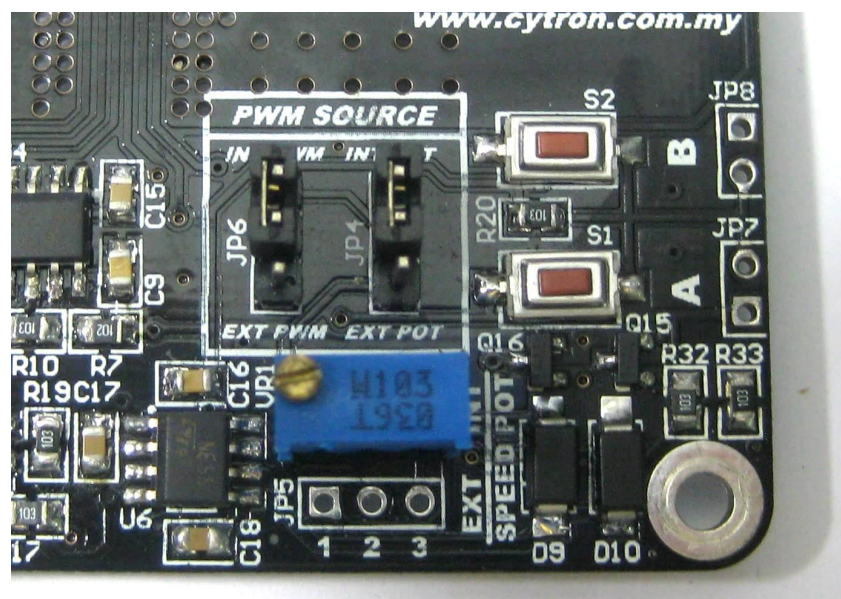
### Onboard Switches and Potentiometer

Set the jumpers as below:

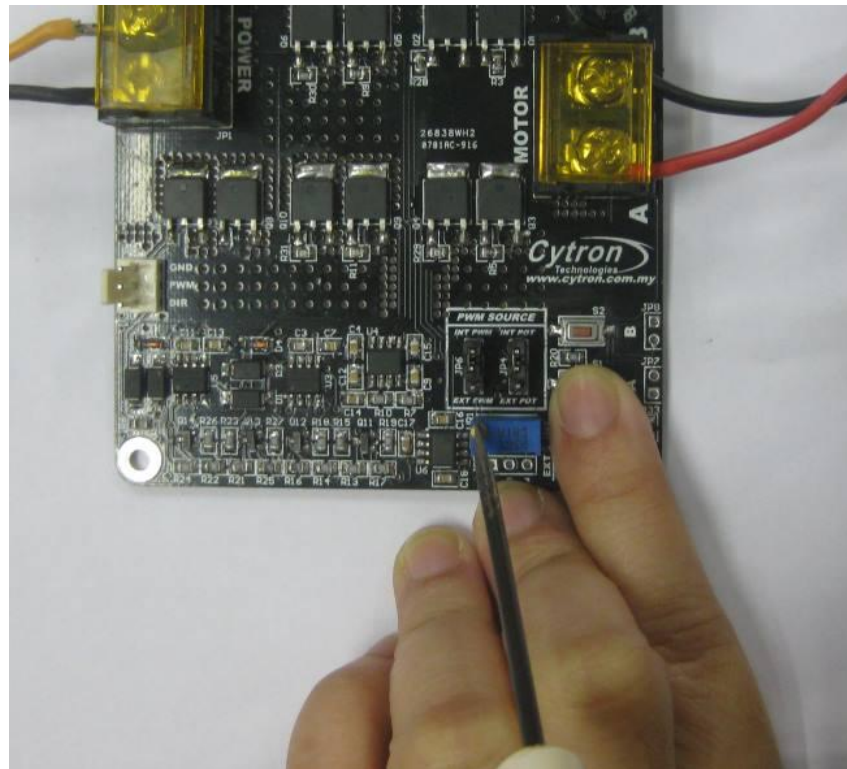
**JP4** : INT POT

**JP6** : INT PWM

After that, connect the battery and motor to the MD30C. Pressing switch A will run the motor in CW direction and pressing switch B will run the motor in CCW direction (The actual direction is depending on the motor polarity). The speed of the motor can be controlled by the onboard speed potentiometer.



Don't worry if the motor does not run when the switch is pressed. This might be due to the speed is too low for the motor to run. Try turning the on board potentiometer CW (clock wise) for a few round while pressing down one of the switch to increase the motor speed.



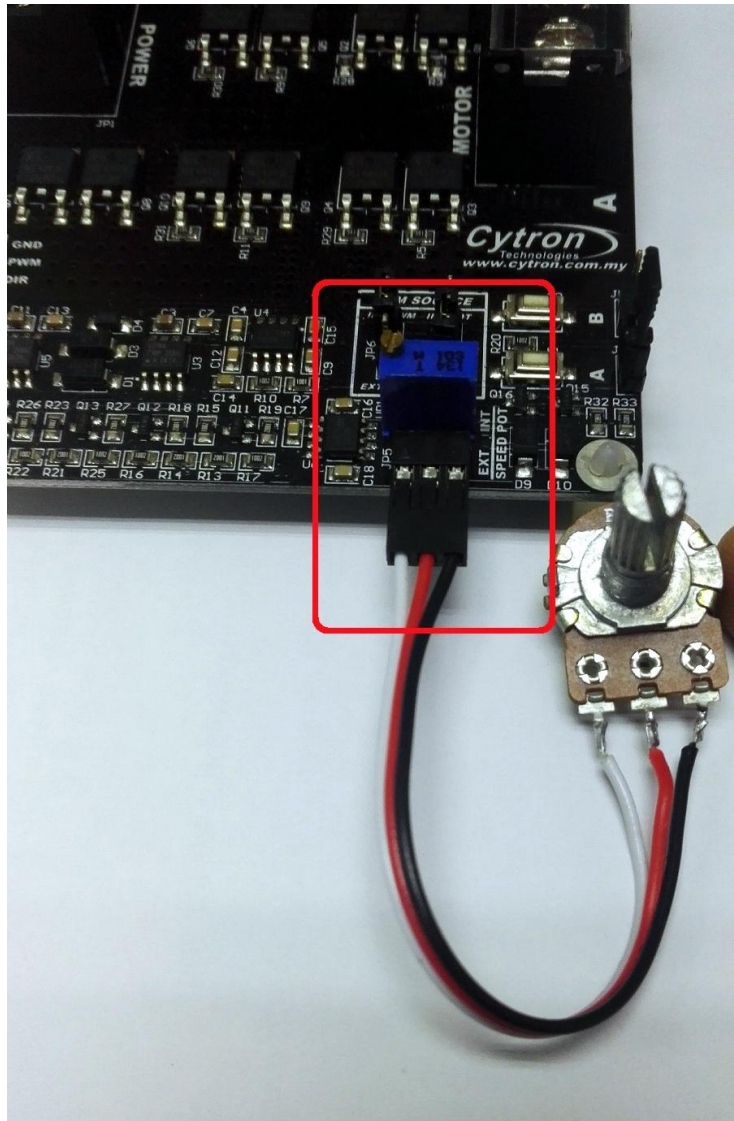
### External Switches and Potentiometer

Set the jumpers as below:

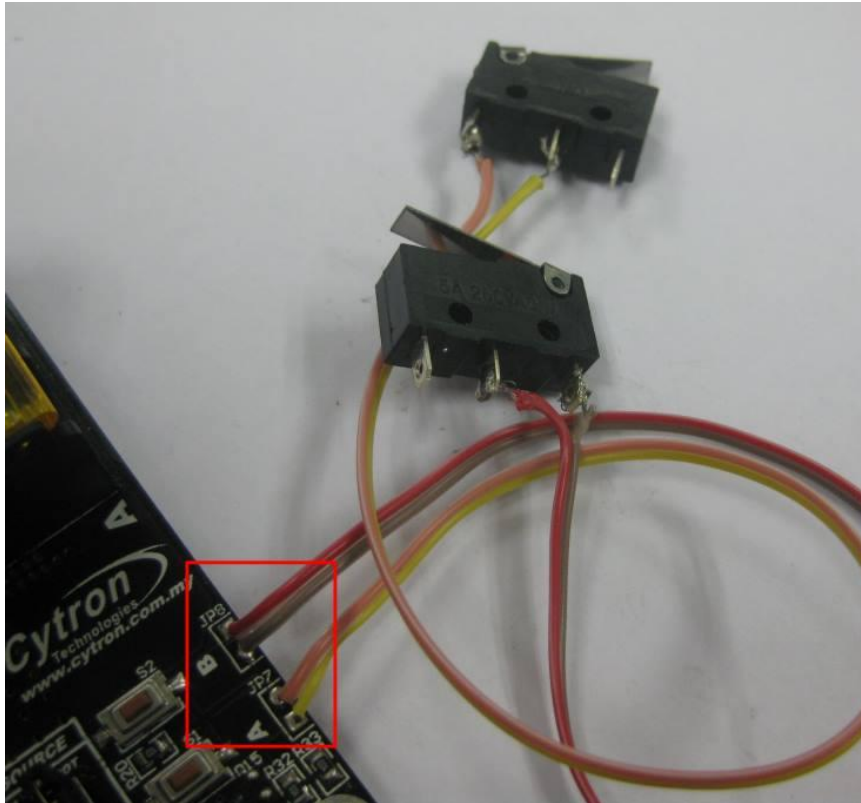
**JP4** : EXT POT

**JP6** : INT PWM

Connect the external switches and potentiometer as below. Please note that the onboard potentiometer will have no effect when JP4 is changed to EXT POT. The recommended resistance for external potentiometer is **10K Ohm**.



External potentiometer is connected on JP5. Please use potentiometer or Variable Resistor with value of **10K Ohm**. It can be direct solder, just make sure the pads are clean from flux or any solder ball.



External switch is connected to JP7 and JP8

### 6.3 Interface with Microcontroller

To control the motor with a microcontroller, set the jumpers as below:

**JP4** : Don't Care

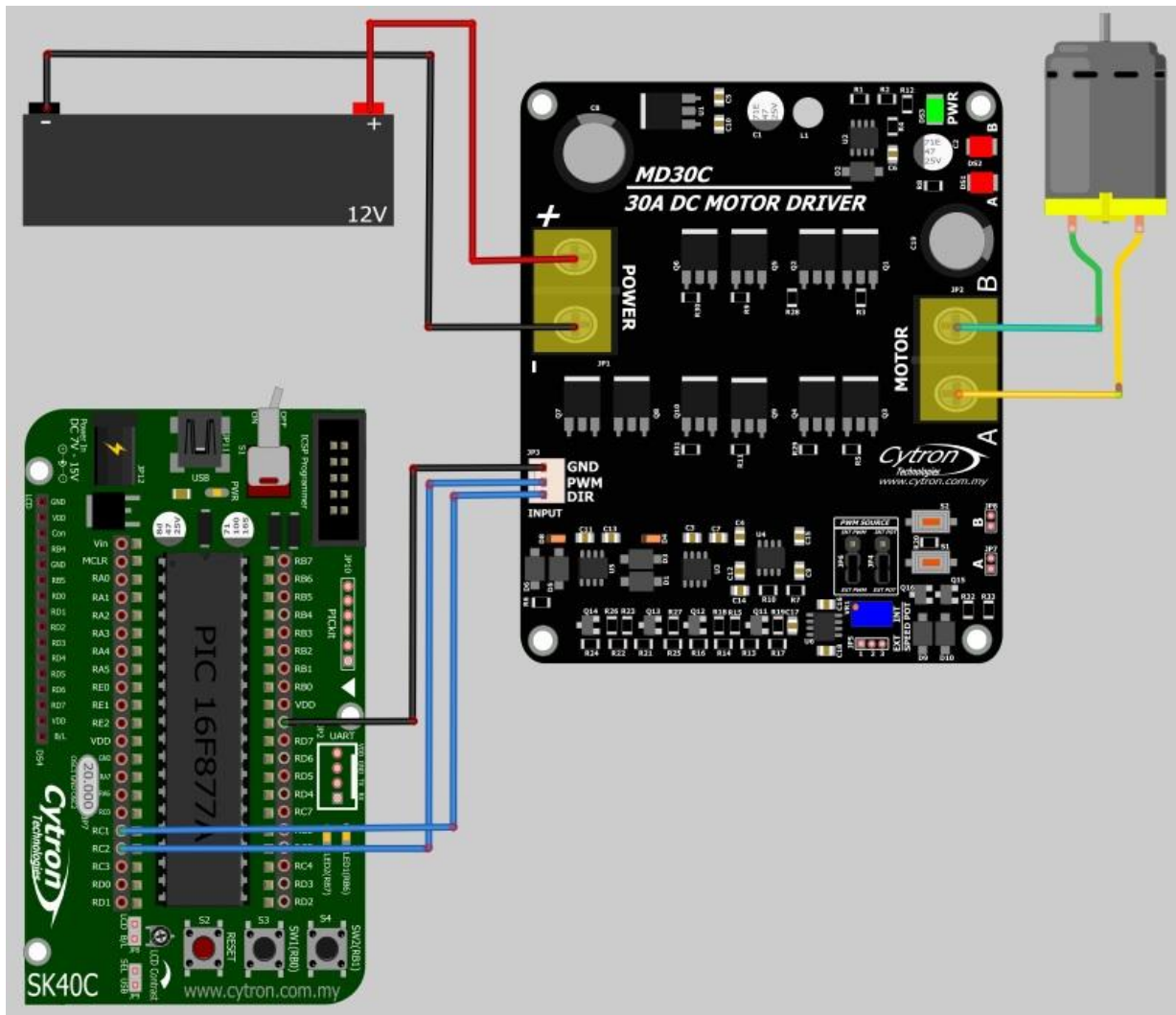
**JP6** : EXT PWM

Truth table for the control logic:

| PWM  | DIR            | Output A | Output B | Motor State |
|------|----------------|----------|----------|-------------|
| Low  | X (Don't Care) | Low      | Low      | Brake       |
| High | Low            | High     | Low      | CW          |
| High | High           | Low      | High     | CCW         |

**\*\*** Please do note that to set either DIR or PWM pin at LOW condition first when power is on.

Picture below shows an example of connecting the [MD30C](#) to the [SK40C](#).





## 7.0 WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by misuse is not covered under warranty
- Warranty does not cover freight cost for both ways.

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