CYTRON MD10A
10A Motor Driver

USER'S MANUAL

V1.1

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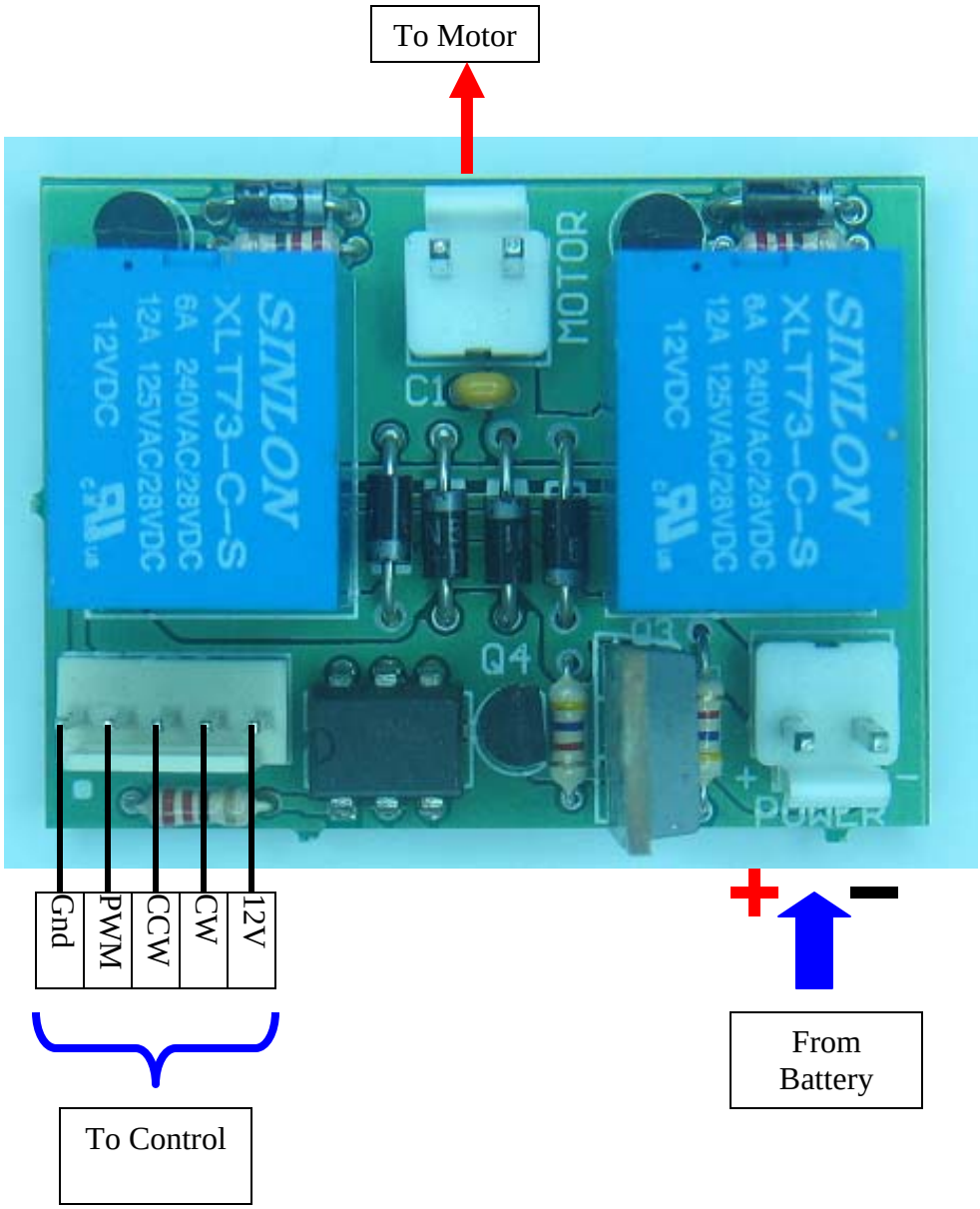
1. INTRODUCTION AND OVERVIEW

MD10A 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 to be plugged 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 with opto-isolator
- 4 Schottky diode as clamping diode

2. BOARD LAYOUT



3. SPECIFICATION

Pin Function Description

Label	Definition	Function
Power	Battery Input	Power source for motor. It can be as low as 6V and as high as 28V. 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 in next page (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 on board MOSFET to ON and OFF further control the speed the motor.
Gnd	Ground	Logic ground signal. Internally is separated from Power's ground

Absolute Maximum Rating

Symbol	Parameter	Value	Unit
V_{in}	Motor supply voltage	24	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		5.5		24*	V
12V	Operating supply voltage		10		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. DRIVING MOTOR

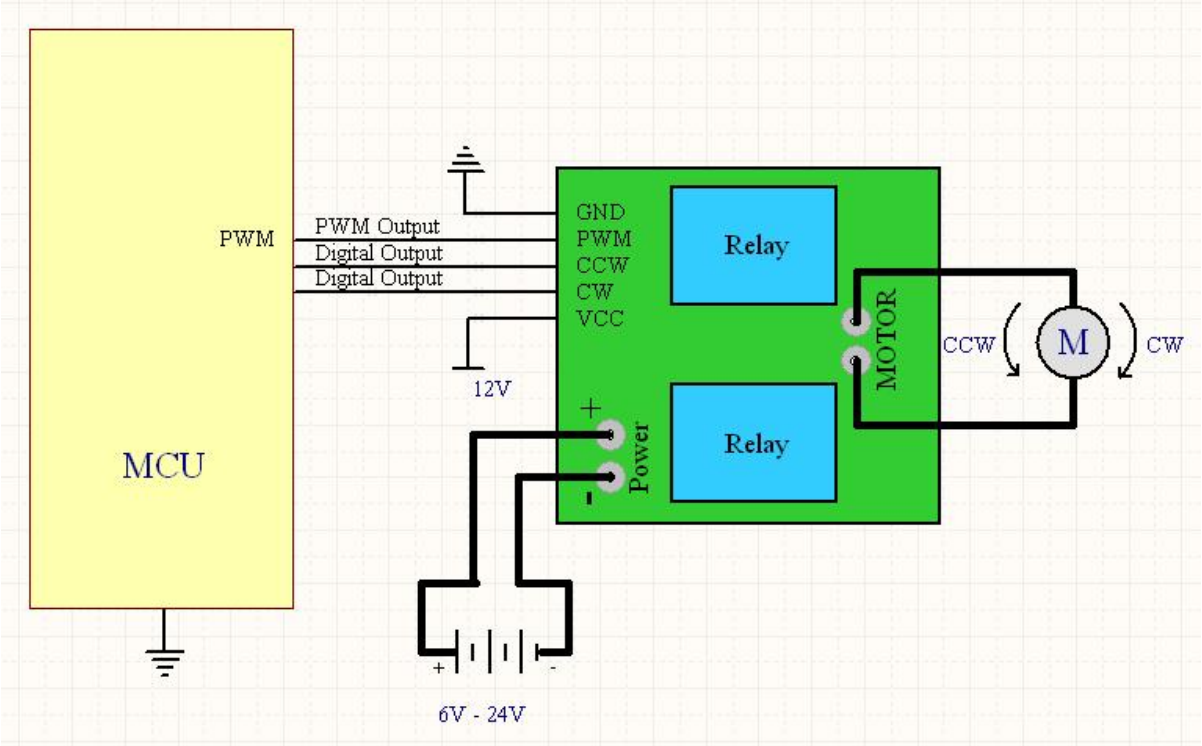
4.1 Connecting Battery and Motor

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 (12V) to 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.

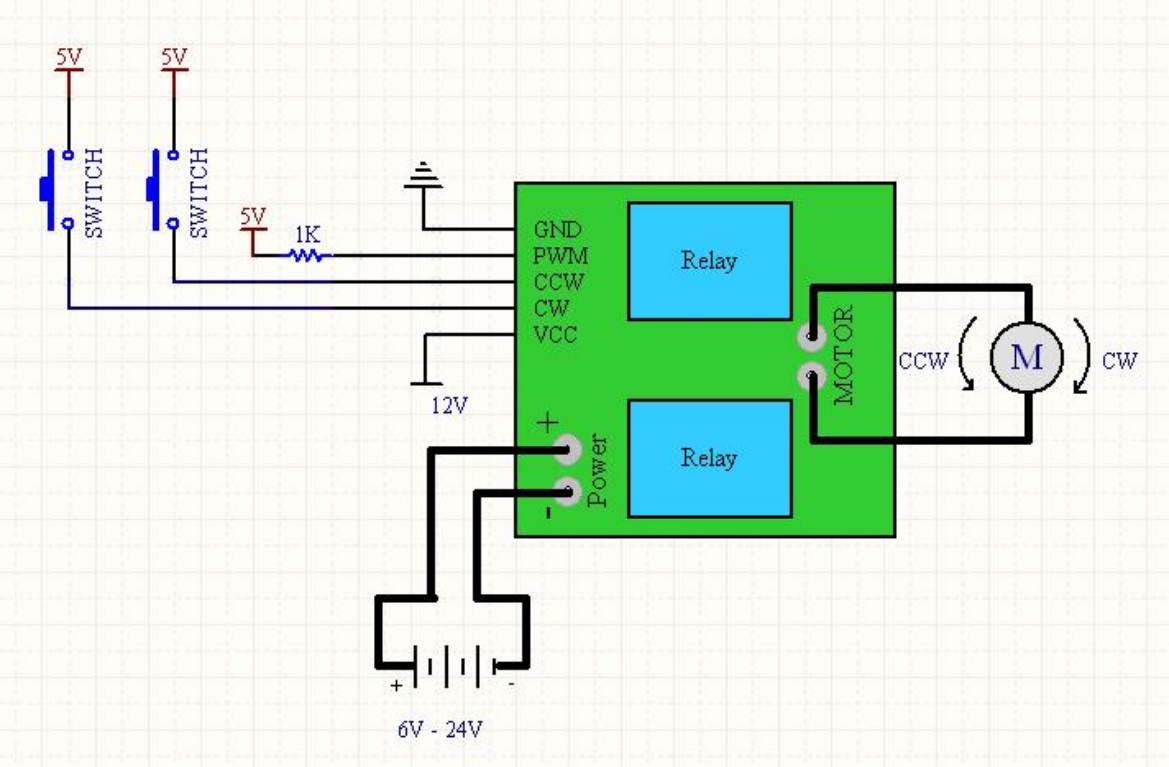
4.2 Connecting to Microcontroller

Typical Application Circuit for DC to 10KHz PWM Operation



4.3 Connecting to switches (without microcontroller)

Typical Application Circuit using switches (no speed control)



4.5 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.

5. WARRANTY

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

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