

## Ocean Controls KT-5195 Hi Current DC Motor Speed Controller

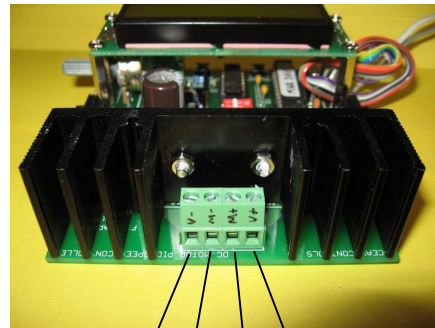


The Ocean Controls DC Motor Speed Controller is a DC motor speed controller for motors up to 20A. It features

- Potentiometer, 0-5V or 4-20mA Control
- Open Loop PWM Speed Control
- Dual IRFZ44 MOSFET Output
- Selectable PWM Frequencies of 9.7KHz, 1.2KHz, 152Hz and 38Hz

### Connections:

- V+ - Motor Positive input Voltage
- M+ - Motor Positive
- M- - Motor Negative
- V- - Motor Negative input Voltage
- Vs - 12V Controller Power Supply Input
- COM - Common Power Supply Connection
- AIN - 0-5V Analog input
- COM - Common (Ground)



V- M- M+ V+

Note: Motor Power Supply must be connected to the V- and V+ terminals. If you are using separate power supplies then their negative terminals must be connected to a common ground for the motor controller to work properly.

### Notes:

The IRFZ44 Mosfet has a maximum current of 49A, voltage of 55V and an on resistance of 17.5mΩ. In reality the Mosfets will overheat and the PCB tracks will not handle this much current. As two are used it can be assumed that for a motor current of 20A, each Mosfet will be conducting approximately 10A. This means that each Mosfet will dissipate approximately 1.75W into the heatsink. The provided heatsink is rated at 5°C/W which will mean a temperature increase of approximately 17.5°C above ambient. A fan will help with the heat dissipation if the motor is going to draw this much current continuously.

The PWM signal controlling the Mosfets is available at a PCB pad labeled PWM to the right of the Mosfet labeled Q2. If you wish this PWM output can be used to drive a solid state relay or other higher current capable FET.

If you wish to just monitor the PWM output of the controller a 50% duty signal is available on an unlabeled PCB pad next to pin 15 of the ATmega168 IC. This can be used as a sync input for your oscilloscope and the PWM output can be monitored from the PWM pad.

### PWM Frequency Selection:

PWM Frequency can be selected using the 2-way DIP switch.

SW1	SW2	Frequency
OFF	OFF	9.77 KHz
ON	OFF	1.22 KHz
OFF	ON	152 Hz
ON	ON	38 Hz

**Controlling with Potentiometer:**

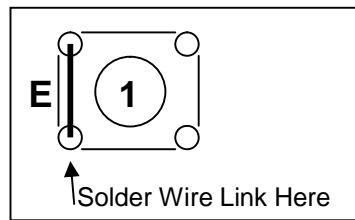
If you wish to control the speed using a potentiometer it should be connected with the ends on the 5V and COM terminals and the wiper on the AIN terminal.

**Controlling with 0-5V Signal:**

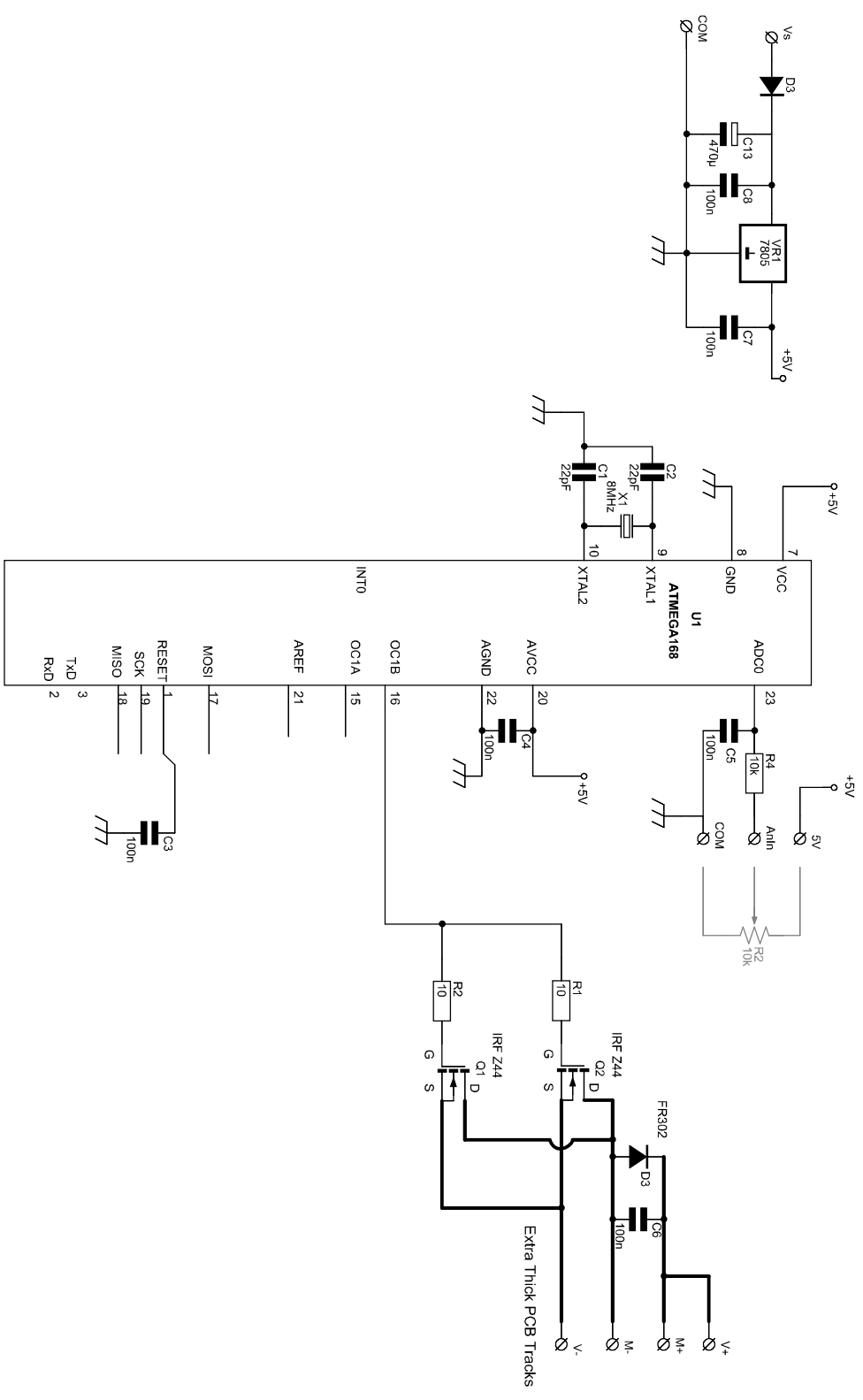
If you wish to control the speed with a 0 to 5V signal then connect the signal to the AIN and COM terminals.

**Controlling with 4-20mA Signal:**

If you wish to use a 4-20mA signal to control the speed install a 240Ω resistor between the AIN and COM terminals and a wire link should be soldered along the line next to the E on button 1. The 4-20mA signal is then connected across the AIN and COM terminals.

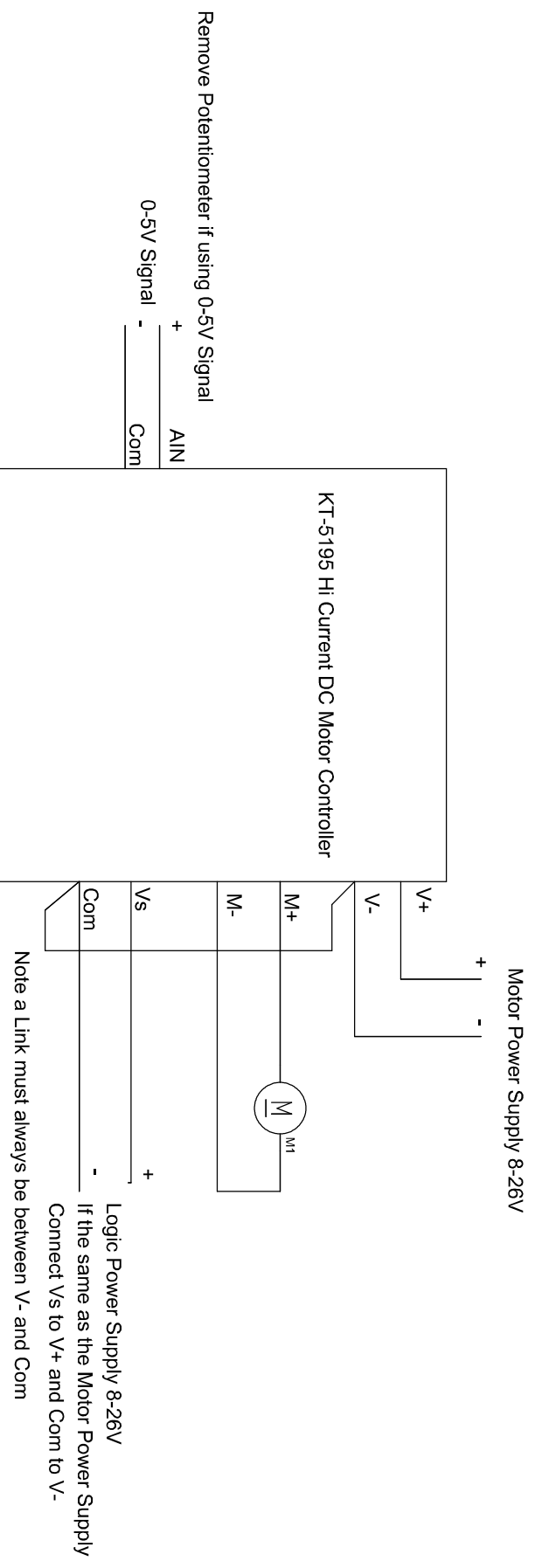
**Parts List:**

Part	Designator	Quantity
10R Resistor	R1,R2	2
1N4004 Diode	D3	1
10K Resistor	R4	1
22pF Cap Ceramic	C1,C2	2
0.1uF Cap 50V Monobloc	C3 -C8	6
470uF Cap 50V Low ESR	C13	1
7805 Regulator	VR1	1
20MHz Crystal	X1	1
2-way DIP Switch	SW1	1
Large Heatsink		1
Small Heatsink		1
10K 16mm Potentiometer		1
2way Terminal	T2-T5	4
3way Terminal	T1	1
IRFZ44 MOSFET	Q1,Q2	2
FR302 Fast Recovery Diode	D2	1
ATMega168 Programmed	U1A,U1B	1
28pin IC Socket	U1A,U1B	1
10 x 3mm Bolt		3
3mm Nuts		3
PCB		1



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