Mecanum Wheel Vectoring Robot - IG52 DB

Assembly and Operation

This is a chain drive 4WD base Programmable robot kit that uses 8" Nexus mecanum wheels allowing it to vector in any direction. It can support payloads up to 200 lbs. Make it RC or use it with sensors and a microcontroller to make it autonomous/semi-autonomous.

Images shown may not be an exact representation of the robot's features listed in this document

Contents

Mechanical Assembly

1. Mount the motors as shown in Figure 1, with the motor spacer plate between the motor and the chassis. Make sure to use Loctite on the screws. Do not fully tighten the screws at this point since the motors will need to slide to tension the chain. Once the motor is mounted, the small sprockets can be mounted on the motor shaft. The hub should face the motor and they should be pushed all the way against the inside plate with just a small clearance for rotation.
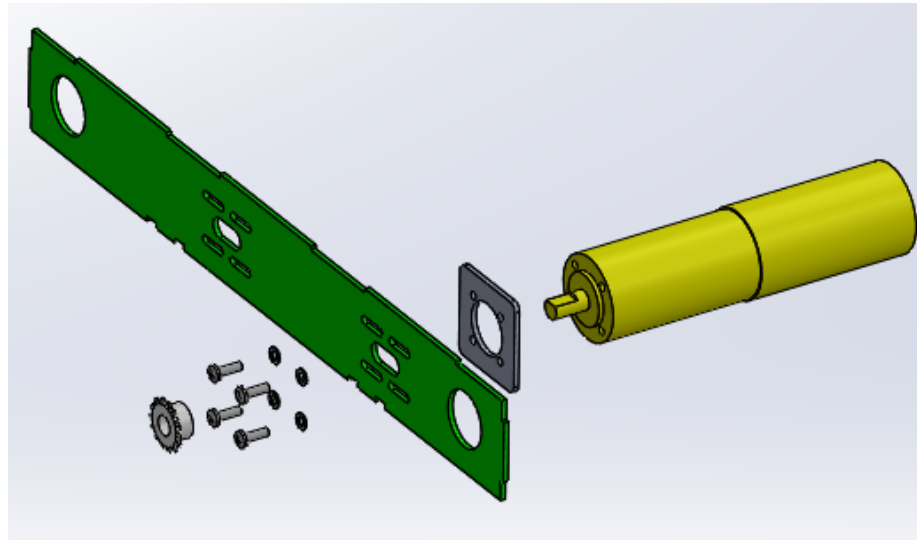

Figure 1: Exploded view sketch of motor mounting

2. Mount the mecanum wheels to the axles by removing the 6 inner socket head screws on one side of the wheels, sliding the axle through the wheel, and bolting it to the wheel. The axle should face the outside of the robot.

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Figure 2: Wheel/axle assembly

3. Before mounting the wheels, note that they need to be oriented correctly in order for the robot to work properly. See the figure below for the correct orientation.

Direction of Movement	Wheel Actuation
Forward	All wheels forward same speed
Reverse	All wheels backward same speed
Right Shift	Wheels 1, 4 forward; 2, 3 backward
Left Shift	Wheels 2, 3 forward; 1, 4 backward
CW Turn	Wheels 1, 3 forward; 2, 4 backward
CCW Turn	Wheels 2, 4 forward; 1, 3 backward

To the right: This is a top view looking down on the drive platform. Wheels in Positions 1, 4 should make X- pattern with Wheels 2, 3. If not set up like shown, wheels will not operate correctly.
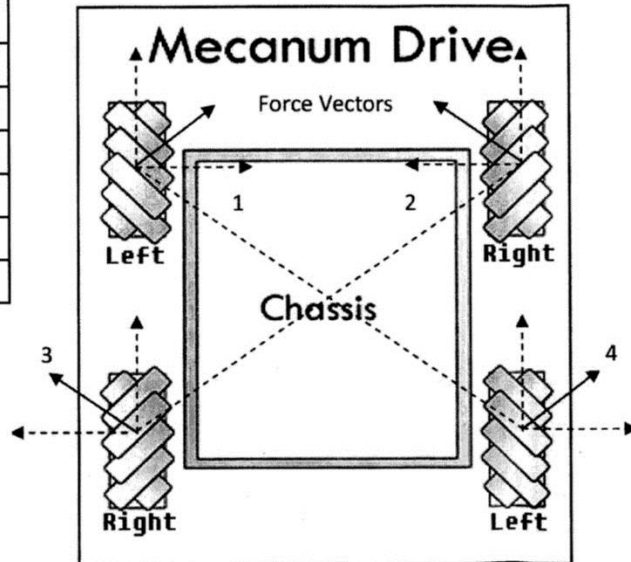

Figure 3: Wheel Orientation

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 4 of 12

4. Slide all 8 bearings into place through the bearing holes in the chassis. Slide a lock collar onto the axle, then slide the axle through the first bearing. At this point, put the key in the shaft and slide on the wheel sprocket. Finally slide the shaft through the second bearing. Slide another lock collar on to secure the inside bearing and slide the outside lock collar over to secure the outside bearing. Use Loctite on all set screws.
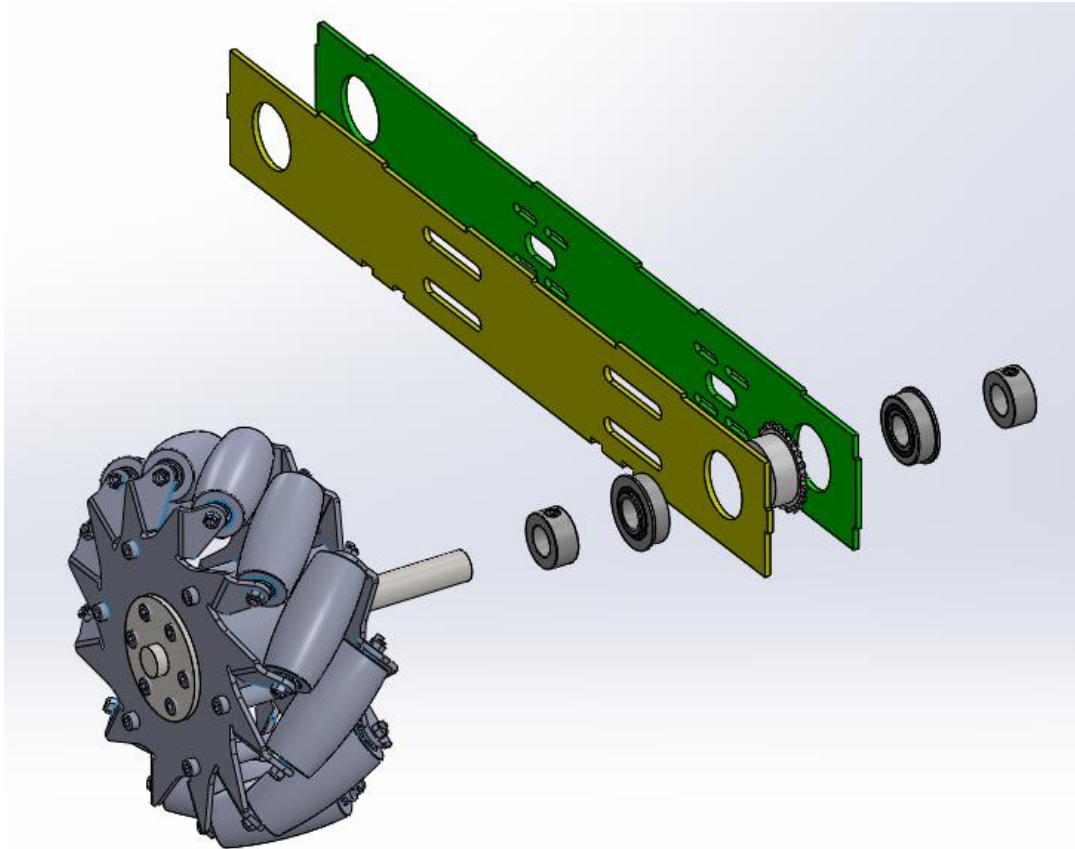

Figure 4: Wheel and Axle assembly

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 5 of 12

Figure 5: Sprocket with key installed

5. Measure, cut, and install the chain using the chain cutting instructions listed below.
6. Follow the instructions in the next section to wire the robot. Once finished with wiring the wheels and lid can be installed.

Chain Measuring, Cutting, and installation

7. See the video tutorial below or follow the steps below.

   Roller Chain Cutting Instructional Video

8. With the motor in the center of the slot, measure out the required length of chain and mark the two links you need to cut.

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

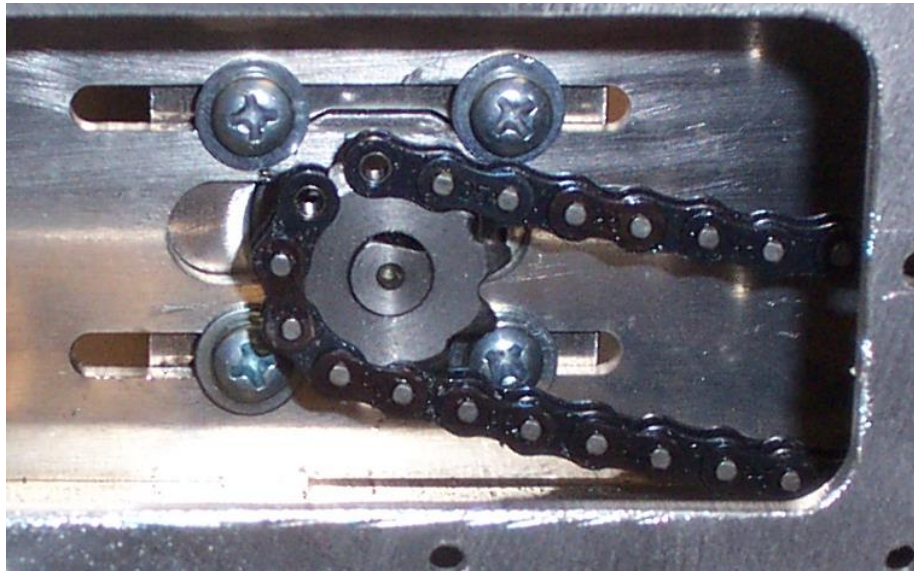Revised: April 23, 2018

Page 6 of 12

Figure 6: Chain layout

9. The easiest way to cut the chain is with a chain breaker tool, illustrated in Figure 7.

Figure 7: Chain breaker tool

10. Alternatively, clamp the chain in a vise and grind/file the ends of the pins down. Then drive the pin through the chain. Refer to Figure 8, Figure 9, and Figure 10.

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 7 of 12

Figure 8: Chain Cutting Setup

Figure 9: Chain grinding/breaking

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 8 of 12

Figure 10: Chain Link removal

11. Once the chain is cut to size, install it around both sprockets and install the master link as shown in Figure 11. Alternatively, install the connecting link prior to installing the chain in the robot (so you have a loop of chain), remove the axles, wrap chain around the motor sprocket and the loose wheel sprocket, and then reinstall the axle through the wheel sprocket. Tension by moving the motor in the slots and tighten the motor mount screws.
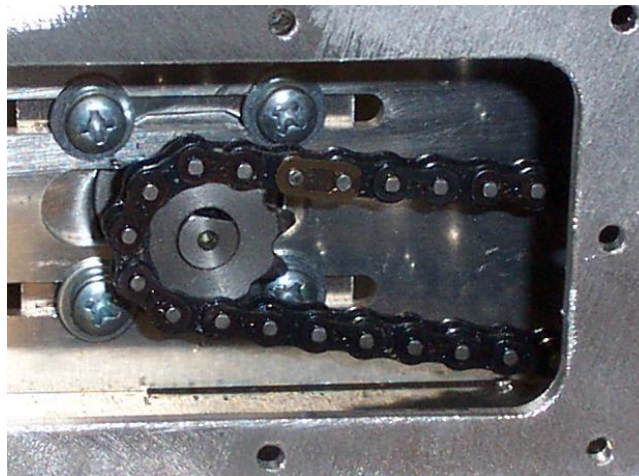
12. Repeat for the other four wheels.

Figure 11: Master Link Installation

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 9 of 12

Mounting Electrical Components

13. Mount batteries using battery brackets and hardware provided. Use foam tape on the bracket and underneath the battery to ensure a snug fit.
14. Measure a place on the chassis to mount the switch. Drill a ½" hole or use a switch bracket.
15. Mount the motor controller to the front or rear plate of the chassis. If using 12Ah batteries, the motor controller will fit between the two batteries. A custom plate will need to be installed to mount it there.
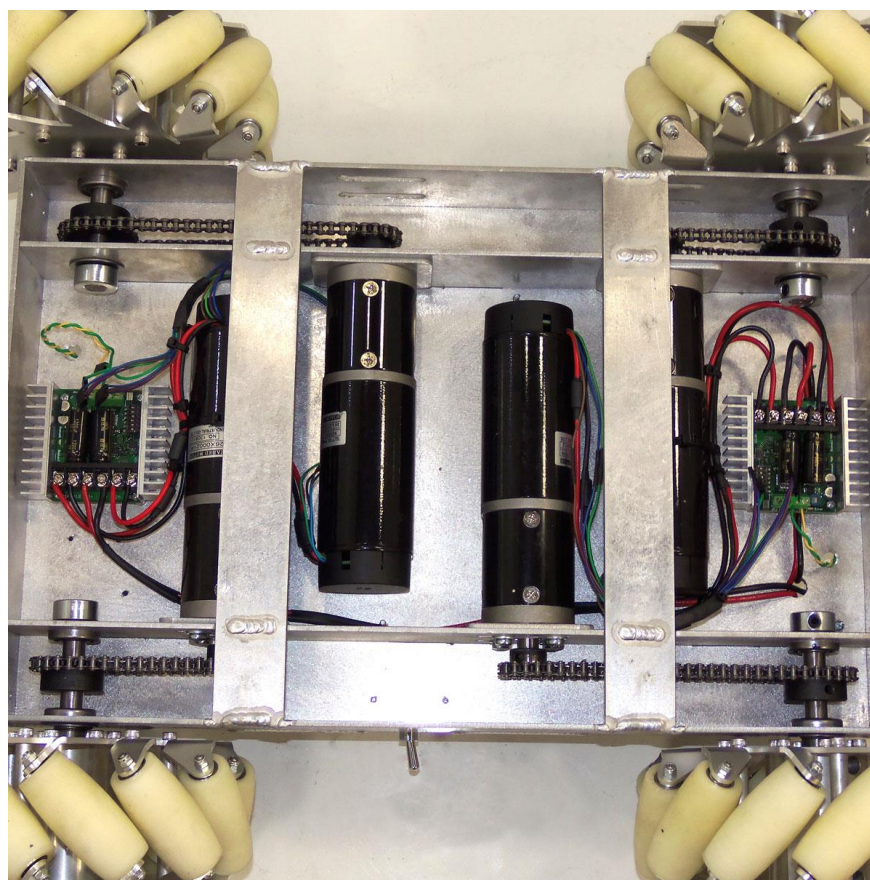
Electrical Assembly

Figure 12: Assembled Robot

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 10 of 12

For electrical assembly please follow the schematic that is listed on the page below:

Schematics

For additional support on wiring, soldering, and crimping, please read the following support pages:

Electric Motor Hookup Support

Electric Power Hookup Support

Soldering Tips

Crimping Wires

For hooking up the charger, a separate set of leads should be run from the battery through a fuse (for 4A charger use 5A fuse) to a 30 Amp connector set. The other side of the connector set should be crimped to the charger.

Operation
1. Before powering on the robot make sure it is up on blocks so the wheels can spin freely. Occasionally some or all of the wheels start as soon as the motor controller gets power. In this case the settings of the motor controller need to be changed.
2. Make sure to use the correct DIP switch settings. If using R/C mode switch 1 should be DOWN (closest to the number) and all other switches should be UP. If using a different mode see the manual for the motor controller you are using.

Binding a Spektrum Remote

3. Insert the bind plug into the receiver and power on the robot.
4. While pressing the Bind button, power on the transmitter.
5. Release the Bind button after the receiver's LED stays illuminated. This indicates the receiver is bound to the transmitter.
6. While the robot and transmitter are still powered on, remove the bind plug from the receiver.
7. If the wheel aren't moving as desired, it may be necessary to swap the Alieron and Elevator plugs or to reverse the channels on the transmitter. To reverse channels see the instructions for "Servo Reversing" in the Spektrum documentation.

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 11 of 12

General Terms

1. SuperDroid Robots, Inc is not responsible for special incidental or consequential damages resulting from any warranty or under any legal theory, including, but not limited to lost profits, downtime, goodwill, damage to, or replacement equipment or property, or any cost of recovering, reprogramming, or reproducing any data stored. ANY LIABILITY SHALL BE LIMITED TO REPLACEMENT OF DEFECTIVE PARTS. SuperDroid Robots, Inc. is further not responsible for any personal damages, including, but not limited to bodily and health damages resulting from any use of our products.
2. SuperDroid Robots, Inc. makes no representations as to the fitness of its products for specific uses. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS HEREBY EXCLUDED.
3. Agreements shall be construed in accordance with the laws of the State of North Carolina, and the rights and obligations created hereby shall be governed by the laws of North Carolina.
4. In the event a dispute or controversy arises, such dispute or controversy (including claims of default) shall be brought in the courts of Wake County, North Carolina and the plaintiff hereby agrees to this choice of venue.

SuperDroid Robots, Inc
224 Technology Park Lane
Fuquay Varina, NC 27526
www.SuperDroidRobots.com

Contact
(919) 557-9162
SDR@SDRobots.com

Revised: April 23, 2018

Page 12 of 12