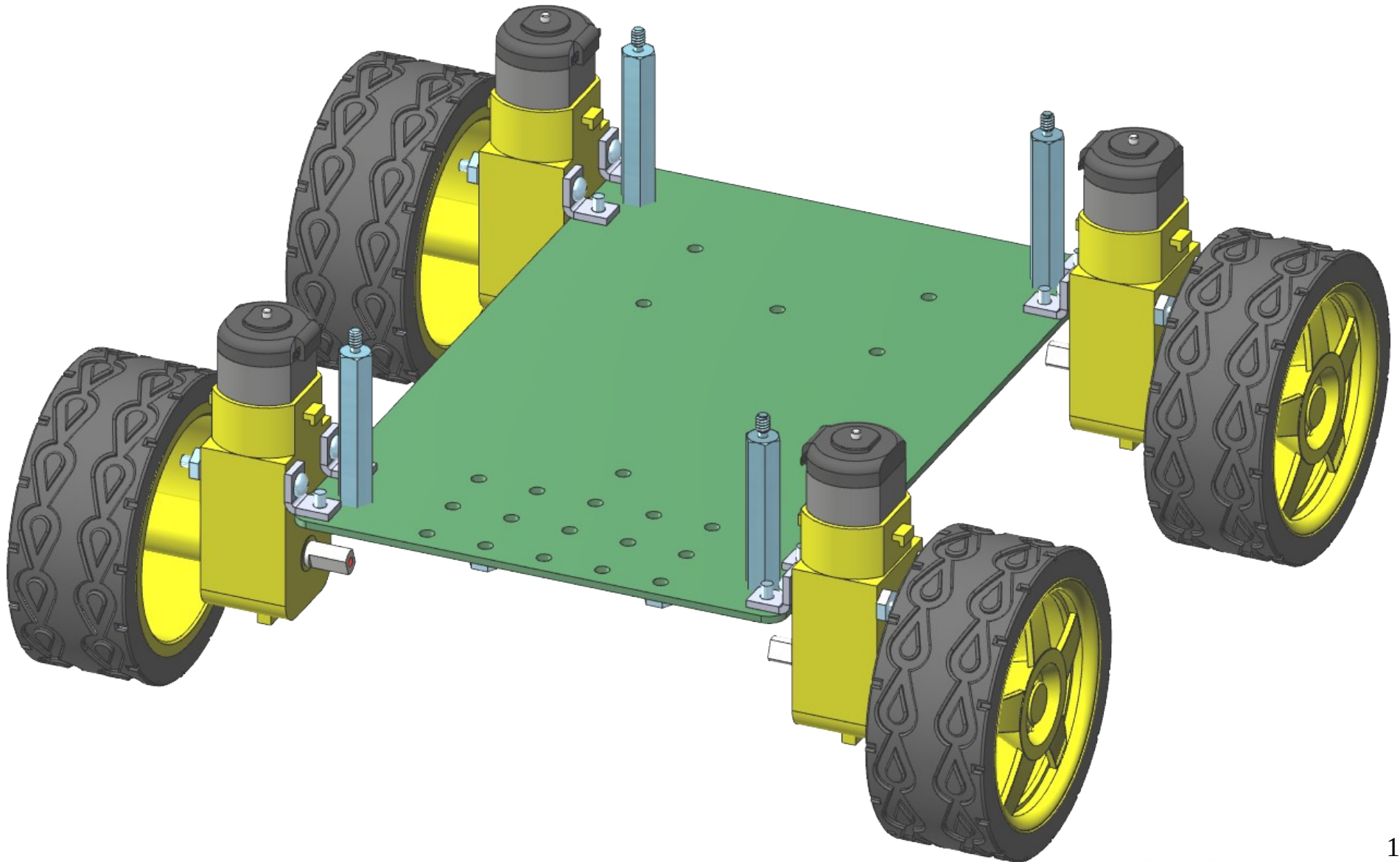


# StenBOT Robot Expansion Kit

## Assembly

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# Legal Stuff

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- Stensat Group LLC assumes no responsibility and/or liability for the use of the kit and documentation.
- There is a 90 day warranty for the Quad-Bot kit against component defects. Damage caused by the user or owner is not covered.
  - Warranty does not cover such things as over tightening nuts on standoffs to the point of breaking off the standoff threads, breaking wires off the motors, causing shorts to damage components, powering the motor driver backwards, plugging the power input into an AC outlet, applying more than 9 volts to the power input, dropping the kit, kicking the kit, throwing the kit in fits of rage, unforeseen damage caused by the user/owner or any other method of destruction.
- If you do cause damage, we can sell you replacement parts or you can get most replacement parts from online hardware distributors.
- This document can be copied and printed and used by individuals who bought the kit, classroom use, summer camp use, and anywhere the kit is used. Stealing and using this document for profit is not allowed.
- If you need to contact us, go to [www.stensat.org](http://www.stensat.org) and click on contact us.



# References

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- [www.arduino.cc](http://www.arduino.cc)
- <https://github.com/esp8266/Arduino>



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# Assembly



# Robot Expansion Kit Parts List

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- 12 – 1/4" 4-40 screws
- 8 – 1" 4-40 screws
- 30 – 4-40 nuts
- 8 – 1/2" 4-40 screws
- 4 – 3/4" standoffs
- 8 – right angle brackets
- 1 – Fiberglass base plate
- 4 – geared motors with wheels
- Dual H-Bridge driver module
- 1 – 6 cell battery holder
- Servo Parts
  - 4 – 1.5" standoffs
  - 4 – 1/4" 4-40 screws
  - 4 – 4-40 nuts
  - 2 – M2.5-6 screws
  - Servomotor
  - Servo mounting plate
- Sensors
  - 1 – 6 axis IMU
  - 1 – Magnetic field sensor

# Tools Needed

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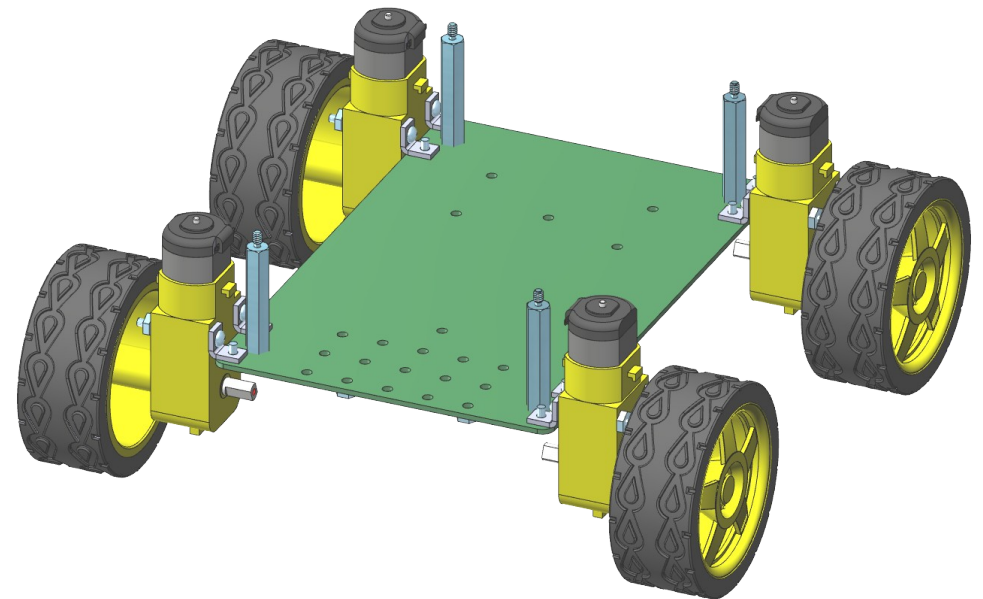
- Phillips screw driver
- 1/4 inch nut driver



# Overview

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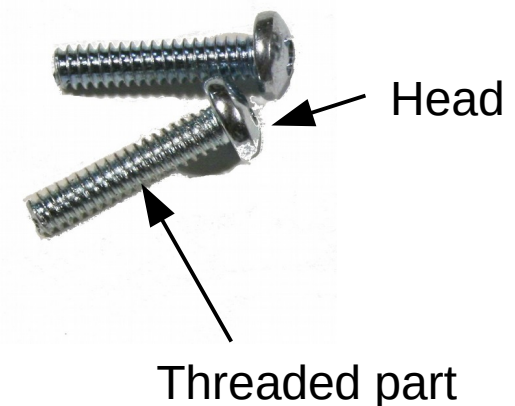
- The robot expansion kit includes a base plate and four motors and wheels and the needed hardware to attach the SYS101 kit.
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# Definition of Components

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- Screw – A cylindrical device with a raised helical thread running around it used to join things together.
  - Sizes
    - 4-40 means it is a #4 size screw with threads that wrap around 40 times per inch length.
    - #4 size is .112 inches diameter
    - #6 is .138 inches diameter
    - #8 is .164 inches diameter
  - Length is how long the threaded part of screw is.
  - The screw pictured at the right is a machine screw.
  - Screws with a pointy end are wood screws or sheet metal screws.





# Definition of Components

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- Nut – A device that mates to a screw to secure things together. The sizing is specified the same way, ie 4-40 or 6-32.
- Kep nut is a nut with an integrated lock washer.
- A nylon lock nut is a nut with a piece of nylon material inserted to keep the nut from spinning freely. It is used to join things together but let them move against each other.



Kep Nut



Nylon Lock Nut



# Definition of Components

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- Right angle bracket – A device that allows two things to be attached at right angles to each other.
- Standoff – A device that allows things to be attached to each other at a distance. Allows stacking. One end can be threaded like a screw and the other hollowed and threaded to be like a nut. They are made in different lengths. The robot uses 1.5 inch standoffs to mount the robotic arm.



Standoff



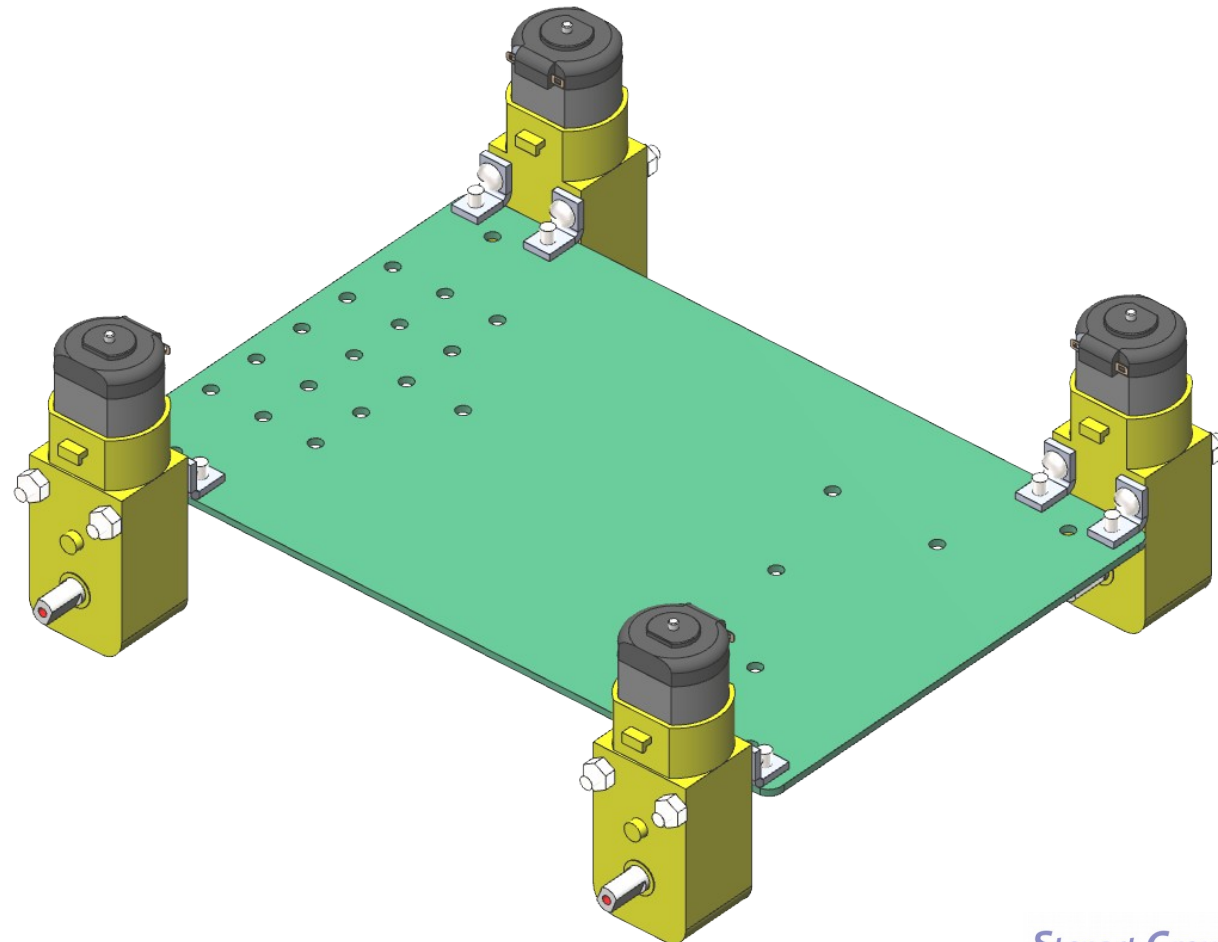
Right Angle Bracket



# Motor Assembly

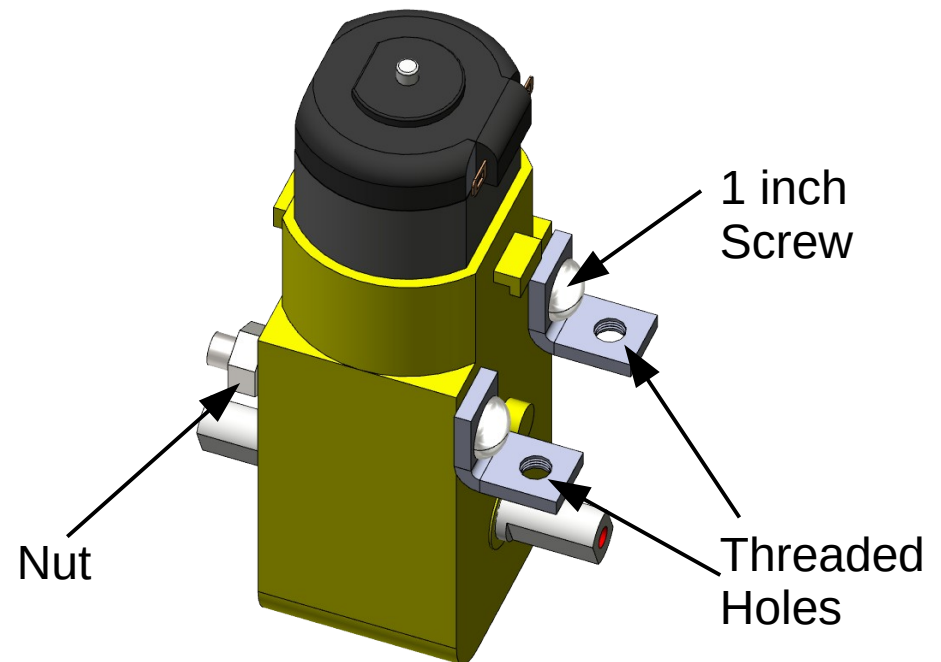
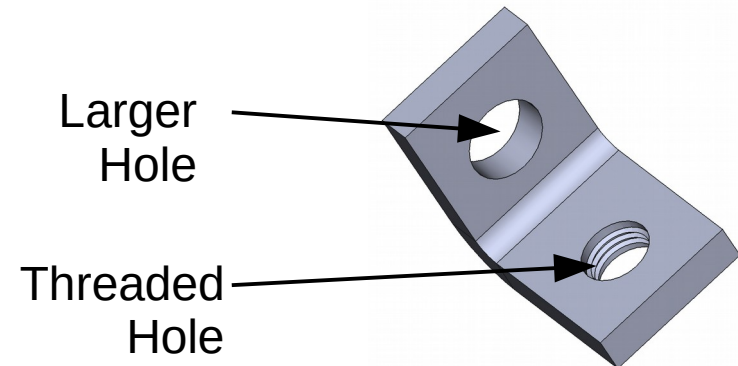
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- Below is how the motor assemblies are to be positioned. The view is from the top side.
- The motors should be oriented so the wires point inward.



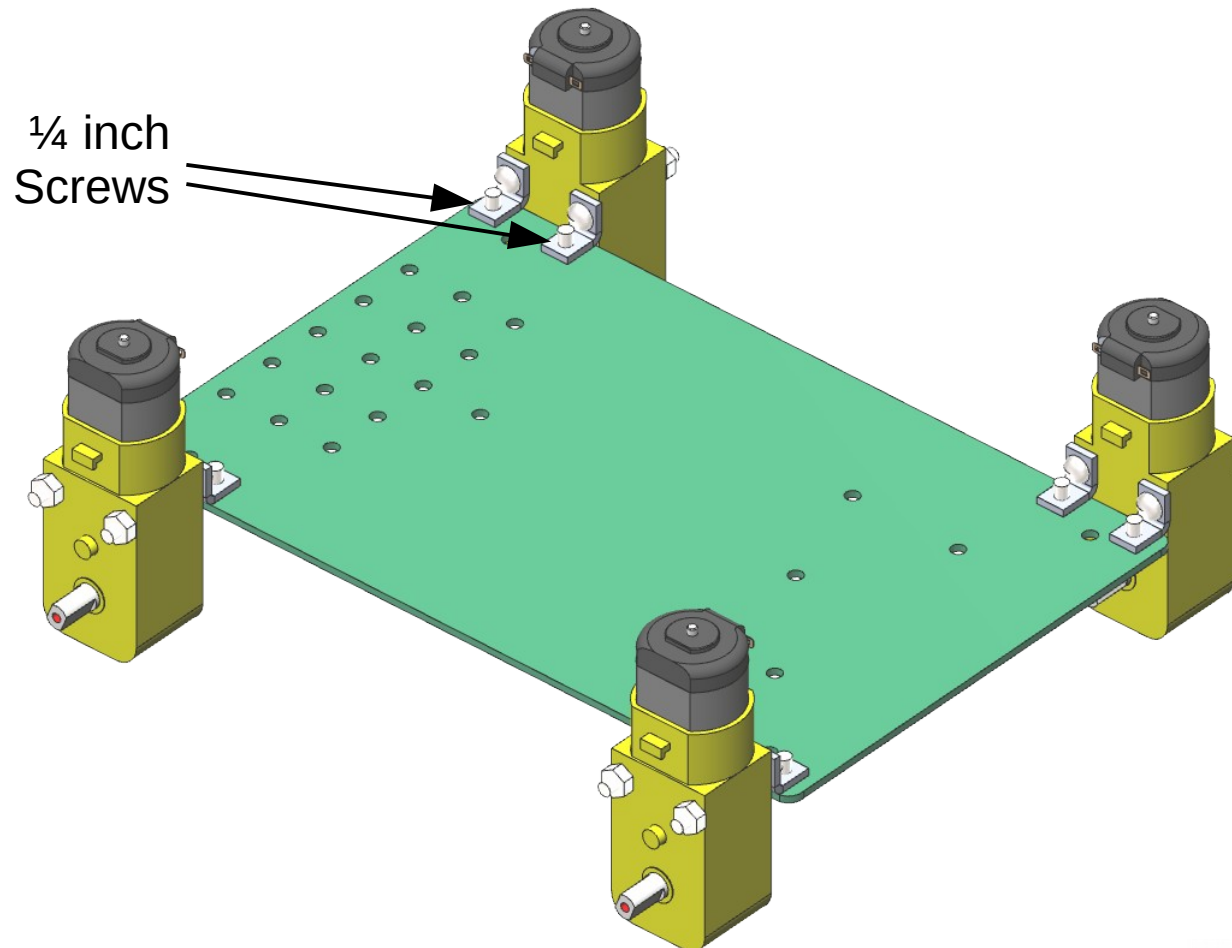
# Motor Mount Assembly

- The bracket has two holes, one is threaded and the other is not. The hole that is not threaded looks larger.
- Position one right angle bracket with the larger hole over a mounting hole in the motor as shown and insert a 1" long screw.
- Secure with a nut on the other side.
- Install the second right angle bracket the same way in the other mounting hole in the motor.
- Do the same for all four motors.



# Mounting the Motors

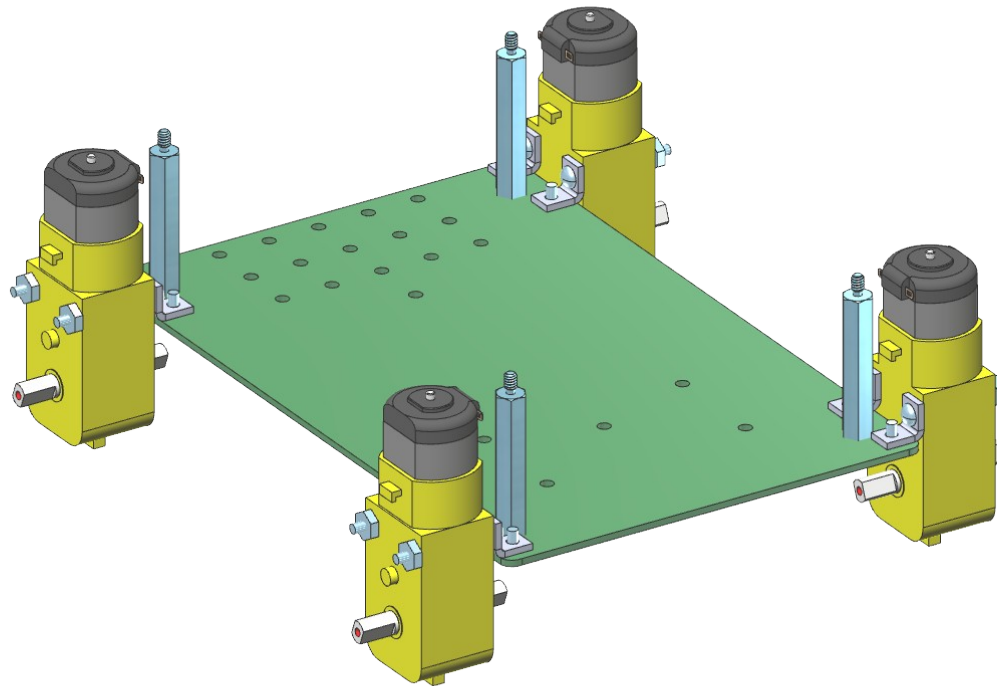
- Secure the motors to the base plate. Use eight ¼ inch screws from the bottom side into the threaded holes of the brackets.
- This completes the installation of the motors.



# Processor Board Mount

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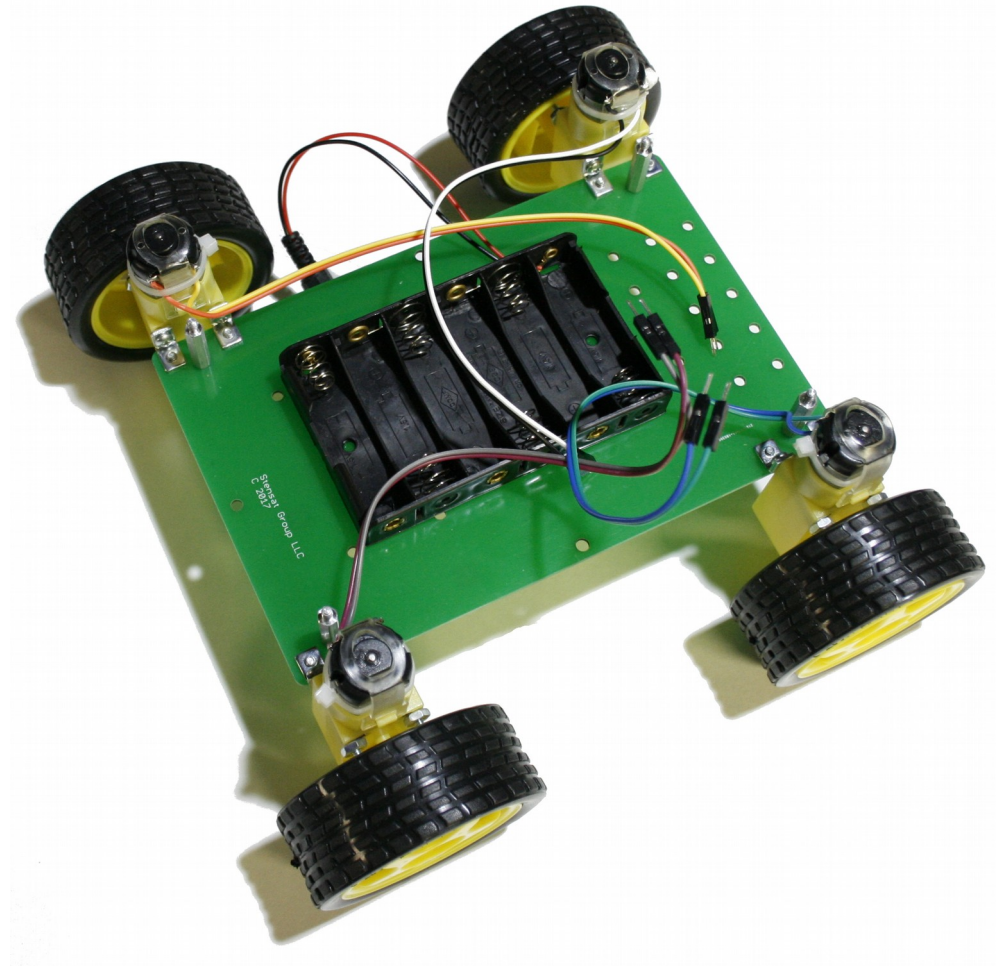
- Install a standoff in each corner of the board. Secure with a ¼ inch screw from the bottom.
- The standoff threads are supposed to point upwards.



# Battery Holder

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- Take the battery holder and remove the paper from the double sided tape.
- It doesn't matter which way the battery holder is secured as long as the plug comes out the side.
- Press the battery holder on the top side of the robot in the center. Press firmly so the tape can get a strong grip.

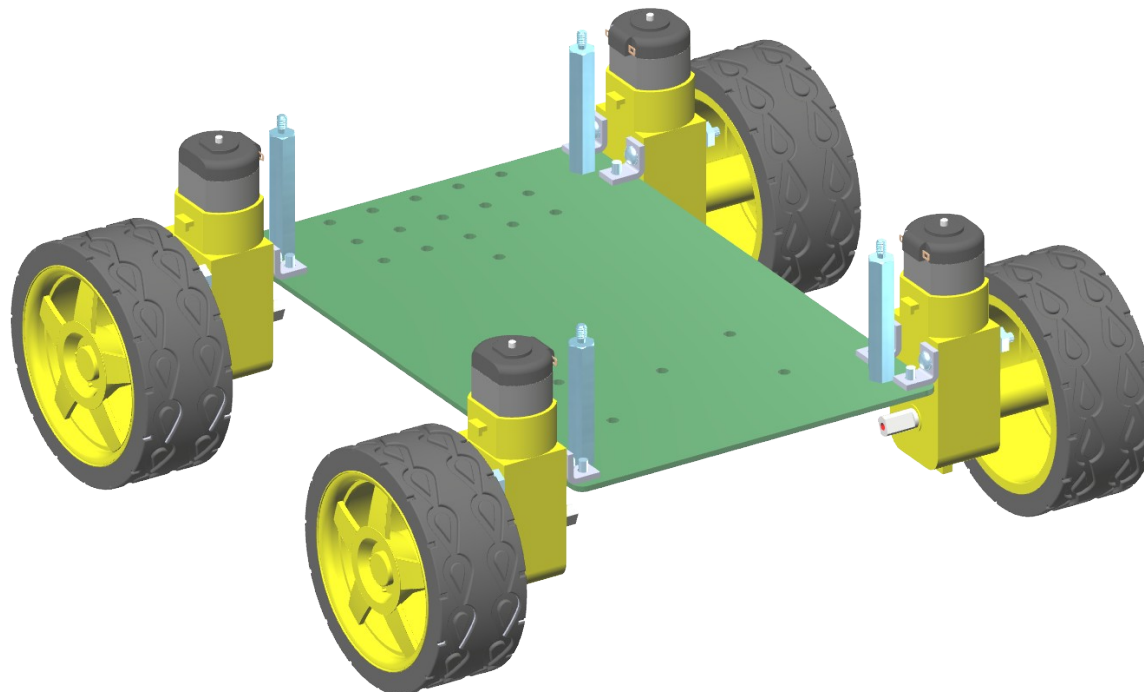




# Wheels

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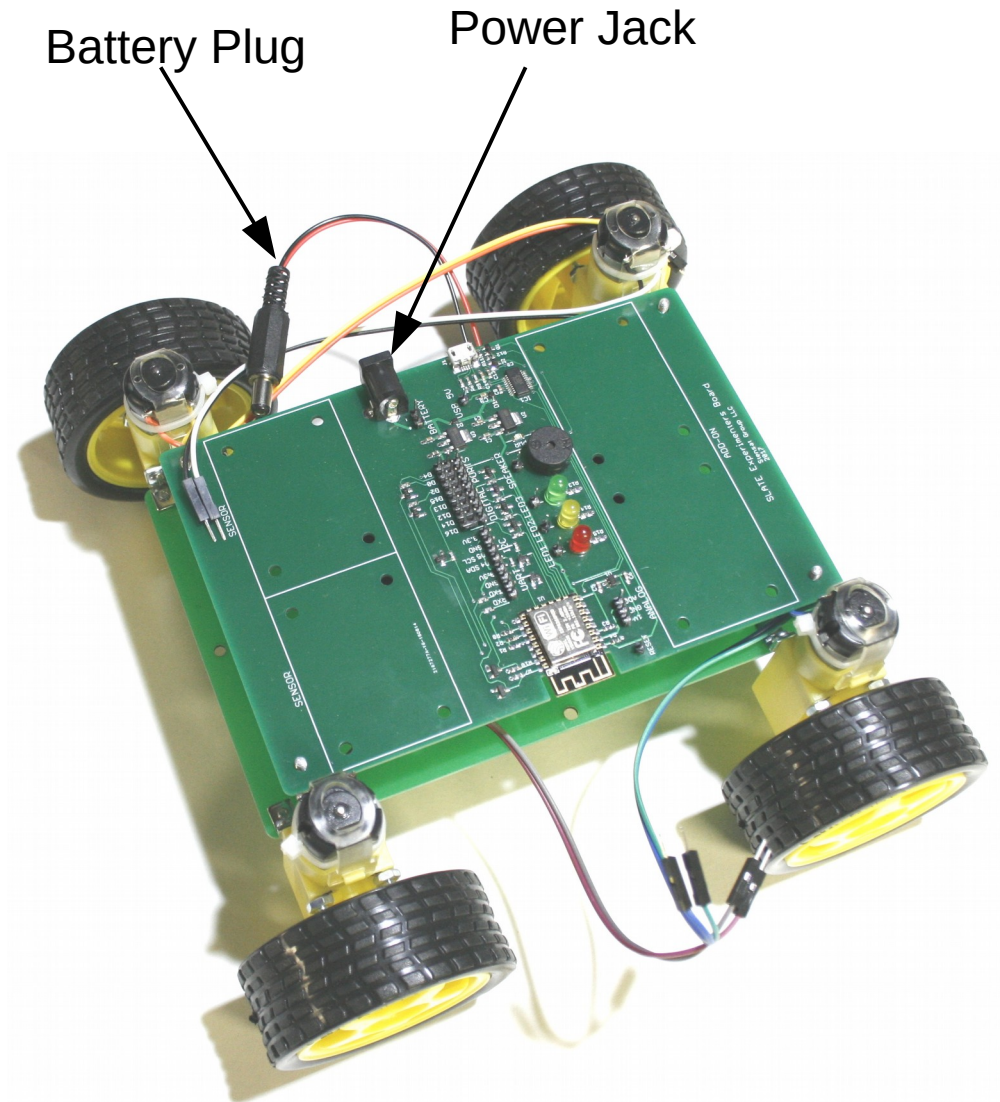
- Insert the four wheels onto the geared motor shaft. The shaft is shaped so the wheels need to be aligned with the shape of the shaft. Press fit the wheels onto the shafts.





# Mount the Electronics

- Orient the SLATE board so that the battery jack is on the same side as the battery plug.
- Place the SLATE board on the standoffs. Holes in the four corners will align with the standoffs.
- Secure with nuts.
- Plug the battery holder into the SLATE board power jack when you want to power by battery.



# End of Section

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