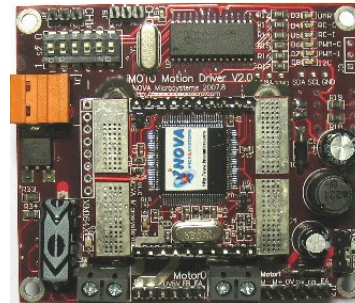


iMoto High Current Dual DC Motor Motion Controller Hardware Guide

Key Features

- On-Board Motion Control for brushed DC Motor (Velocity Mode, Position Mode)
- On-Board MOSFET PWM driver.
- Able to drive **Two** DC motors in the same time. MAX DC Current Per Motor = **10A**.
- On-Board fan for efficient heat dissipation.
- Protection for Reverse Polarity, Over-Current, Over-Temperature.
- Controllable by RC Servo PWM pulse directly.
- Controllable by UART Interface.
- Controllable by I2C interface.
- Able to control the PWM output directly.
- **Switching power supply** for best battery power efficiency.
- **Compact** size of 75mmX65mm



Top



Bottom

Descriptions and Applications

iMoto is a multi-functional high current 2-axis Motor Driver with motion control. It features on-board over-current protection and over-temperature protection. Maximum DC current per motor channel is 10A.

For DC motor with incremental encoder feedback, the **iMoto** is able to drive the motor in velocity mode or position mode. For DC motor without encoder feedback, the **iMoto** is able to drive the motor by the output PWM. The on-board motion processor allows user to change motion control parameters like PID parameters, motor configuration etc. **iMoto** operates in 3 modes as follows.

UART Mode: In UART Mode, the **iMoto** is able to interface with host microcontroller via UART port. In this mode, the MHD164 will receive AT Command sent from the host microcontroller to change its speed, position, etc.

I2C Mode: In I2C Mode, the iMoto is able to interface with host microcontroller via I2C port. The I2C address is selectable from 0x70 to 0x7E. The host microcontroller is able to control the iMoto by I2C command.

Radio Control PWM mode: In this Mode, the MHD164 can be connected the RC receivers (Hitec/Futaba) directly so that the two motors' speed can be control by the RC remote controller. In this mode, user may choose to run the two motors under coordinated mode or independent mode. This mode is especially useful in **building RC remote robots like Sumo Wrestling robot**.

MHD164 is fully compatible with iMicro robotic controller from iNOVA Microsystems.

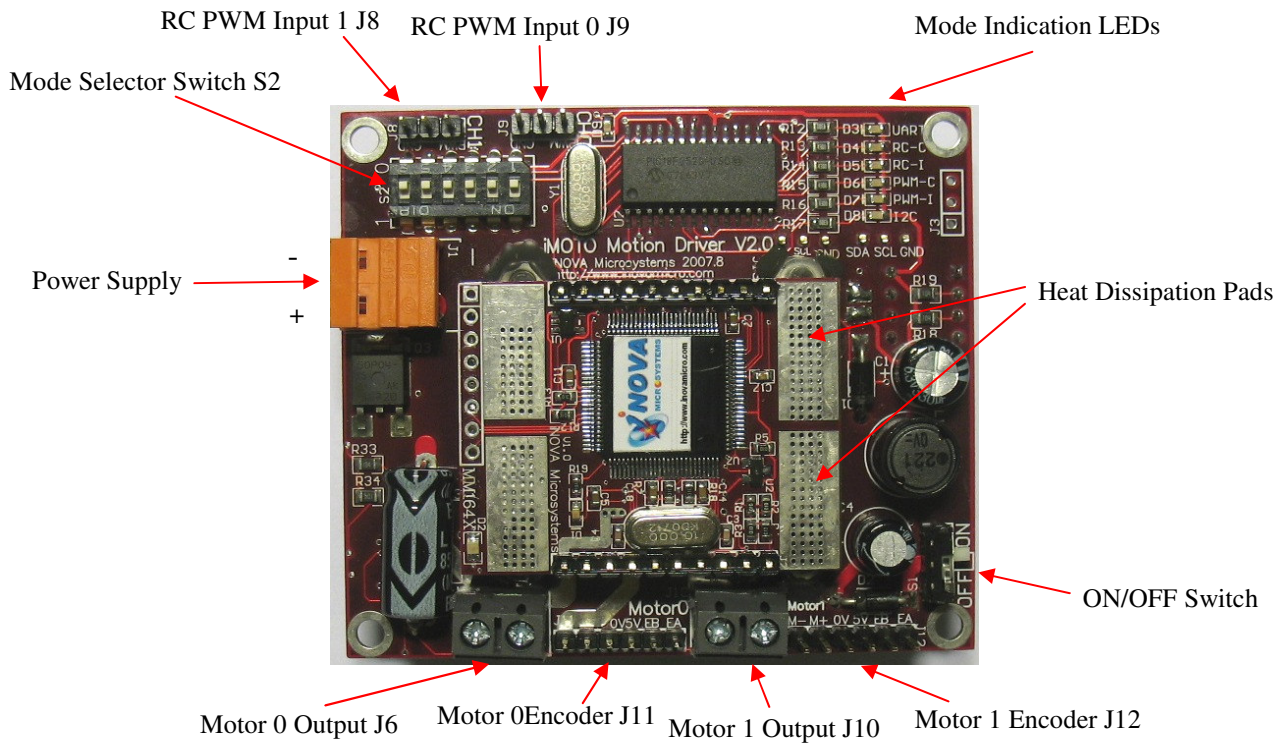
Technical Specification

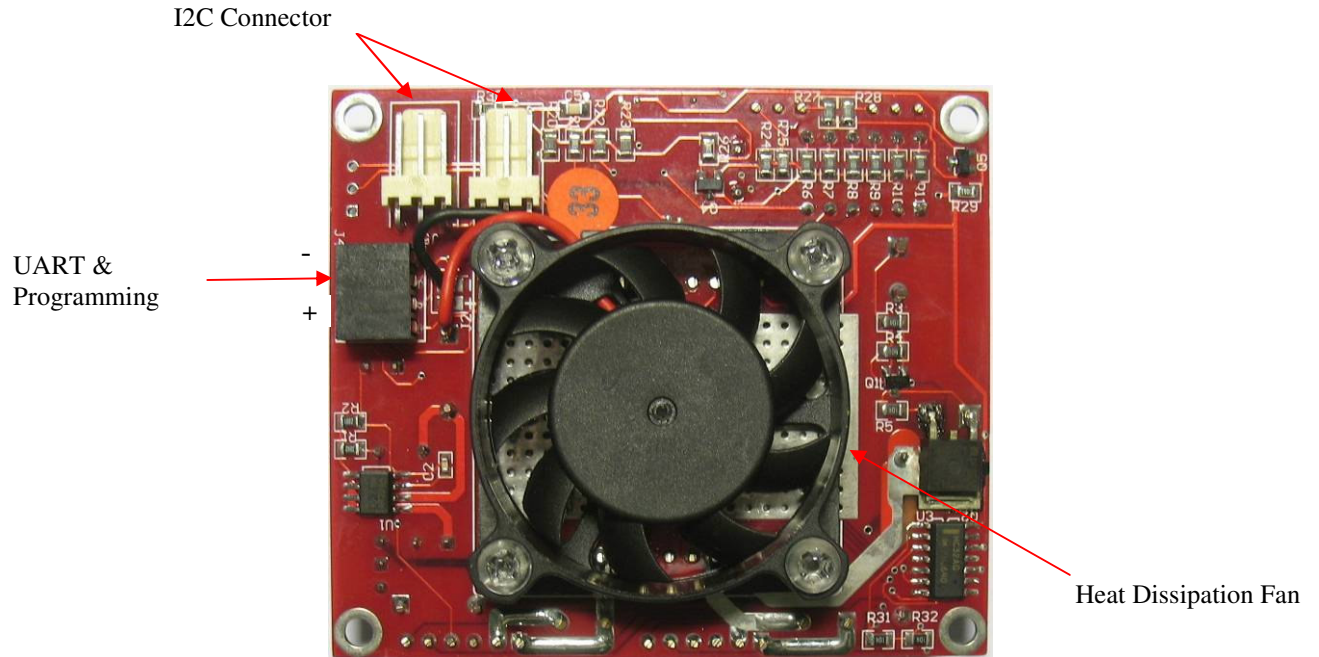
Item	Specification	iMoto
Power Supply Voltage	7V – 24V	yes
Power Supply type	Switching Regulator	yes
Power Consumption	2W (without motor)	yes
Processor Speed	40MHz	yes
DC Motor DC current	Max DC Current = 10Amp / Channel	yes
DC Motor Pulse current	Max Pulse Current = 20Amp	yes

Order Information

Our Part No.	Description	Price	Farnell Order Code
iMoto-X2	High current motor driver	SGD440/pc	1287353

Board Layout

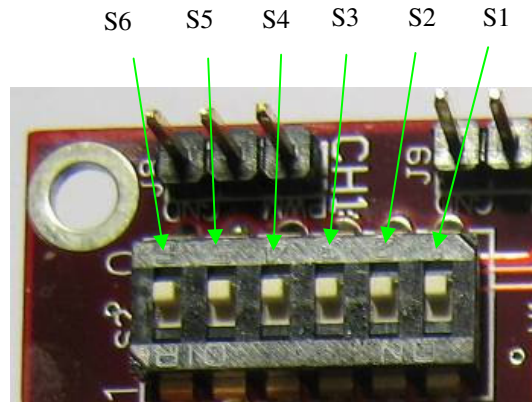




Connector Pin Layout

Mode Selection Switch

The iMoto motion driver is able to operate under various modes that can be set by the Mode Selection Switch S2 showed in the following figure.



Mode Selection Table

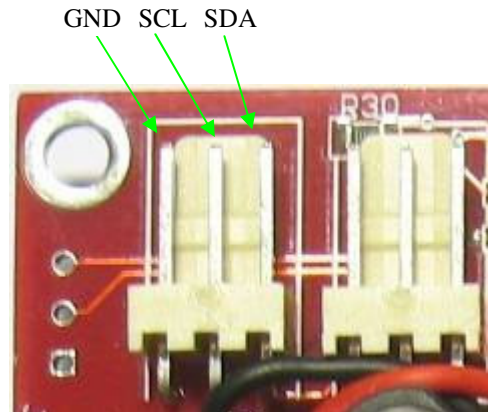
S4	S5	S6	Mode	LED
0	0	0	UART Mode	D3
0	0	1	RC-PWM Velocity Mode - Coordinated	D4
0	1	0	RC-PWM Velocity Mode - Independent	D5
0	1	1	RC-PWM Voltage Mode - Coordinated	D6
1	0	0	RC-PWM Voltage Mode - Independent	D7
1	0	1	I2C Mode	D8

I2C Address Selection Table

S1	S2	S3	I2C Address
0	0	0	0x70
0	0	1	0x72
0	1	0	0x74
0	1	1	0x76
1	0	0	0x78
1	0	1	0x7A
1	1	0	0x7C
1	1	1	0x7E

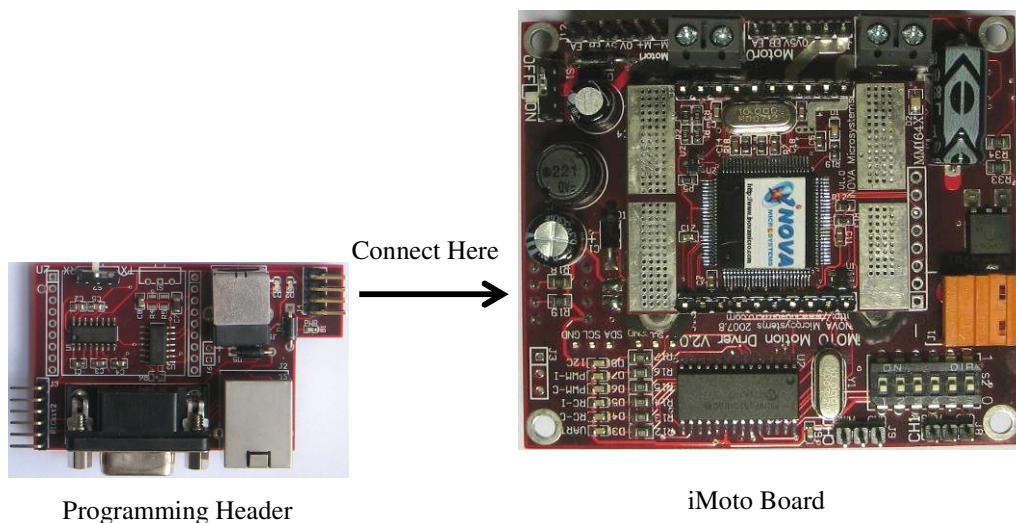
I2C Port

The iMoto has ONE I2C port. However, two I2C connectors are provided for easy cascading of a few iMoto motion controllers. Up to eight iMoto motion controllers can be connected to the same I2C bus.



UART & Programming Port

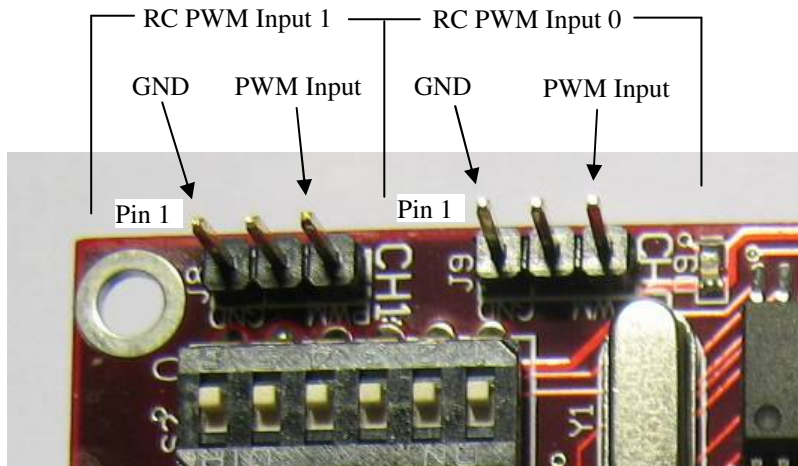
The iMoto motion controller comes with the programming adaptor to mate to this port to provide RS232 level conversion such that iMoto is able to communicate with PC serial port directly. For details about the Programming Adaptor, please refer to [Programming Adaptor Hardware Guide](#).



RC PWM Inputs

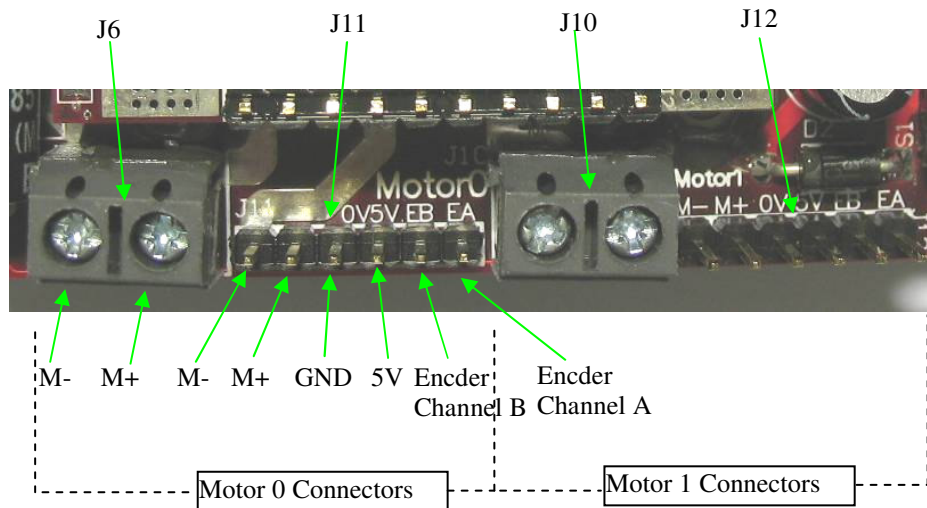
The 2 channels of RC signal inputs, CH0 and Ch1 are connected to J9 and J8. The pins configuration of these header pins are as follows.

- Pin 1 – GND
- Pin 2 – N.C.
- Pin 3 – RC PWM Signal



DC Motors Connection

dNote The DC motors are connected to J6, J11 and J10, J12 respectively. J6 and J10 are used for M+ and M- and J11 and J12 are for encoders. The pins layouts are as follows:



Operating Mode Description

The MHD164 can be controlled by three different ways, namely, RC (radio control) PWM Pulse, UART and I2C.

RC PWM Pulse Control

MHD164 accept two channels of standard RC PWM pulses to control the Motor 0 and Motor 1.

- For motors with incremental encoder feedback, **RC-Velocity-I (independent)** mode and **RC-Velocity-C (Coordinated)** mode can be used.
- For motors without incremental encoder, **RC-Voltage-I** mode and **RC-Voltage-C** mode can be used.

RC-Velocity-I Mode

In this mode, the **velocity** of motor 0 is proportional to the pulse width of the RC PWM input CH0. The **velocity** of motor 1 is proportional to the pulse width of the RC PWM input CH1. The two motors are running independently.

RC-Velocity-C Mode

In this mode, the **average velocity** of motor 0 and motor 1 ($(V0+V1)/2$) is proportional to the pulse width of the RC PWM input CH0. The **velocity difference** of motor 0 and motor 1 ($V0-V1$) is proportional to the pulse width of the RC PWM input CH1. In robotic applications, The RC-Velocity-C mode is useful when one joystick of the remote control is used to control to linear movement while the other joystick of the remote control is used to control the rotational movement.

RC-Voltage-I Mode

In this mode, the **voltage** of motor 0 is proportional to the pulse width of the RC PWM input CH0. The **voltage** of motor 1 is proportional to the pulse width of the RC PWM input CH1. The two motors are running independently.

RC-Voltage-C Mode

In this mode, the **average voltage** of motor 0 and motor 1 ($(U0+U1)/2$) is proportional to the pulse width of the RC PWM input CH0. The **voltage difference** of motor 0 and motor 1 ($U0-U1$) is proportional to the pulse width of the RC PWM input CH1.

For more details about how to use MHD164 in RC PWM mode, please refer to “Application Note – Use MHD164 with Radio Controller”.

UART Control

In UART mode, MHD164 accept AT commands to perform the desired task. The UART baud rate is fixed at 115200bps. For details of the AT commands, please refer to “iMoto Software Guide”.

I2C Control

In I2C mode, MHD164 acts as an I2C slave with its I2C address selectable. It can be configured and commanded by I2C master. For details of the I2C commands, please refer to “iMoto Software Guide”.