



MD10B

Enhanced 10A Motor Driver



User's Manual

V1.0

August 2008

Information contained in this publication regarding device applications and the like is intended through suggestion only and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. No representation or warranty is given and no liability is assumed by Cytron Technologies Incorporated with respect to the accuracy or use of such information or infringement of patents or other intellectual property rights arising from such use or otherwise. Use of Cytron Technologies's products as critical components in life support systems is not authorized except with express written approval by Cytron Technologies. No licenses are conveyed, implicitly or otherwise, under any intellectual property rights.

Index

| | |
|--|---|
| 1. Introduction and Overview | 1 |
| 2. Packaging List | 2 |
| 3. Product Specification and Limitations | 3 |
| 4. Board Layout | 5 |
| 5. Installation (hardware) | 6 |
| 5.1 Connecting Battery and Motor | 6 |
| 5.2 Connecting to Microcontroller | 6 |
| 5.3 Connecting to Switches (without microcontroller) | 7 |
| 5.4 Reverse Battery | 7 |
| 6. Getting Started | 8 |
| 7. Warranty | 9 |

1. INTRODUCTION AND OVERVIEW

MD10B is an enhanced version of MD10A. It is designed to drive high current brush motor or application. It is designed for wide range of robotics and automotive applications. The board incorporates most of the components of the typical applications. With minimum interface, the board is ready for plug and play. Simply add in power, this driver is ready to drive high current motor.

It has been designed with capabilities and features of:

- Industrial grade PCB with heavy copper material for **high current applications**
- Each component is soldered properly and tested
- Support up to **10A maximum**
- 5V logic level compatible inputs
- 12V as V_{cc}
- PWM speed control up to **10KHz**
- Bi-directional control for 1 motor
- Very low standby power consumption
- System ground is isolated from motor's power source using opto-isolator
- 4 Schottky diode as clamping diode

2. PACKAGING 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 immediately.



1. 1 x MD10B
2. 1 x 2510 5 ways female connector pin.
3. 5 x 2510 iron pins.
4. 2 x terminal block

3. PRODUCT SPECIFICATION AND LIMITATIONS

Pin Function Description

| Label | Definition | Function |
|-------|------------------------|---|
| Power | Battery Input | Power source for motor. It can be as low as 5V and as high as 19V . The driver does not have protection against wrong polarity on power input, thus user must be careful during providing power source to this driver. Please follow (+) and (-) marker on the PCB for the correct polarity. |
| Motor | Motor Terminal | Terminal for motor connection. |
| 12V | Operating supply | Input for driver logic operation. User should provide 12V |
| CW | Clock Wise | Voltage controller input pin. These two pins control the state of the relay in normal operation according to the truth table 4.1 (brake, clockwise and counterclockwise). |
| CCW | Counter Clock Wise | |
| PWM | Pulse Width Modulation | Voltage controlled input pin. This pin is isolated using opto-isolator. It will control the onboard MOSFET to ON and OFF further control the speed the motor. |
| Gnd | Ground | Logic ground signal. Internally separated from Power's ground |

Absolute Maximum Rating

| Symbol | Parameter | Value | Unit |
|-----------|------------------------------------|------------|------|
| V_{in} | Motor supply voltage | 19 | V |
| V_{cc} | Operating voltage | 12 | V |
| I_{max} | Maximum Output Current (continuos) | 10 | A |
| I_R | Reserve Output Current (continuos) | 10 | A |
| I_{in} | Logic Input current (CW/CCW) | 20 | mA |
| I_{pw} | PWM Input Current | 20 | mA |
| T_c | Case Operating Temperature | -0 to 80 | °C |
| T_{STG} | Storage Temperature | -40 to 100 | °C |

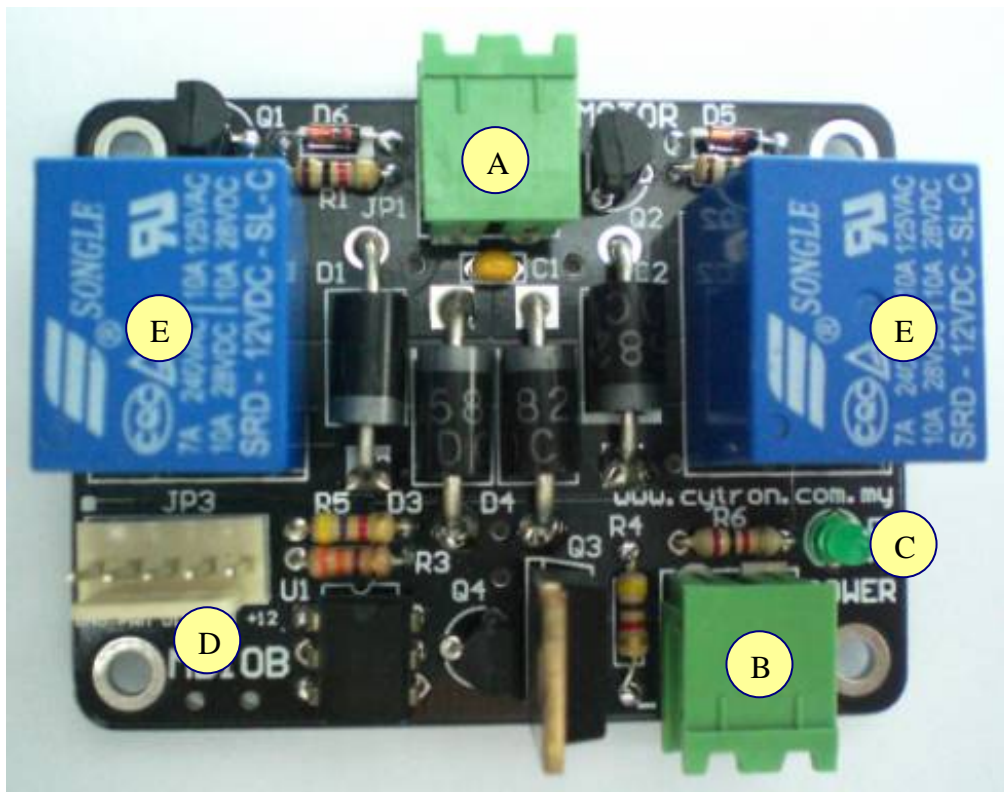
Electrical Characteristics

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|----------------------|-----------------------------|-----------------|-----|-----|-----|------|
| Power | Motor supply voltage | | 5 | 12 | 19 | V |
| 12V | Operating supply voltage | | 10 | 12 | 14 | V |
| f | PWM frequency | | 0 | | 10 | KHz |
| V _{pwl} | PWM low level voltage | | | | 1.0 | V |
| V _{pwh} | PWM high level voltage | | 4.0 | | | V |
| V _{CW/CCWL} | CW input low level voltage | | | | 1.0 | V |
| V _{CW/CCWH} | CW input high level voltage | | 4.0 | | | V |

Truth Table in Normal Operating Condition

| CW | CCW | Motor(+) | Motor(-) | Comment |
|----|-----|----------|----------|--------------------|
| 1 | 1 | H | H | Brake to Power (+) |
| 1 | 0 | H | L | Clockwise |
| 0 | 1 | L | H | Counter Clockwise |
| 0 | 0 | L | L | Brake to Power (-) |

4. BOARD LAYOUT



| Label | Function |
|----------|---|
| A | Connector for motor. |
| B | Connector for power supply. |
| C | On board power supply indicator LED. It is green color. |
| D | 5 ways header pin for external connection. |
| E | Relay |

A – Connector for motor.

B – Connector for power supply.

C – Power supply indicator LED. It is green in color. Once power is inserted to the board, this LED will turn ON.

D – 5 ways header pin for external connections. If this kit is connected to microcontroller board, it should be powered with 12V. Please refer to hardware installation for detail connection.

E – Relays are used as switch to change the direction of motor (clockwise or anticlockwise).

5. INSTALLATION (HARDWARE)

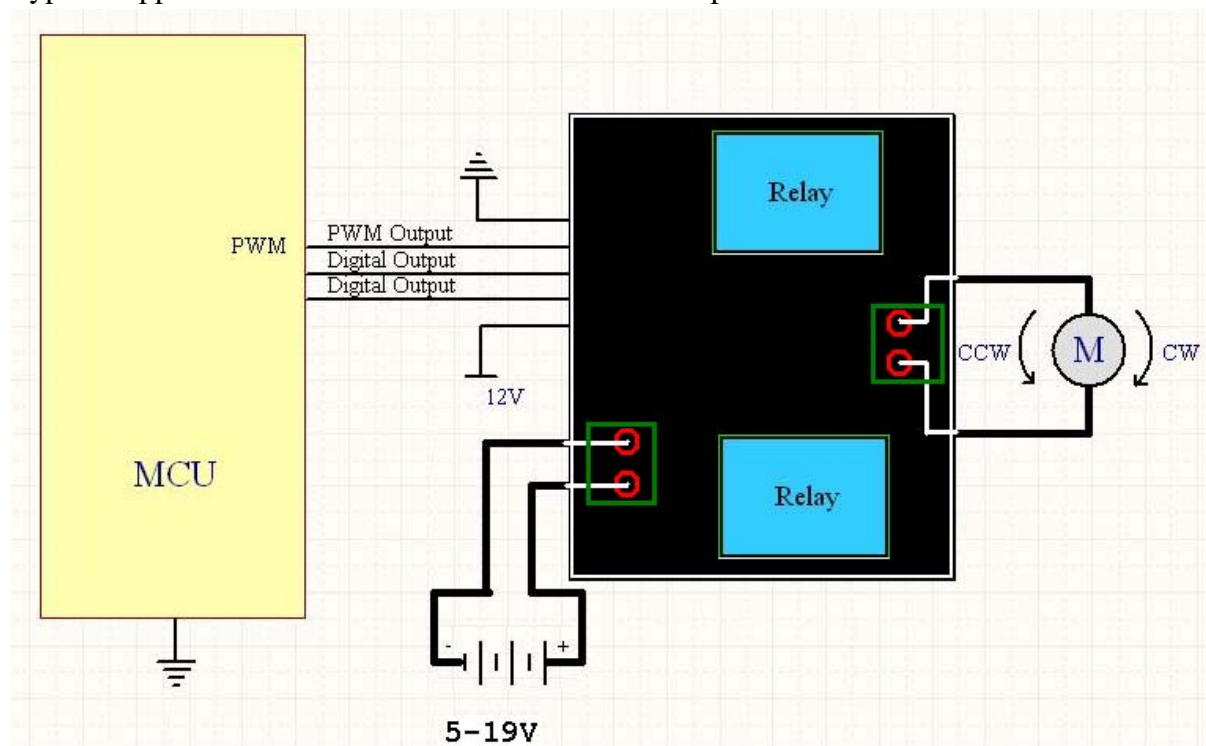
5.1 Connecting Battery and Motor

In a typical application, the motor power supply (battery) should be soldered to connector provided. The control pin come with connector and is ready for user to interface with wire.

12V should be supplied (to12V pin) for this driver for logic operation. CW and CCW control the activation and direction of the motor, while the PWM pin turns the motor on or off for speed control. CW and CCW will activate the on board relay. Thus providing 5V using a switch or relay to these 2 pin can turn on the relays further drive the motor. As for PWM pin, user may provide a constant 5V to it if no speed control is required.

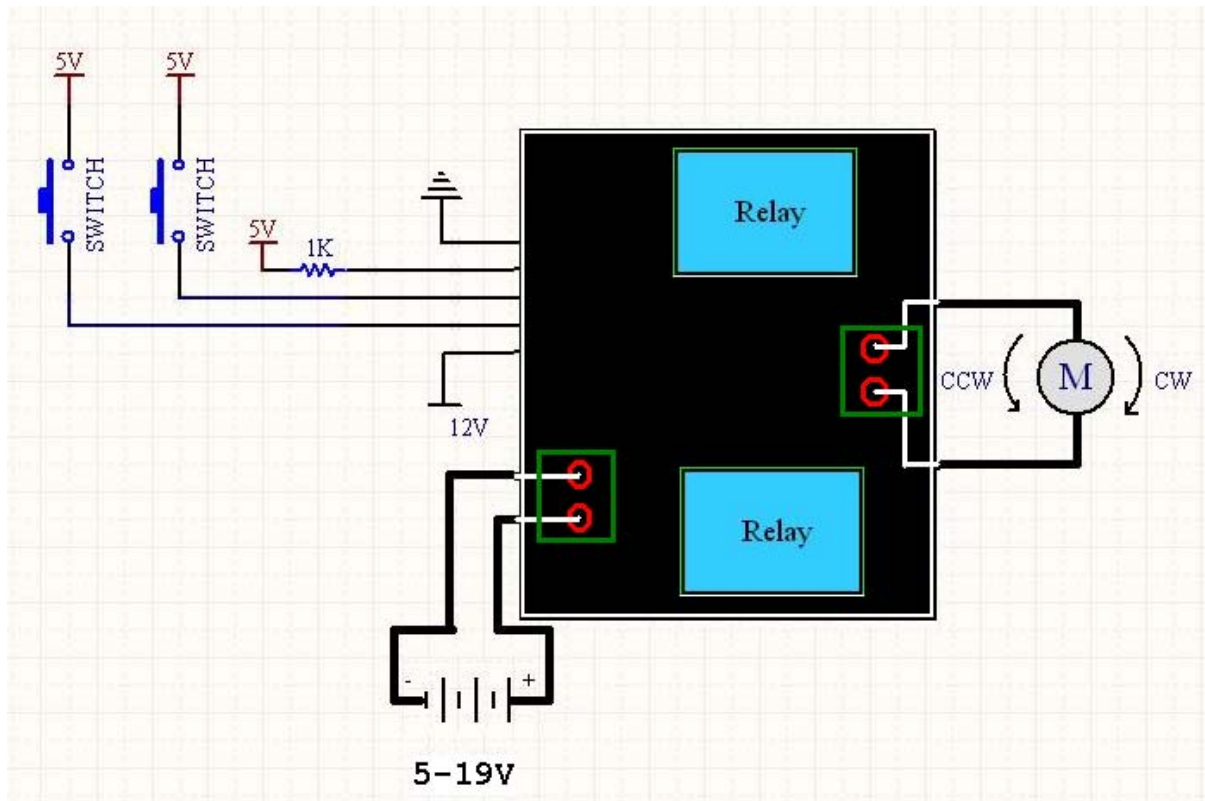
5.2 Connecting to Microcontroller

Typical Application Circuit for DC to 10KHz PWM Operation



5.3 Connecting to switches (without microcontroller)

Typical Application Circuit using switches (no speed control)



5.4 Reverse-battery

The motor driver boards do not have any protection against reverse-battery. If user connects the battery or power source wrongly it will damage the on board clamping diode and further burn the driver. Thus please be careful during making connection.

6. GETTING STARTED

For this section, MD10B will be interface with PR10. Please refer PR10, DIY project from Cytron website for details example using MD30B. PR10 shows the method using MD10A; however MD10B have been designed to be compatible to MD10A, user may refer to this project. This DIY project also shows the method to writing program to use MD10B. Link to PR10 is <http://www.cytron.com.my/PR10.asp>

7. WARRANTY

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

Prepared by
Cytron Technologies Sdn. Bhd.
19, Jalan Kebudayaan 1A,
Taman Universiti,
81300 Skudai,
Johor, Malaysia.

Tel: +607-521 3178

Fax: +607-521 1861

URL: www.cytron.com.my

Email: support@cytron.com.my
sales@cytron.com.my