



Doctors of Intelligence & Technology (DOIT)

T-Series Tank Chassis Assembly Guide



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Introduction

This document contains the basic assembly instructions for the T-series tank chassis and the wiring guidelines for connecting the motors to the DOIT NodeMCU Kit. Although the T300 tank chassis is used in this document, the instructions can be equally applied to any other T-series tank chassis (i.e. T200, T500, T800)

1. Bearing Wheel Installation

Each Bearing Wheel should consist of the following parts:

NO.	PART	QUANTITY
1.	17mm Copper Hex Spacer	3
2.	M3*8 Screw	6
3.	Stainless-steel Connector	1
4.	M2 Screw	1
5.	Bearings	2
6.	Wheel Discs	2

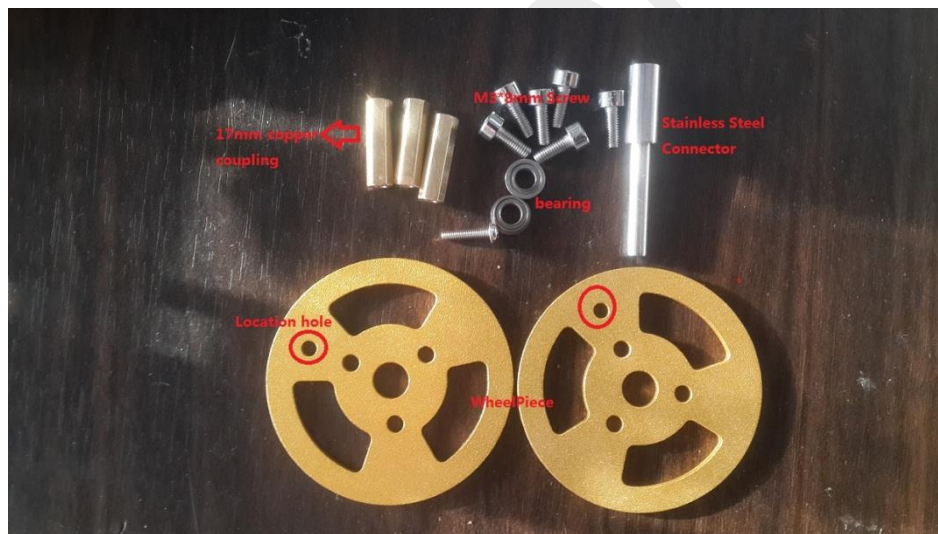


Figure 1.0 – Bearing Wheel Parts

- 1.1 Install the 3 **Copper Hex Spacers** on one **Wheel Disc**. Use the **M3*8 screws** to hold them on the Wheel Disc. The placement of the hex spacers should be as shown in Figure 1.1.



Figure 1.1 – Hex Spacer installation

- 1.2 Install the 2nd **Wheel Disc** by using the remaining **M3*8 screws**. Use the marking holes on both the Wheel Discs to align the wheel.



Figure 1.2 – Bearing Wheel Disc assembly

- 1.3 Place a **Bearing** to the **Stainless-steel Connector** before installing it to the wheel.
The Bearing ensures that the wheel can spin freely after installed.



Figure 1.3 – Bearing in Connector

- 1.4 Insert the Stainless-steel Connector to the center of the assembled wheel. Place the other **Bearing** to the opposite side of the Connector and tighten it slightly with the **M2 screw**. The completed wheel should look like Figure 1.4.



Figure 1.4 – Bearing Wheel

Notes:

- Use the marking holes to align both the wheel discs.
- Make sure that you do not tighten the M2 screw too much. The wheel must be allowed to spin freely.

2. Driving Wheel Installation

Each Driving Wheel should consist of the following parts:

NO.	PART	QUANTITY
1.	28mm Copper Hex Spacer	3
2.	Aluminum Alloy Coupling	1
3.	M3*8 Screw	6
4.	Stainless-steel Connector	1
5.	M4*16 Screw	1
6.	Jackscrew	2
7.	Wheel Discs (Gear)	2



Figure 2.0 – Driving Wheel Parts (Hex Spacers not shown)

- 2.1 Install the **Jackscrews** into the **Aluminum Alloy Coupling**. Make sure they are not too deep to allow the insertion of the motor later.



Figure 2.1 – Jackscrew installation on Aluminum Alloy Coupling

- 2.2 Install the **28mm Copper Hex Spacers** to one of the **Wheel Disc** using the **M3*8 screws**.



Figure 2.2 – Hex Spacer installation on Driving Wheel Disc

- 2.3 Install the 2nd **Wheel Disc** using the remaining **M3*8 screws**. Use the marking holes to align the discs.



Figure 2.3 – Driving Wheel Disc assembly

- 2.4 Insert the **Aluminum Alloy Coupling** to the wheel assembly from the side of the Wheel Disc that provides a **large middle hole** shaped for the coupling. Make sure that the Jackscrews are on the outside of the wheel.

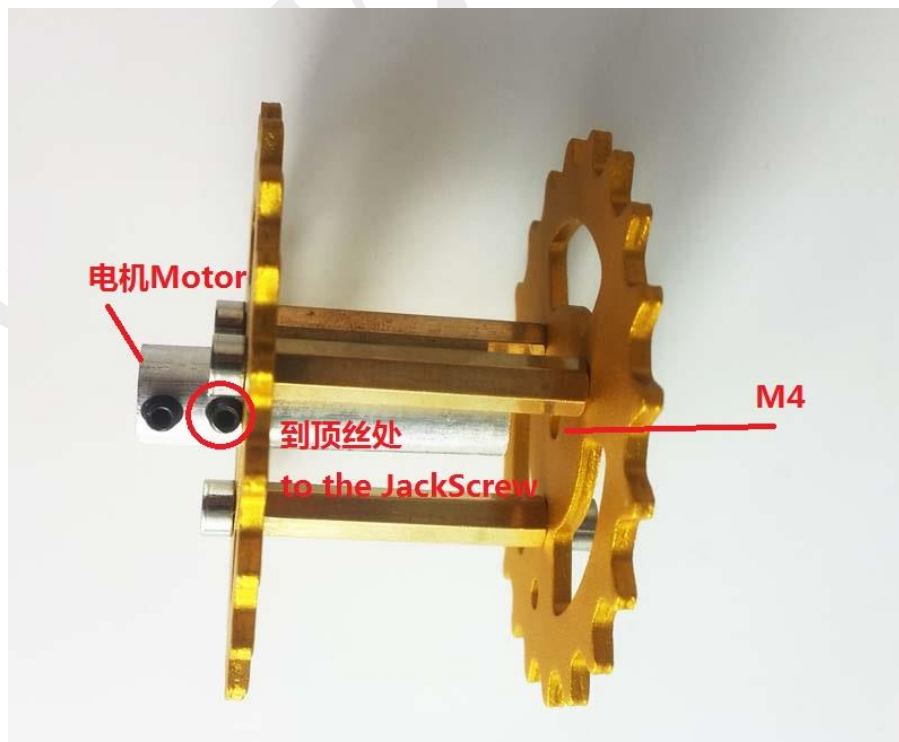


Figure 2.4 – Aluminum Alloy Coupling installation

- 2.5 Finally, complete the installation of the wheel by using the **M4*16 screw** from the other side of the Driving Wheel Disc. The completed Driving Wheel should look like the one shown in Figure 2.5.



Figure 2.5 – Driving Wheel

3. T300 Tank Chassis Installation

The T300 tank chassis should consist of the following parts:

NO.	PART	QUANTITY
1.	Motor	2
2.	LED Lights	2
3.	Tracks	2
4.	Chassis Panel (Top, Left and Right)	3
5.	Power Cable	2
6.	M3*12 Screw	8
7.	M3 Nut	8
8.	M3*10 Screw	4



Figure 3.0 – T300 Tank Chassis Parts

3.1 Use the **M3*12 screws** to hold the side panels with the top panel.

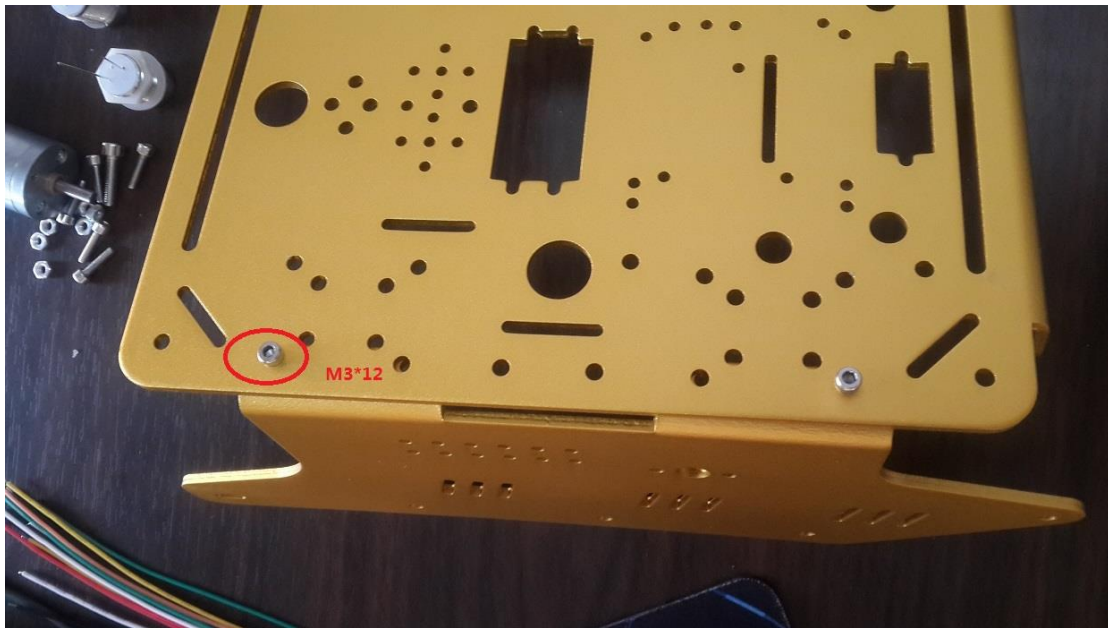


Figure 3.1 – Side panel installation

3.2 Use the **M3 nuts** to hold the side panels underneath the top panel. Screw them in tightly.

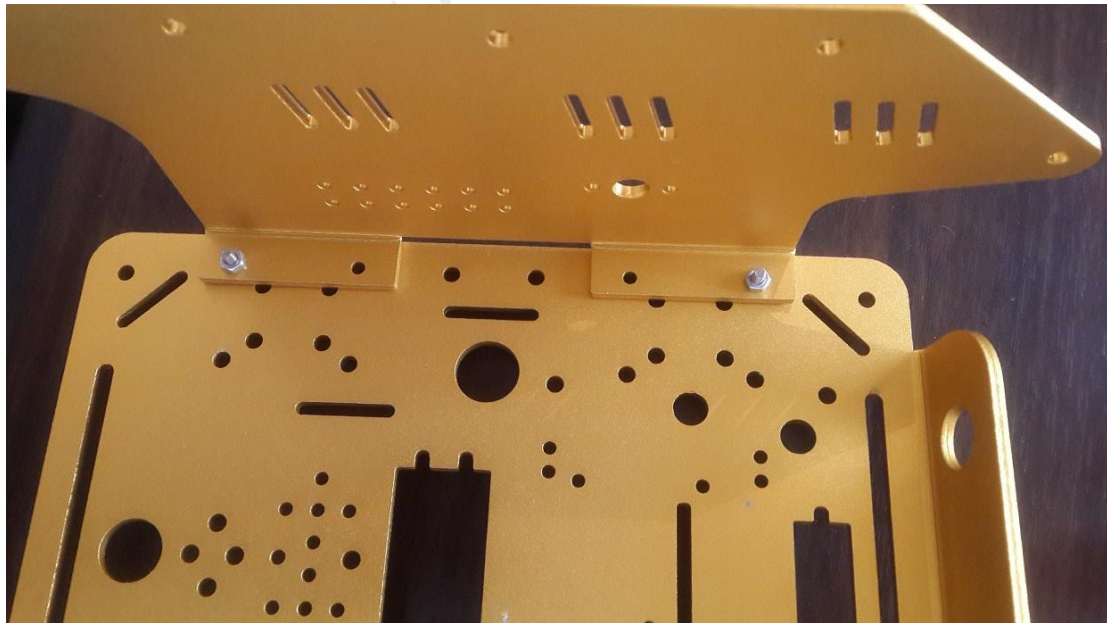


Figure 3.2 – Under top panel

- 3.3 Align the motor to the hole at the side panels. Use the **M3*10 screws** to screw in the motor in place. The motor should be placed inside and its shaft should be exposed through the hole to allow installation with the coupling later. Do this for both motors on each of the side panels.

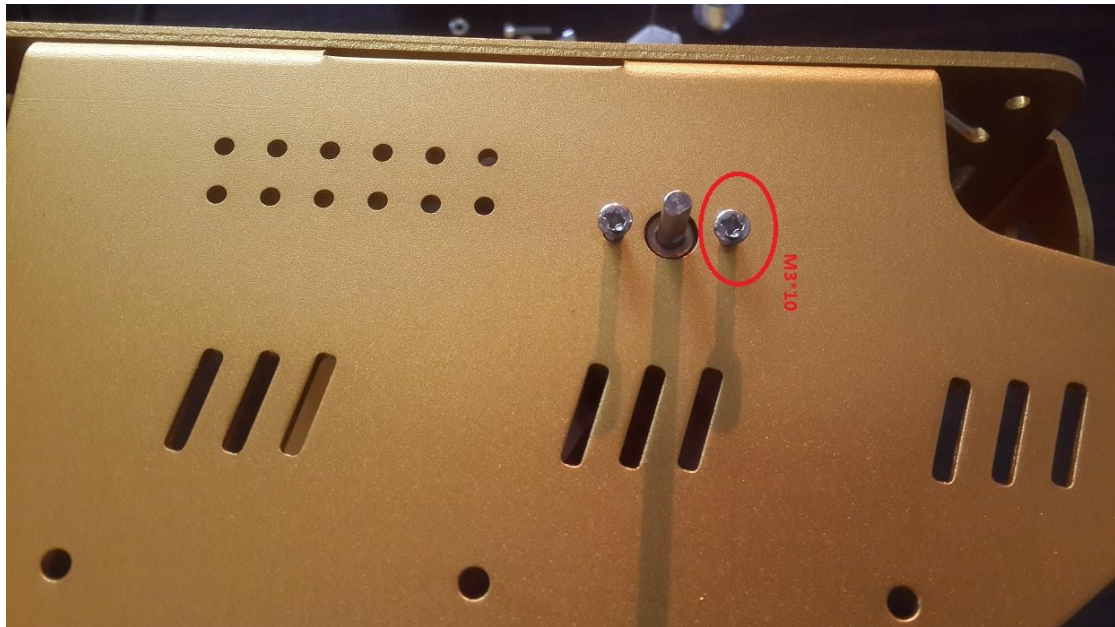


Figure 3.3 – Motor installation

- 3.4 Install the assembled Driving Wheels that was completed previously to the motor shaft. Tighten the Jackscrews to hold the wheel in place. Please leave a small gap between the coupling and the chassis to allow smooth rotation of the driving wheel. Do this for both Driving Wheels on each of the side panels.

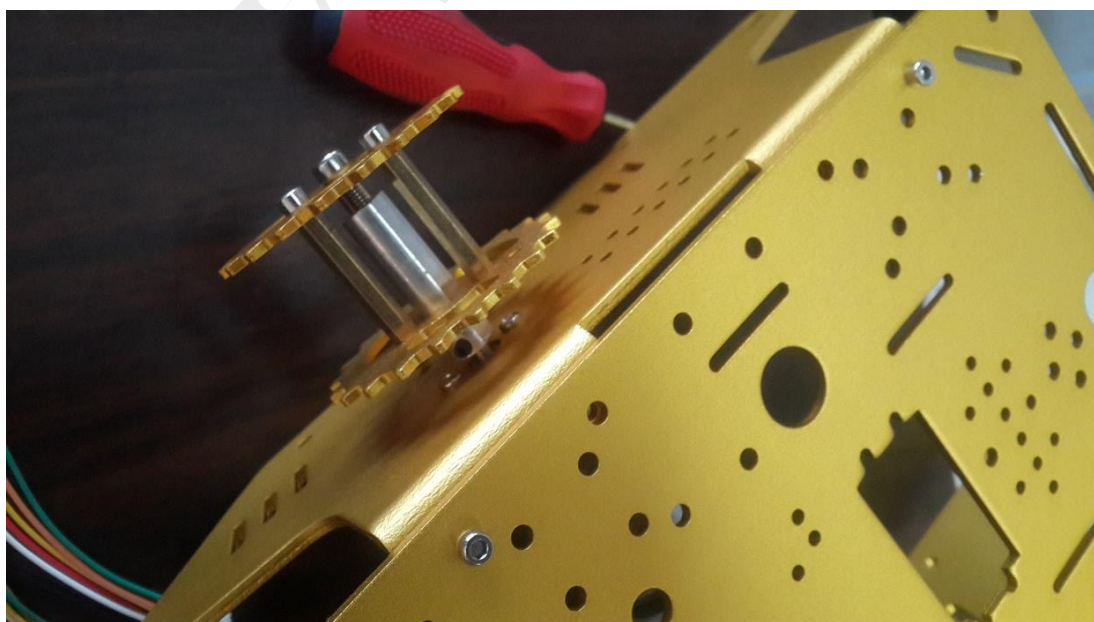


Figure 3.4 – Driving Wheel installation on chassis

- 3.5 Install the assembled Bearing Wheels from previous steps to the side panels. There will be holes at the bottom of the panels that you can screw the wheels in. Do this for all the wheels on both the side panels.

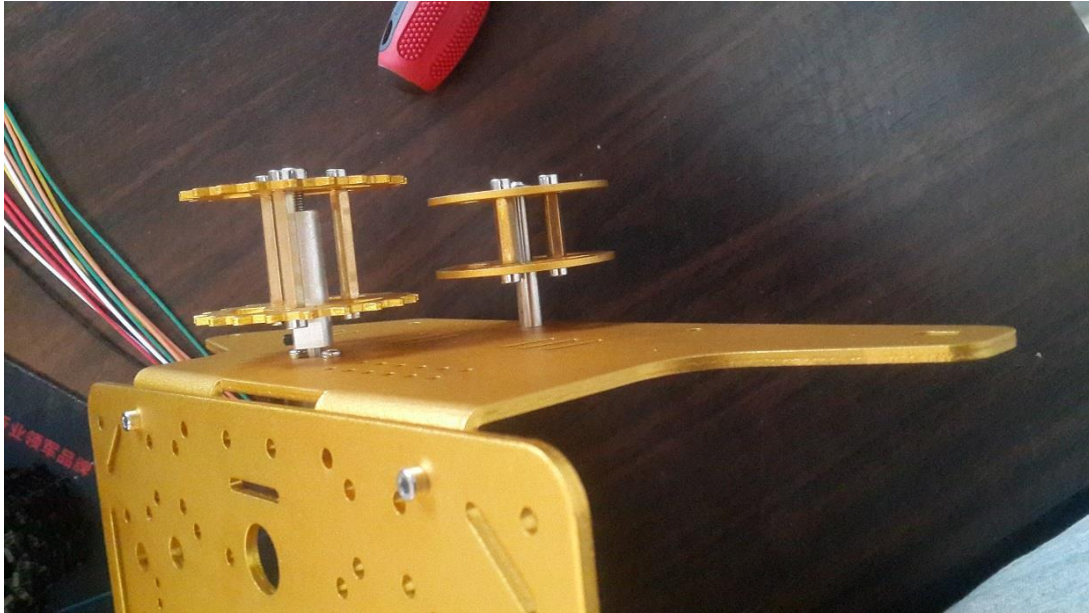


Figure 3.5 – Bearing Wheels installation on chassis

- 3.6 For the track installation, measure and adjust the length appropriately. **Please take note that the track is connected individually through a needle and its length can be adjusted according to your needs.** Use a small screwdriver or a tool to remove the needle at a particular section to adjust the length of the tracks.



Figure 3.6 – Track length adjustment

- 3.7 Install the tracks over the wheels. Make sure that the holes on the tracks are inserted properly into the gears of the Driving Wheel. You will notice that on the side panels, there is one hole for a Bearing Wheel that is slightly longer. This is to allow you to easily move the wheel for the installation of the tracks.

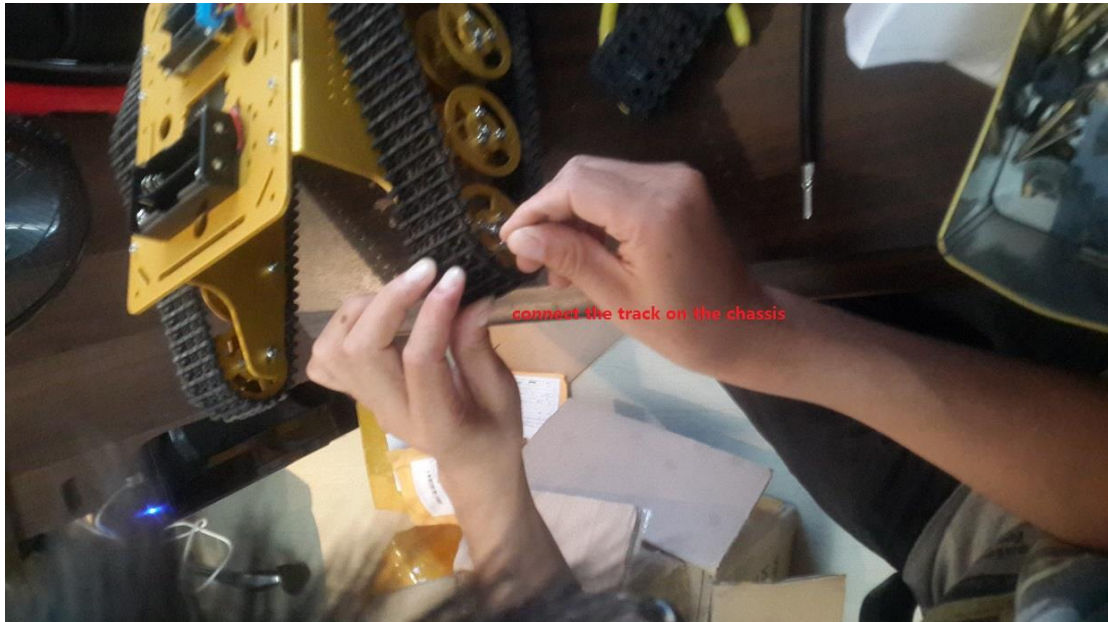


Figure 3.7 – Tracks installation

- 3.8 The completed T300 tank chassis should look like Figure 3.8 and 3.9.



Figure 3.8 – T300 Tank Chassis side view



Figure 3.9 – T300 Tank Chassis front view



Important Notes

- During the installation of the Bearing and Driving Wheels, please ensure that the marking holes are aligned.
- The tracks are connected by individual sections through needles and can be adjusted to any length. You may need to use a small screwdriver or a tool to remove the needle. Please practice safety precaution to prevent injury when removing the needle as you may need to apply some force.
- There are different types of screws being used for this chassis. Please take note of their usage, length and diameter sizes.
- Please make sure that the Bearing Wheels are not too tight and allow them to spin freely before installing the tracks.

This document can be downloaded from www.smartarduino.com.

For other tank chassis and accessories, please

visit http://www.smartarduino.com/robotics_d005.html

4. Motor Datasheet

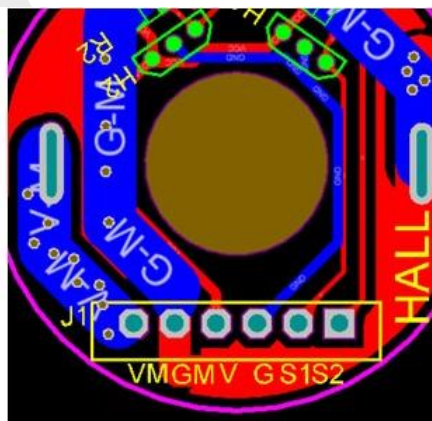
The datasheet of the motors that is included with the T-series tank can be viewed at http://www.smartarduino.com/25mm-9v-dc-reduced-gear-motor-for-robot_p94537.html



Figure 4.0 – Motor

This motor includes a Hall sensor which can be used to measure the velocity of the wheel. The pins on the motor indicate:

VM	GM	V	G	S1	S2
Power for Motor	Ground for Motor	Power for Sensor	Ground for Sensor	Output signal for 1 st Hall Sensor	Output signal for 2 nd Hall Sensor



where, VM and GM are connected to motor, V and G is the power for sensor, S1 and S2 are the output signal.

5. DOIT NodeMCU Kit

The T-series tanks can be powered-up using the DOIT NodeMCU Kit which comes together with a NodeMCU and Motor Shield. You can obtain the product from <http://www.smartarduino.com/view.php?id=94867>



Figure 5.0 – DOIT NodeMCU Kit

5.1 For 2WD motor connection, connect the V and G of the motors to the respective ports as shown below:

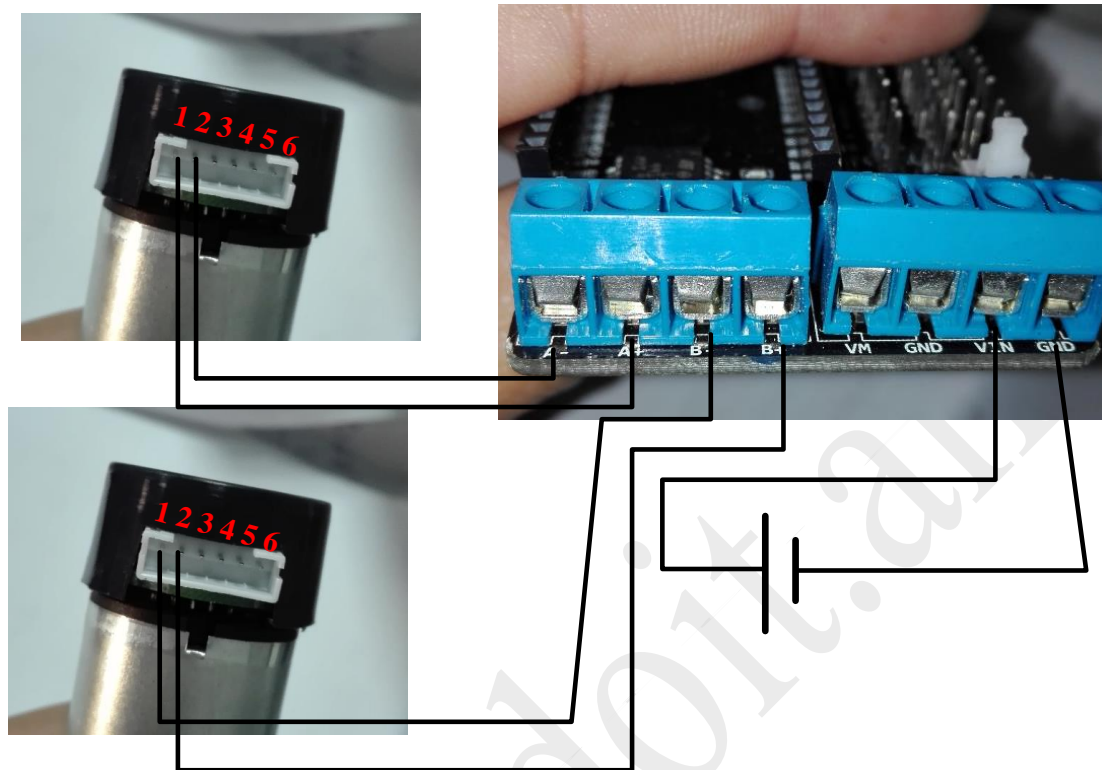


Figure 5.1a – Illustration of 2WD Connection to Motor Shield

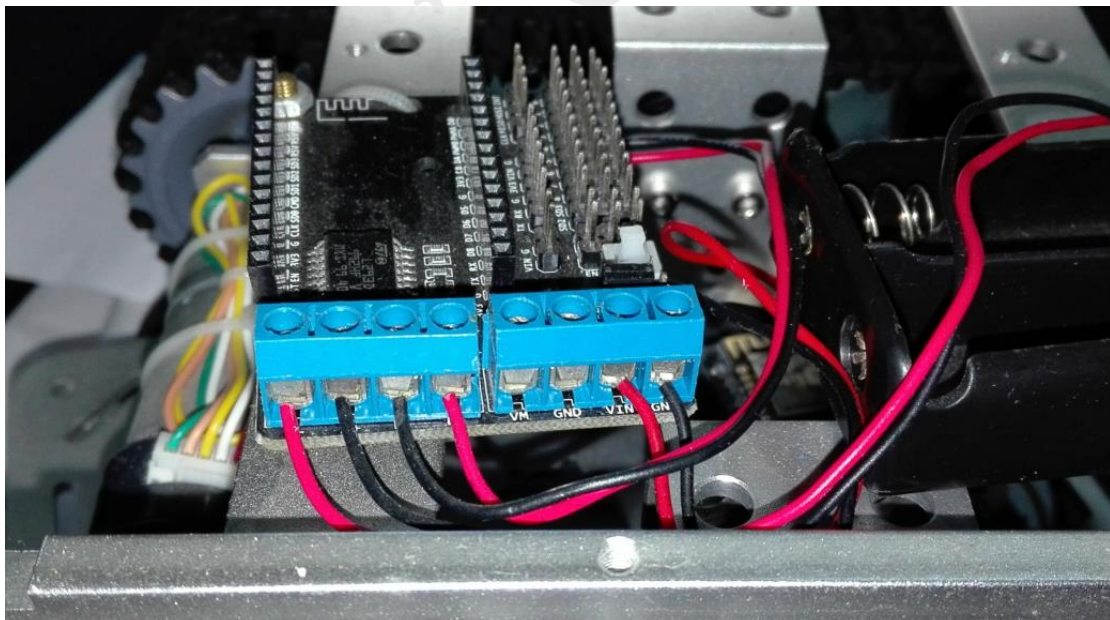


Figure 5.1b – Wiring for 2WD connection to Motor Shield

5.2 For 4WD motor connections, connect the V and G of the motors to the respective ports as shown below:

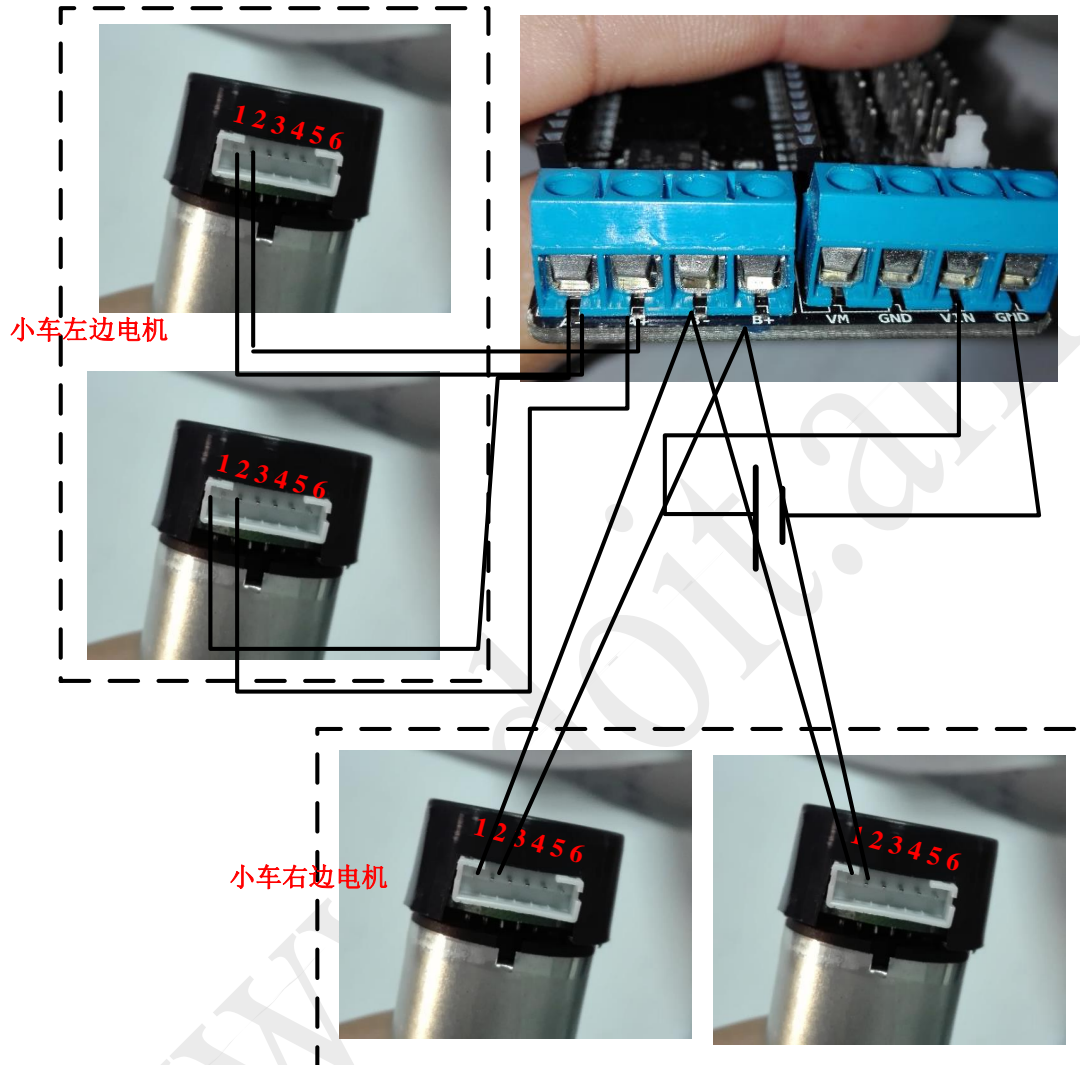


Figure 5.2a – Illustration of 4WD Connection to Motor Shield

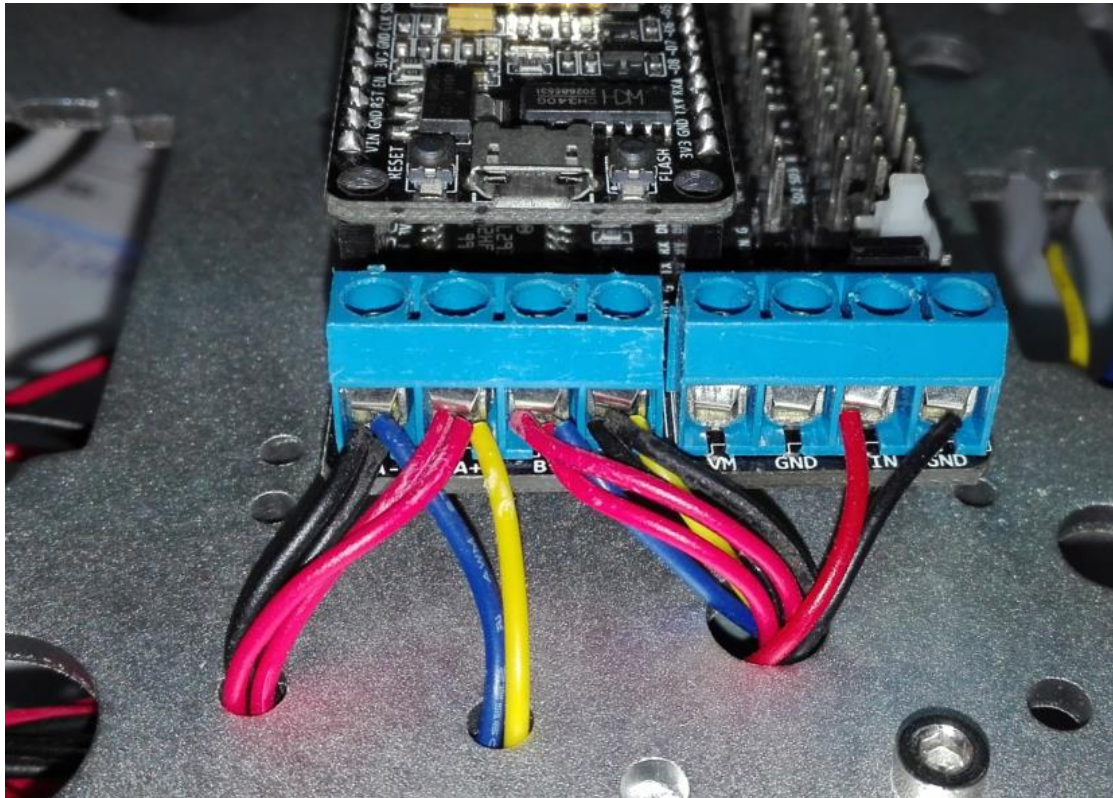


Figure 5.2b – Wiring for 4WD connection to Motor Shield



6. Support and Service

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<http://bbs.smartarduino.com/>

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