## Motor Controller User's Manual By Mike Franks, May 2007

Bill of Material for MotorDriver2.PcbDoc

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Component	P/N	Quantity	Comments
.1uF	Typical Surface Mount	2	C1, C3
1uF	Typical Surface Mount	1	C2
330Ω	Typical Surface Mount	1	R1
1K	Typical Surface Mount	2	R2, R3
47uF	Radial, Electrolytic	1	C4
5V Reg.	UA78M05	1	SOT-223 Footprint
Dual Bi-lateral Switch	74V2G66STR	1	SOT23-8 Footprint
MOSFET Driver	IXDD414YI-ND	2	5TO263 Footprint
Single Inverter	SN74AHC1G04	1	SOT 23-5 Footprint
LED	Typical Surface Mount	1	None
Header 2		1	2 Pin Header
Header 6		1	6 Pin Header



PCB Layout

Absolute Values	MIN	MAX
Vin	5.5V	25V
Vout	5.5V	25V
Current (peak)		14A
Current (continuous)		4A
Frequency (PWM)		See Note 1

1. Currently unknown, however similar chip has been used at 20kHz with no issues. Further testing will be conducted.

## General Information

The motor driver uses two IXDN414CI MOSFET drivers to form a complete H-bridge capable of controlling one motor in both forward and reverse directions. The IXDN's contain internal MOSFETS; therefore no external ones are needed. The IXDN's also contain a total of four flyback diodes in their internal circuitry, so once again no external diodes are needed.

The motor controller contains an SN74266 Dual Bi-lateral switch that controls which motor terminal receives the PWM signal; therefore only one pin from a microcontroller is needed to control the direction. The inverter keeps both sides of the H-bridge from being in the same state, which would result in a short circuit.

Do to previous observations of the lack of current sensing being utilized, this circuitry has not been added to the motor driver. If current sensing is needed an external sensor must be purchased.

This motor driver has been designed to be pin compatible with the previous MIL motor driver. The only exception is, once again, the current sensing capabilities. These pins are disconnected on the motor driver, therefore will not result in any short from previous designs using the current sensing pins from the previous motor driver.

## **IMPORTANT:**

The 5V regulator used on this motor driver is <u>NOT</u> pin compatible with the LM1117 series regulators (commonly used in the MIL lab). If an LM1117 series is used, GND will be shorted to VDD. The reason for the use of the UA78M05 is because this regulator has a higher maximum voltage than the LM1117. This enables a higher maximum voltage for the motor driver, since the maximum voltage allowed by the IXDN's is 35V. Therefore the limiting factor is the regulator which is powered from the input power for the motors.



Page 4/4

8-Feb-08



Schematic Diagram (Note that some parts are not a shown.)