



## **MDD10A**

### **Dual Channel 10A DC Motor Driver**



## **User's Manual**

**V2.0**

**June 2017**

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## 1. INTRODUCTION/OVERVIEW

[MDD10A](#) is the dual-channel version of MD10C, which is designed to drive 2 brushed DC motors with high current up to 10A continuously. Just like [MD10C](#), the MDD10A also supports locked-antiphase and sign-magnitude PWM signal. It is also using full solid state components, which result in faster response time and eliminate the wear and tear of the mechanical relay.

**\* MDD10A being shipped after Jan 2017 are Rev2.0 that have been upgraded to support a maximum motor voltage of 30V.**

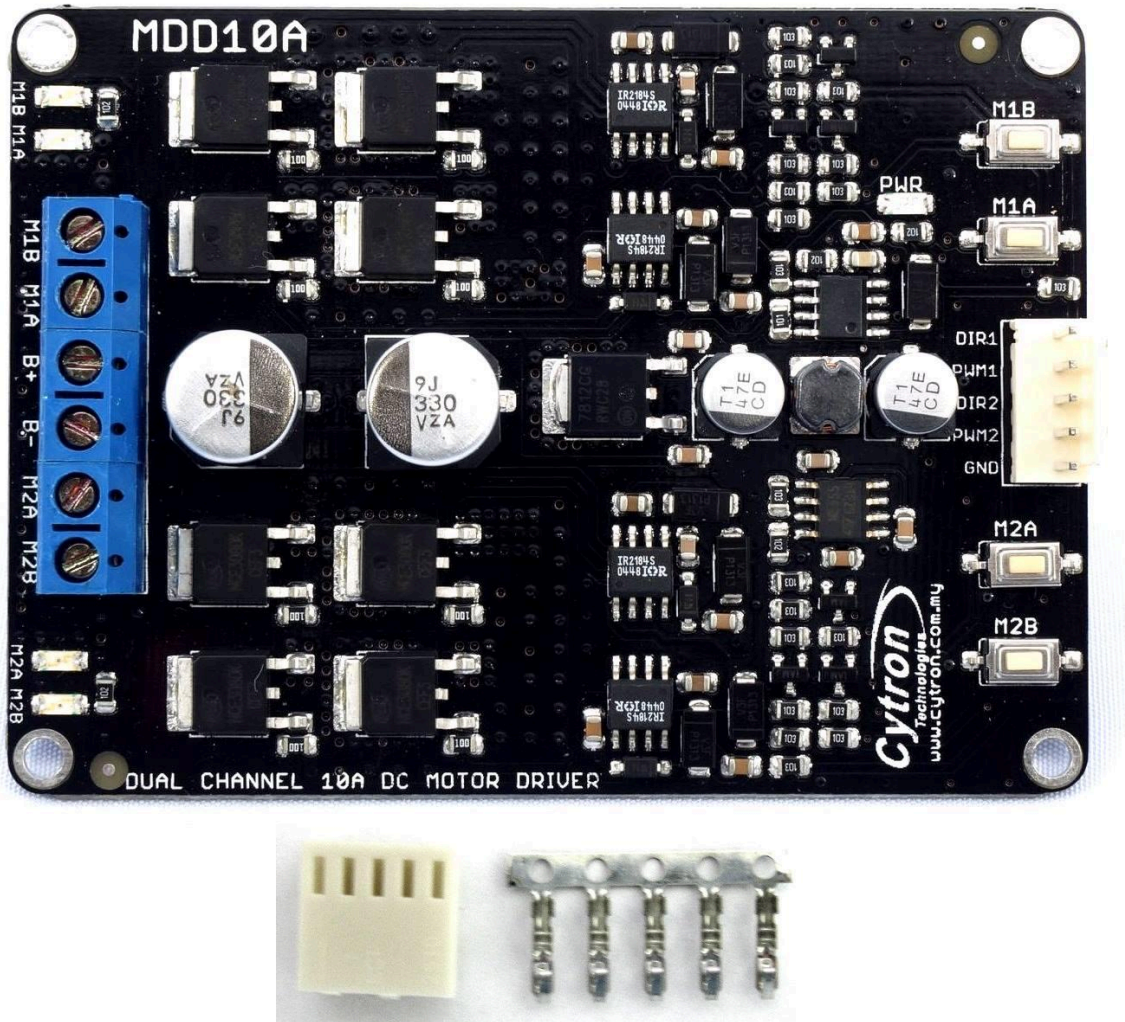
MDD10A has been designed with the capabilities and features of:

- Bi-directional control for 2 brushed DC motors.
- Support motor voltage ranges from 5V to ~~25V~~ 30V (Rev2.0).
- Maximum current up to 10A continuous and 30A peak (10 seconds) for each channel.
- Solid-state components provide faster response time and eliminate the wear and tear of a mechanical relay.
- A fully NMOS H-Bridge for better efficiency, and no heat sink is required.
- Speed control PWM frequency up to 20KHz (Actual output frequency is the same as input frequency).
- Support both locked-antiphase and sign-magnitude PWM operation.
- Support TTL PWM from the microcontroller, **NOT PWM from the RC receiver.**
- Onboard push button to control the motor manually.
- Dimension: **84.5mm x 62mm**

**Note:** Please use the battery when driving an inductive load, such as the DC brush motor. Due to the protection circuit of most power supplies (switching), it will shut down when regenerative current from the motor is detected.

## 2. PACKING LIST

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



1. 1 x [MDD10A](#) Dual Channel 10A DC Motor Driver
2. 1 x [2510 PCB Connector](#) - 5 Ways (Female)
3. 5 x [2510 Terminal Pin](#)
4. The user's manual can be downloaded from <http://www.cytron.com.my>

### 3. PRODUCT SPECIFICATION AND LIMITATIONS

#### Absolute Maximum Rating

| No. | Parameters                                    | Min | Typical | Max | Unit |
|-----|-----------------------------------------------|-----|---------|-----|------|
| 1   | Power Input Voltage***                        | 5   | -       | 30  | V    |
| 2   | $I_{MAX}$ (Maximum Continuous Motor Current)* | -   | -       | 10  | A    |
| 3   | $I_{PEAK}$ – (Peak Motor Current) **          | -   | -       | 30  | A    |
| 4   | $V_{IOH}$ (Logic Input – High Level)          | 3   | -       | 5.5 | V    |
| 5   | $V_{IOL}$ (Logic Input – Low Level)           | 0   | 0       | 0.5 | V    |
| 6   | Maximum PWM Frequency                         | -   | -       | 20  | KHz  |

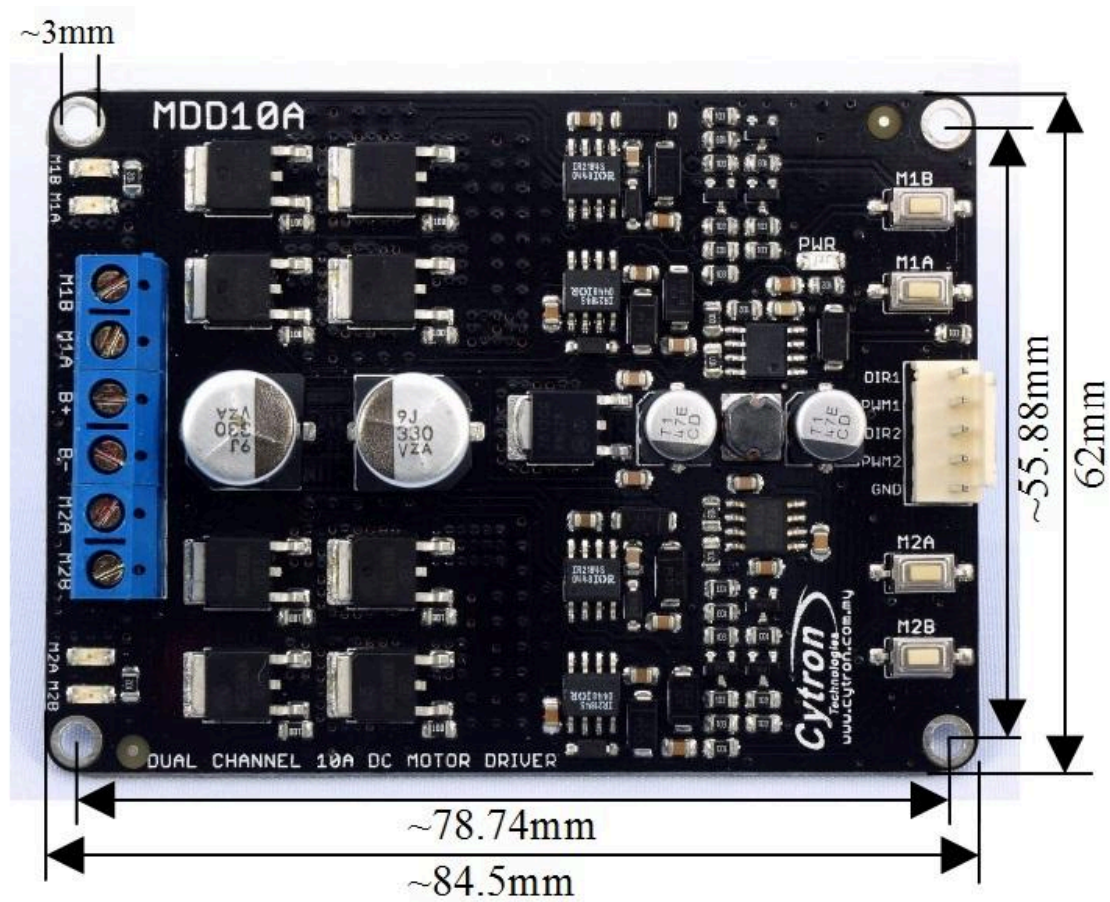
\* Tested in room temperature at 25°C

\*\* *Must not exceed 10 seconds.*

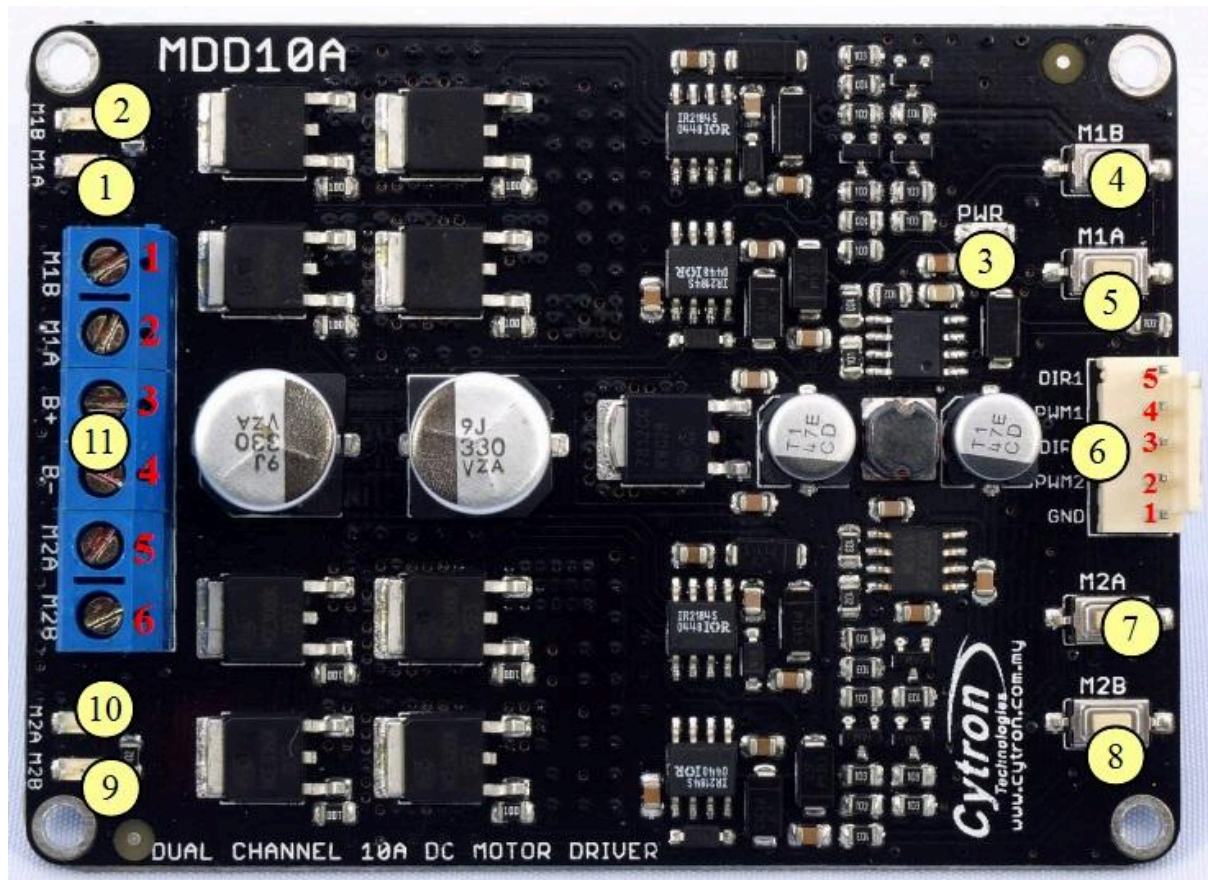
\*\*\* *Rev2.0 has upgraded to support 30V maximum power input voltage*



#### 4. DIMENSION



## 5. BOARD LAYOUT



1. Red LED M1A – Turns on when the output M1A is high and output M1B is low. Indicates the current flows from output M1A to M1B.
2. Red LED M1B – Turns on when the output M1A is low and output M1B is high. Indicates the current flows from output M1B to M1A.
3. Green LED – Power LED. It should be on when the board is powered on.
4. Test Button M1B – When this button is pressed, current flows from output M1B to M1A, and the motor will turn CCW (or CW depending on the connection).
5. Test Button M1A – When this button is pressed, current flows from output M1A to M1B, and the motor will turn CW (or CCW, depending on the connection).

## 6. Input

| Pin No. | Pin Name | Description                           |
|---------|----------|---------------------------------------|
| 1       | GND      | Ground                                |
| 2       | *PWM2    | PWM input for speed control (Motor 2) |
| 3       | DIR2     | Direction input (Motor 2)             |
| 4       | *PWM1    | PWM input for speed control (Motor 1) |
| 5       | DIR1     | Direction input (Motor 1)             |

\*Note that it is not for RC PWM

The truth table for the control logic for motor 1 and motor 2 is as follows:

| PWM  | DIR           | Output A | Output B |
|------|---------------|----------|----------|
| Low  | X(Don't care) | Low      | Low      |
| High | Low           | High     | Low      |
| High | High          | Low      | High     |

7. Test Button M2A – When this button is pressed, current flows from output M2A to M2B and motor will turn CW (or CCW depending on the connection).
8. Test Button M2B – When this button is pressed, current flows from output M2B to M2A and motor will turn CCW (or CW depending on the connection).
9. Red LED M2B – Turns on when the output M2A is low and output M2B is high. Indicates the current flows from output M2B to M2A.
10. Red LED M2A – Turns on when the output M2A is high and output M2B is low. Indicates the current flows from output M2A to M2B.
11. Terminal Block – Connect to motor and power source.

| Pin No | Pin Name         | Description                                    |
|--------|------------------|------------------------------------------------|
| 1      | Motor 1 Output B | Connect to motor 1 terminal B                  |
| 2      | Motor 1 Output A | Connect to motor 1 terminal A                  |
| 3      | POWER +          | Positive Supply (positive terminal of battery) |
| 4      | POWER -          | Negative Supply (negative terminal of battery) |
| 5      | Motor 2 Output A | Connect to motor 2 terminal A                  |
| 6      | Motor 2 Output B | Connect to motor 2 terminal B                  |



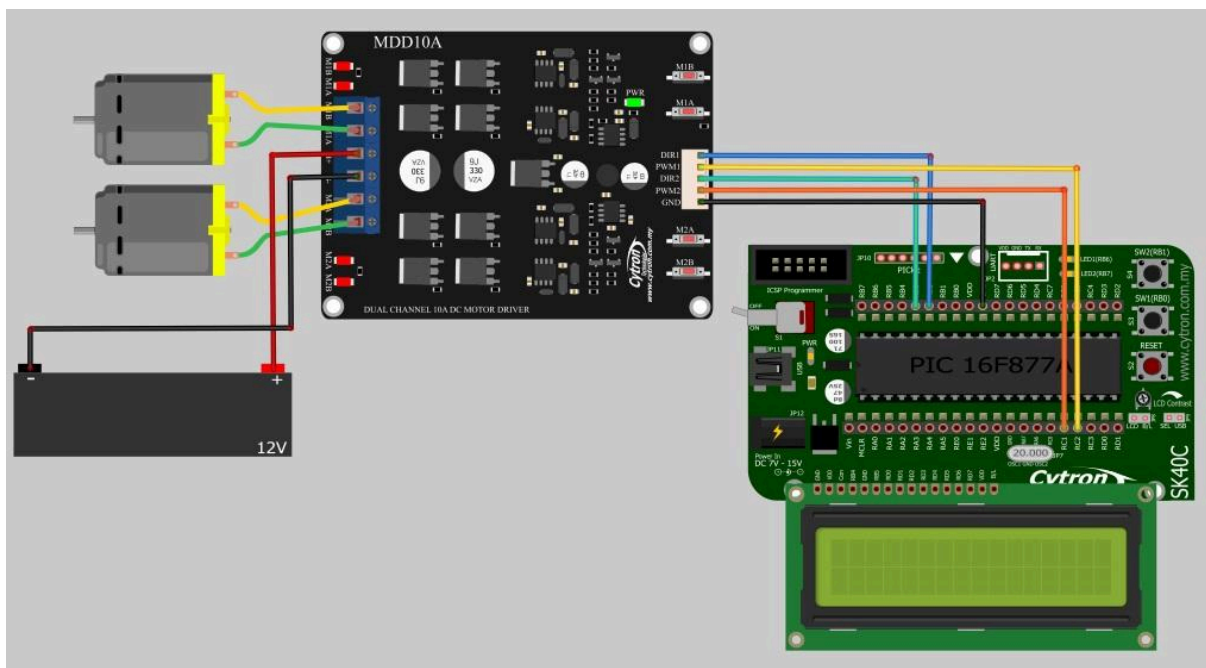
**Note:** Please use a battery when driving an inductive load, such as the DC brush motor. Due to the protection circuit of most Power supplies (switching), it will shut down when regenerative current from the motor is detected. Even if the case where a switching power supply is needed, a battery with the same rated voltage needs to be parallel with the power supply to absorb the regenerative current.

## 6. GETTING STARTED

### 6.1 Getting Started [MDD10A](#) with [SK40C](#)

MDD10A is compatible with 2 types of PWM operation, which are:

1. Sign-Magnitude PWM – For sign-magnitude PWM operation, 2 control signals are used to control the speed and direction of the motor. PWM is feed to the PWM pin to control the speed while DIR pin is used to control the direction of the motor.
2. Locked-Antiphase PWM – For locked-antiphase PWM operation, only 1 control signal is needed to control the speed and direction of the motor. PWM pin is connected to logic high while the DIR pin is being feed with the PWM signal. When the PWM signal has 50% duty cycle, the motor stops running. If the PWM has less than 50% duty cycle, the motor will turn CW (or CCW depending on the connection). If the PWM signal has more than 50% duty cycle, motor will turn CCW (or CW depending on the connection).



### 6.2 Getting Started [MDD10A](#) with Arduino

Check the [tutorial here](#) for the interface of MDD10A with Arduino, an example sketch can be downloaded at the end of the tutorial.

## 7. WARRANTY

- Product warranty is valid for 12 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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