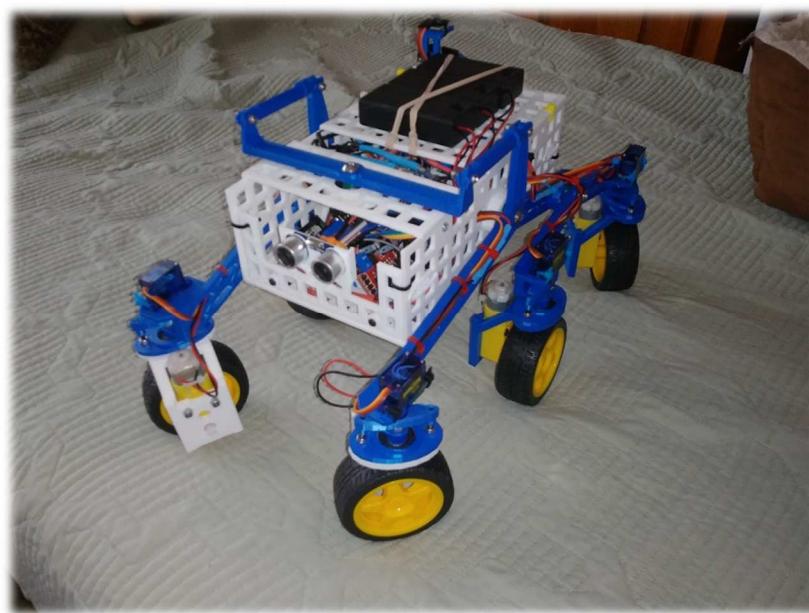
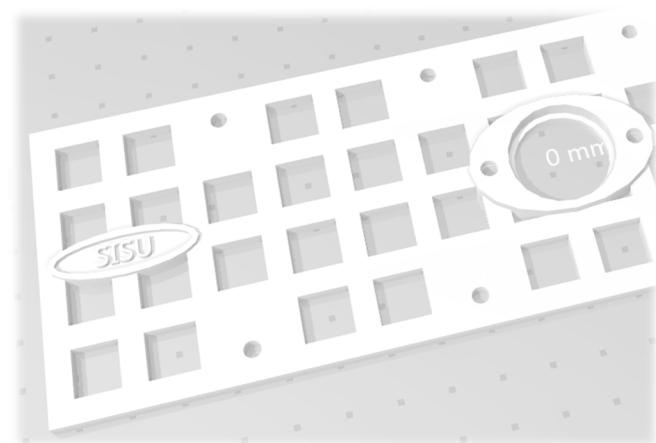


SISU-04

April 2022



SISU_04 Assembly

Date: 03-28-22

Last Rev: 04-17-22

By: DCC

SISU_04 – 6 wheel drive, 6 wheel steering, utility/rover cart with rocker-bogie suspension patterned after NASA Mars rovers Curiosity, and Perseverance. Infra-red (IR) remote control, ultrasonic distance sensor, buzzer, and RGB LED light.

L298Ns Wiring sketch Page 24

Sensors and Motors Wiring Sketch Page 25

Power Terminal Blocks Sketch Page 26

Hardware Connections List Page 27

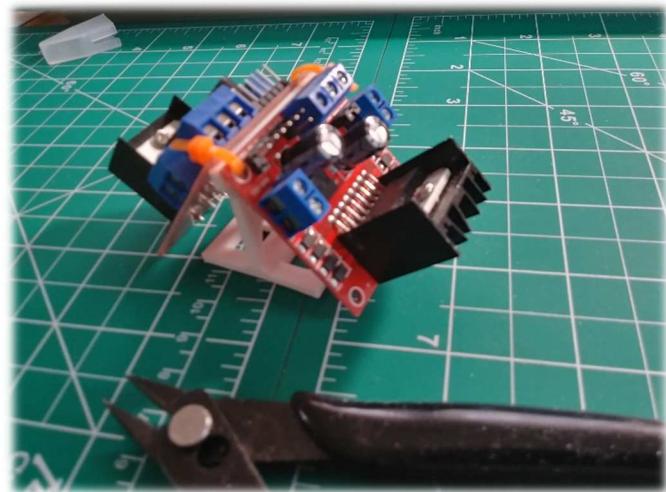
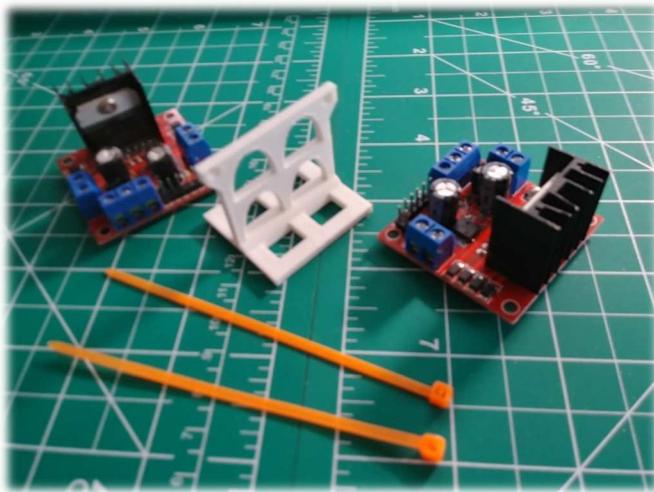
Remote Control Handset Buttons Page 30

Hardware List Page 31

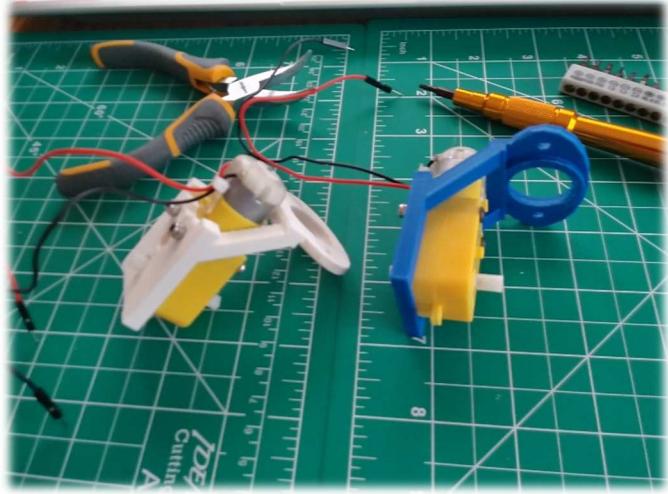
3D Print Files List Page 35

Arduino code Page 37

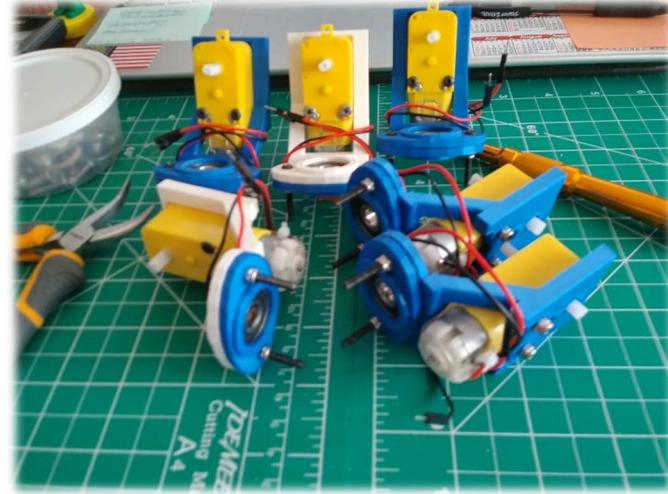
01) Mount two L298Ns to the “L298N_Brace” with zip-ties. Makes for more floor space on the “Base Plate” later helping with access to the wire connection points and hold-down screws.



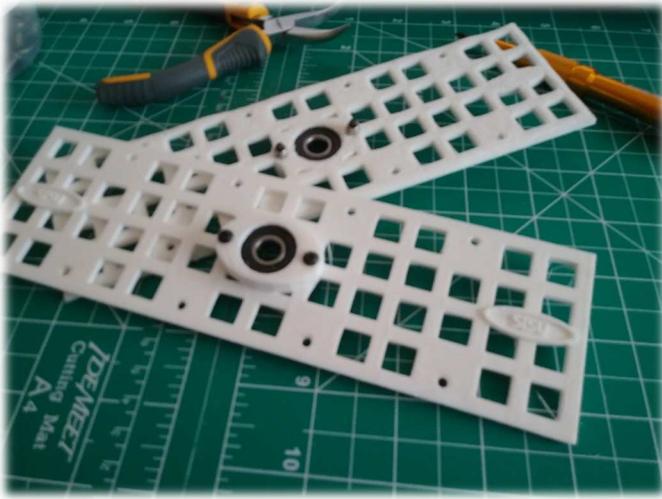
02) Mount 6 DC motors to "Motor Mounts" with 12 ea M3 x 25 pan/cap head screws and nylon insert lock nuts. Make sure wires and screw nuts are on the back side (not much clearance to the wheels on the front).



03) Secure bearings to 6 ea "Motor Mounts" and "Servo Bearing Cap" with 12 ea M3 x 25 pan/cap head screws with lock nuts. The protruding screws will insert into the "Servo Clips" for steering. "Bearing Caps" are slightly smaller than "Servo Bearing Caps". "Bearing Caps" are used later in the suspension.



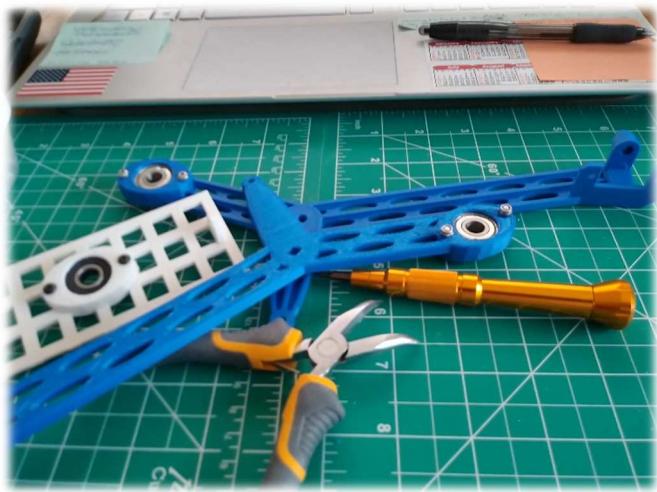
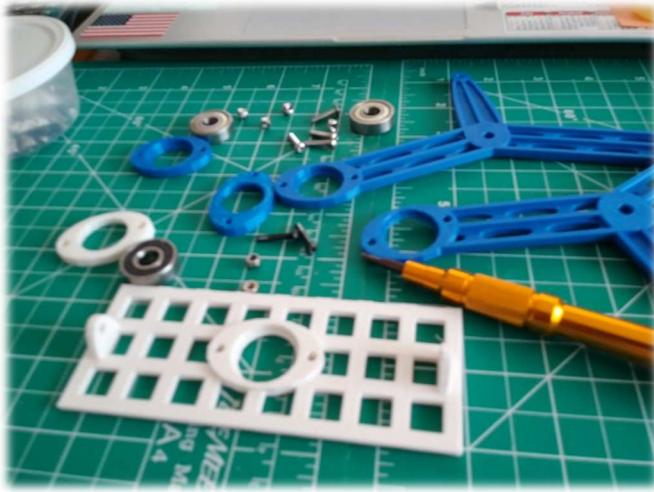
04) Mount 2 ea bearings to “Side Plates” with “Bearing Caps” and 4 ea M3 x 15 pan head screws with lock nuts. Head on outside where it is visible with screw end behind (and not protruding into the path of the rocker arms).



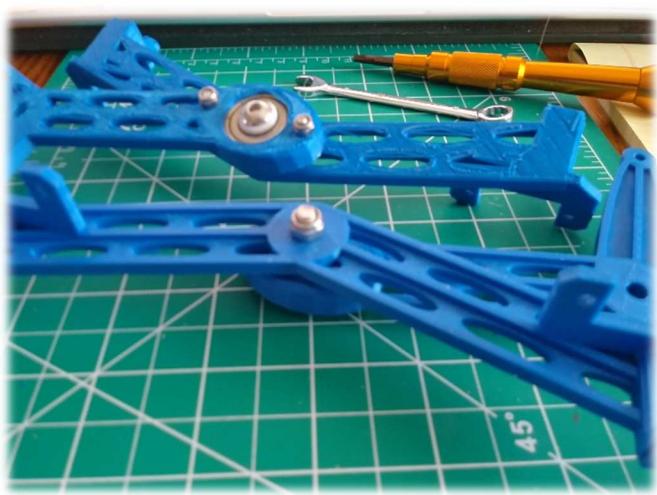
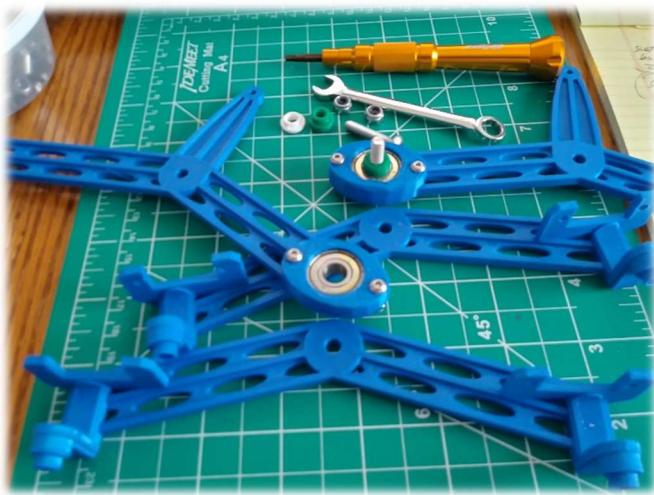
05) Super glue (cyanoacrylate) 6 ea servo horns (arms) to “Servo Clips” to facilitate steering. You will need to clip the tips off the servo horns (arms) to fit in the “Servo Clips”. Try to center the middle holes. Careful, no glue in the middle.



06) Attach 3 ea bearings to “Rocker Arms” (2 ea) and “Top Plate Bearing Pivot” using 3 ea “bearing Caps” with 6 ea M3 x 15 pan head screws with lock nuts.



07) Attach 2 ea “Bogie Arms” to 2 ea “Rocker Arms” using 2 ea M5 x 25 pan head screws with lock washers and “Bearing Hub – Thin” at head of screw and “Bearing Hub – Normal” between the arms. The thin bearing hubs are to center the bolts while the “normal” bearing hubs act as a spacer between the arms (can also use “Bearing Hub – Thick” here).

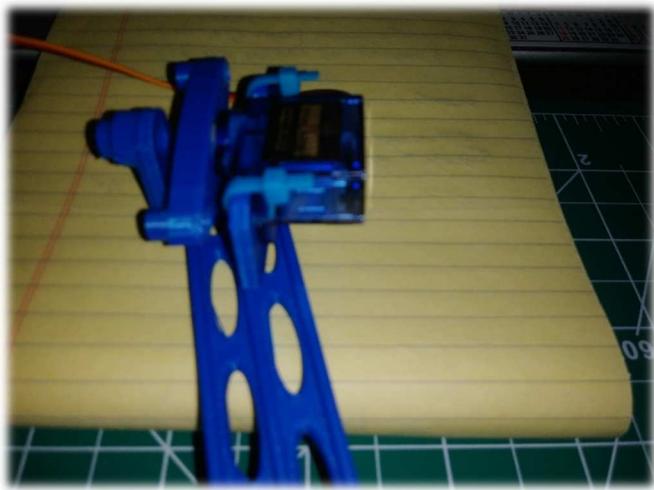
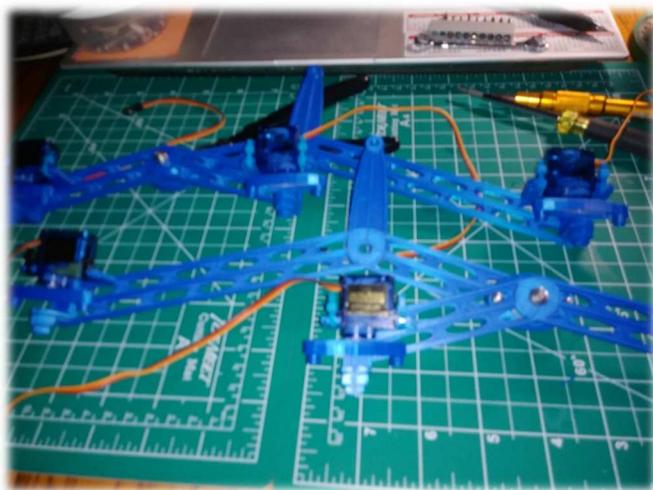


08) Test and set 6 ea servos to 90 degrees. Either very very carefully manually turn the servos to their stops and back to center them (their arc is about 190-200 degrees it seems) or use “**Servo Test And Set**” available on “Thingiverse” or “Thangs”. Mount 6 ea “Servo Clips” with servo horns (arms) attached inside to their servos aligned along 90 degrees using the hub screws included with the servos (larger of 3 screws). Should be approximately straight along the spine of the servo.



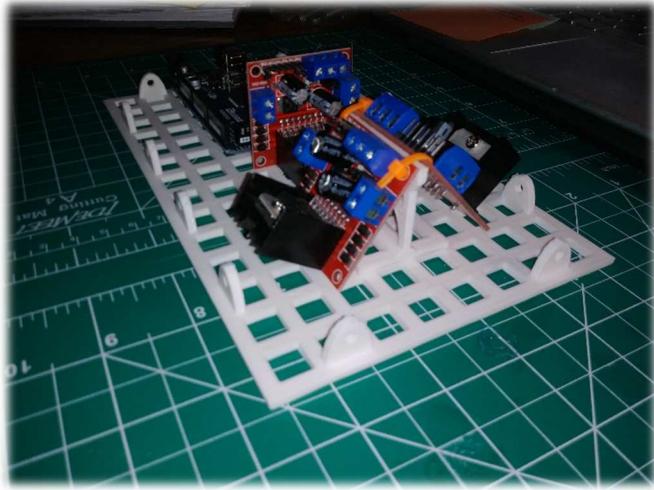
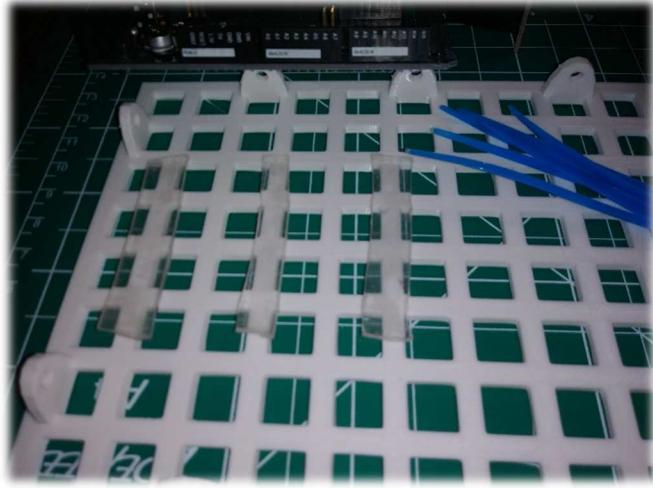
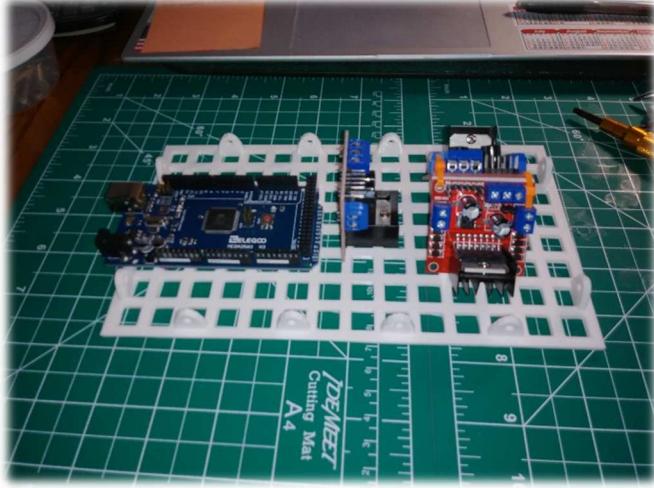
09) Attach 6 ea servos to the rocker and bogie arms with 12 ea small zip-ties. Attach zip-ties as shown so they can be drawn up snug, holding the servos in place without wiggle room. You can also mess around with 12 ea tiny M2 x 15 pan head screws and lock nuts but the zip ties work easier. Use another color zip-tie for contrast if you are going to take a picture. Align the servo axis with the center hole of the steering hub. I put at least one on backwards every time. Servo mounts go on top of the brackets on the arms or there won't be room later to attach the DC motors in their holders.

You may find it easier to postpone attaching the servos until after step #13. I prefer this way but you may find waiting on the servos to be easier.

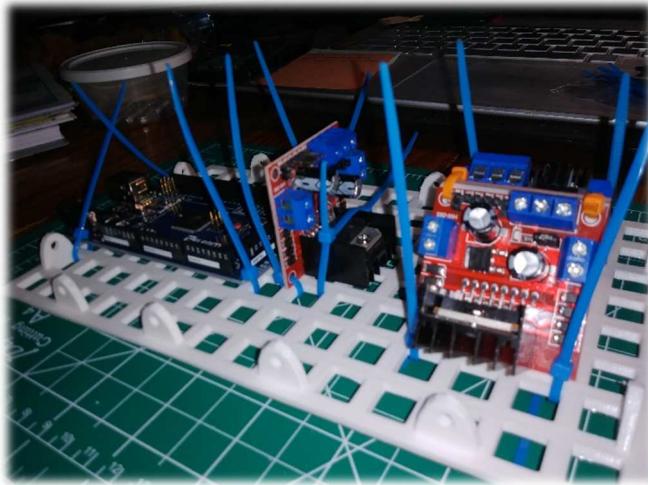
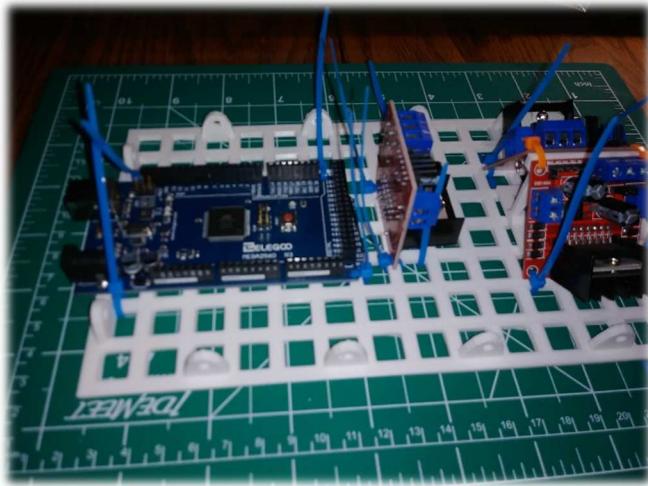


10) Arrange and set up devices on the “Base Plate” and put a couple short strips of PU tape (I don’t know the real name – thick clear cushion sticky both sides) under the “Arduino Mega 2560”. Attempting to allow clearance for the horizontal plug-ins on the L298Ns.

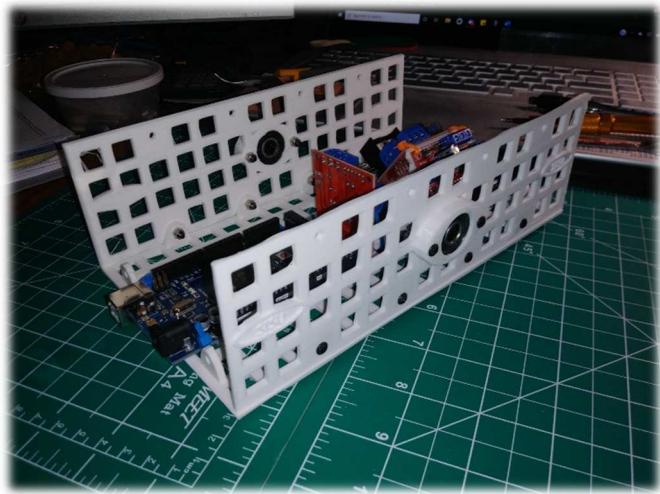
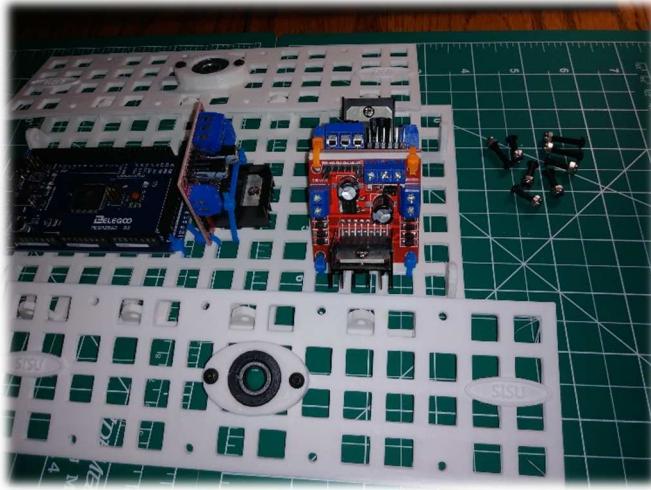
See the bold line in Step #20 around page 16.



11) Attach components to Base Plate with 14 ea zip-ties. Careful with location of catch and tail piece to keep them out of the way of wiring. **See the bold line in Step #20 around page 16.**

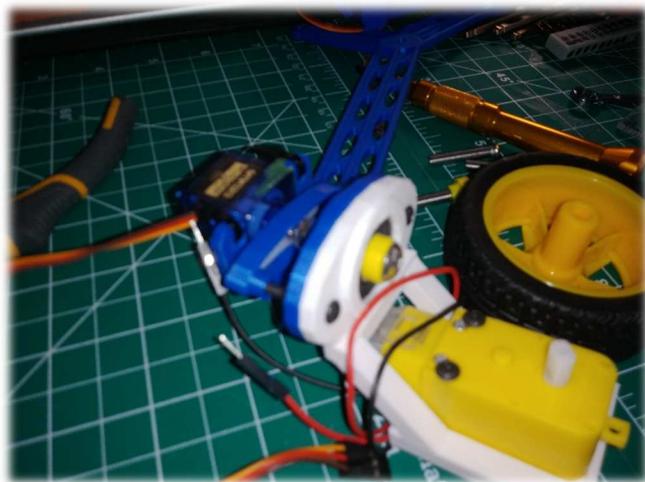


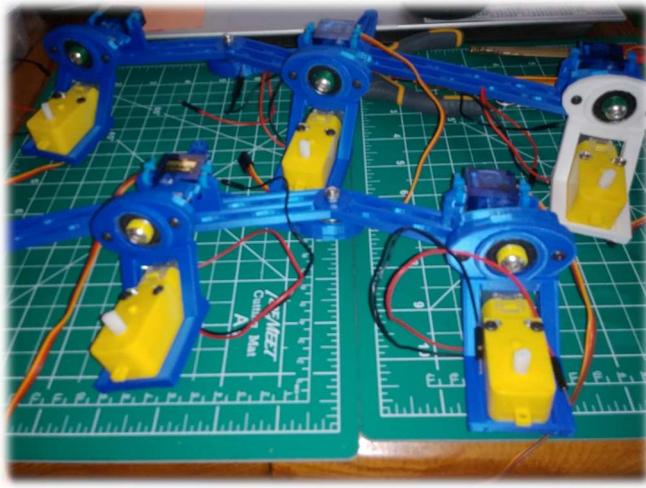
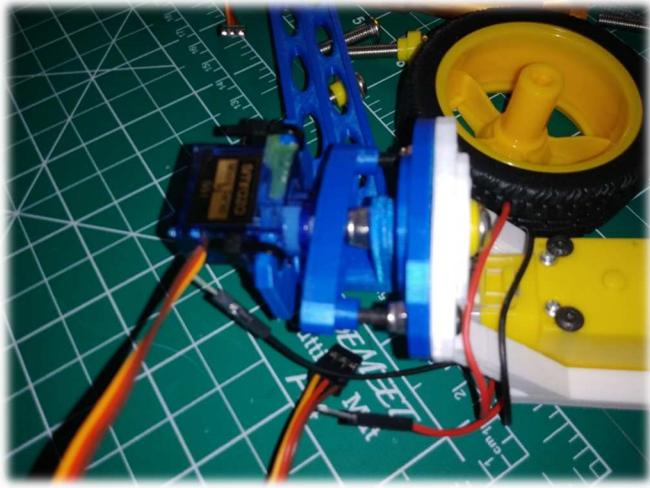
12) Attach 2 ea “Side Plates” to “Base Plate” with 8 ea M3 x 10-12 pan head screws with lock nuts. You can do some of the wiring first but then it covers access to hold the nuts on the screws. Also, having the sides on makes you constantly think about space constraints and trying to keep wiring short and organized. Make sure the ‘SISU’ is right side up.



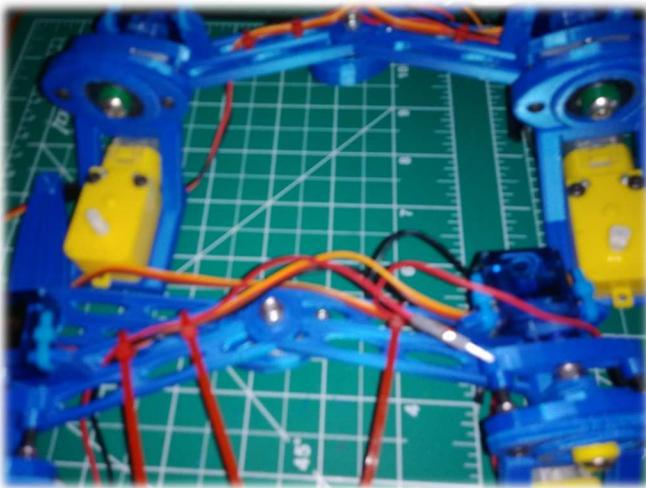
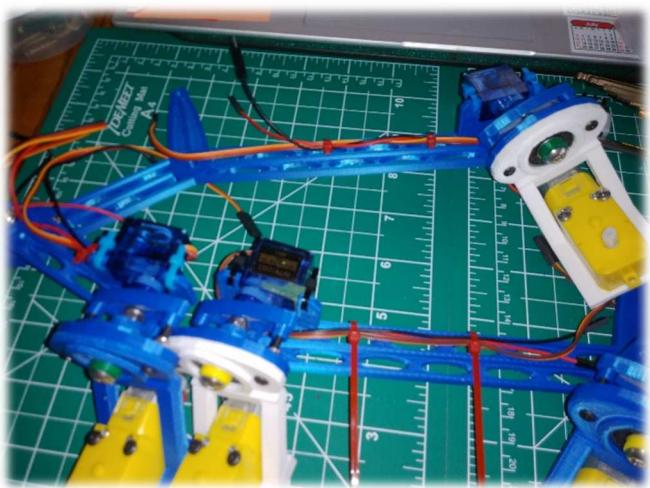
13) Attach 6 ea wheel assemblies (DC “Motor Mounts” with bearings) to “Rocker and Bogie Arms” using 6 ea M5 x 25 pan head screws, lock nuts, and _Bearing Hubs – Norm”. This allows the weight and stress of the connection between utility cart and wheels to be borne by the bearings rather than the servos themselves and still allow the servos to turn/steer the wheels.

Thicker or thinner bearing hubs may cause clearance problems between head of screw and wheel tire or end of screw with nut and servo horn (arm). You earn your keep getting the lock nuts started threading on the screws. Suggest grabbing the lock nut with needle-nose pliers firmly, inserting into “Servo Clip” alongside servo axis, then moving nut sideways over the hole from the “Motor Mount”. Then start threading/turning the screw until it grabs. Then flathead wrench and hex key to tighten. May find it easier to mount servos last.





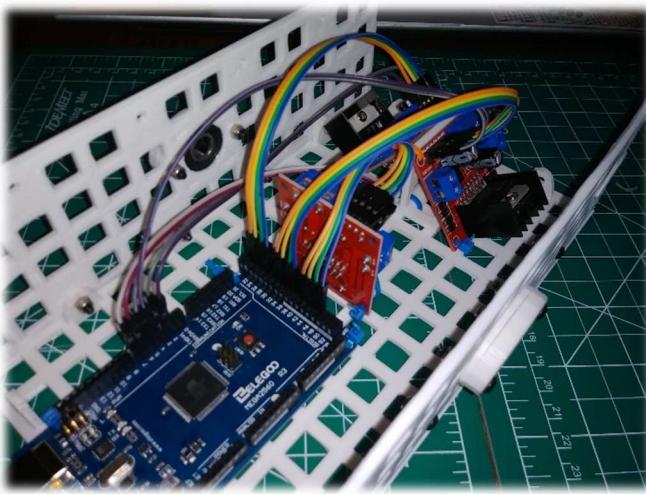
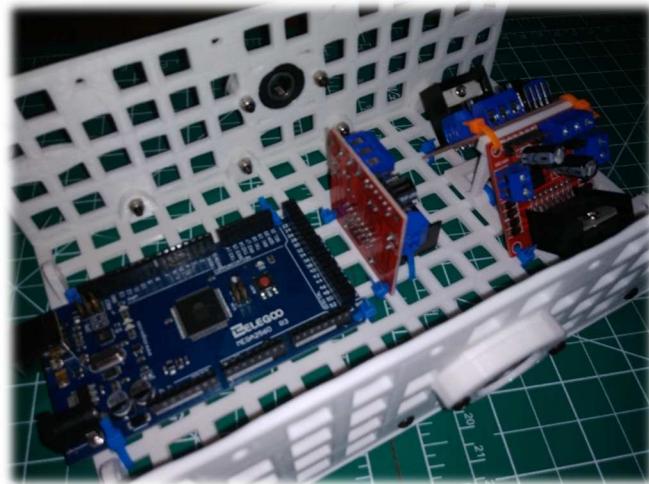
14) Suggest taking time to zip-tie some of the wiring where possible on the “Rocker/Bogie Arms” to help keep them out of the way a little. Be uniform with the catch and tail end positions to keep it relatively neat. Don’t go too far until the Arms are mounted on the “Side Plates” and you can judge the range of motion/slack needed.



15) I like to start the wiring now by adding control wiring from the L298N motor drivers to the Arduino MEGA control board. Will later (after Step 16 when “Rocker-Bogie Arms” are installed) add the power/running wires between the DC motors and the L298Ns while it is more open in the chassis with the “End Plates” off allowing easier access to the screw terminals. See the wiring sketches at the end of this manual.

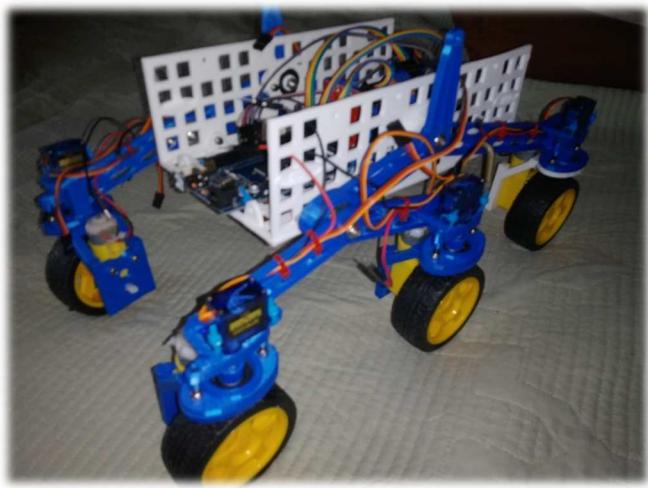
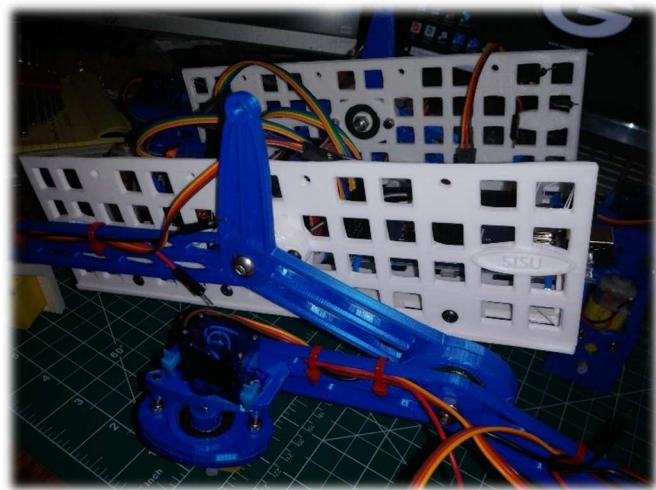
Have plenty of “Dupont” (jumper) cables available to organize lengths and colors. Some spiral “cable wrap” can also be useful once you reach the point that the chassis looks like a rat’s nest.

To help keep organized, match colors to those that come standard on the hardware (such as brown-red-orange on the servos) and purpose, among the items (like purple-gray on the A & B terminals on the L298Ns). Also, it’s better to have the jumpers a little too long than a little too short. Leave the Dupont cables attached to each other until you need to separate them, and then only as much as necessary to reach their connection points.



16) Attach “Rocker-Bogie Arms” to the “Side Plates” using 2 ea M5 x 25 pan head screws with lock nuts plus both “Bearing Hub – Thin” at inner nut end and “Bearing Hub – Normal or Thick” between “Rocker Arm” and “Side Plate (to provide clearance). This step is to put the motors and servos in place to get correct lengths to start wiring.

Added the wheels to the DC Motors and a couple hex wrenches through the “Side Plate” to help stabilize the chassis while doing wiring. Can also sit it on a narrow box.



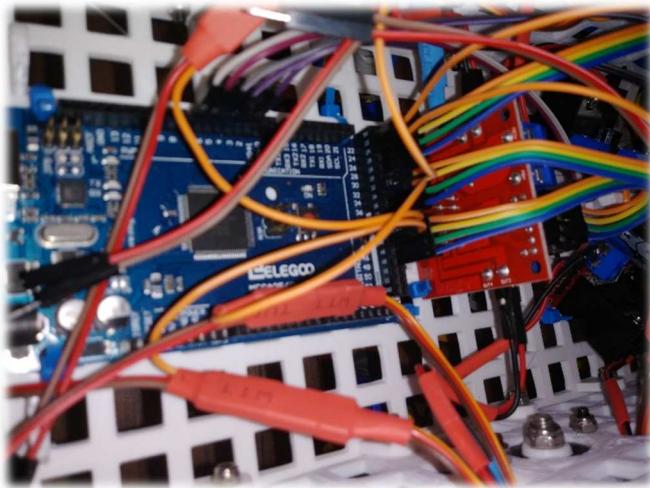
17) Starting motors/servos wiring. Some trial and error figuring out best cable lengths and where to route them.

Also trying some shrink wrap tubing at the Dupont cable connectors to help hold them together. Didn't see the need to actually solder connections nor string continuous wiring with connectors added to end only (I don't like attaching/playing with those tiny connector pieces). Also added some cut up lengths of tiny shrink wrap to try in place of spiral cable wrap on pairs or groups of loose wires.

Started with the black-red pairs from DC motors to the L298N drivers. Stick to a pattern with the wire colors as it will help find the problem later when one or more wheels turns backwards instead of frontwards. In this case I kept motor drive wires as black & red pairs just like they come on the motors. Then connected black to odd numbered L298N terminals (1 & 3) and red to even numbered terminals (2 & 4).

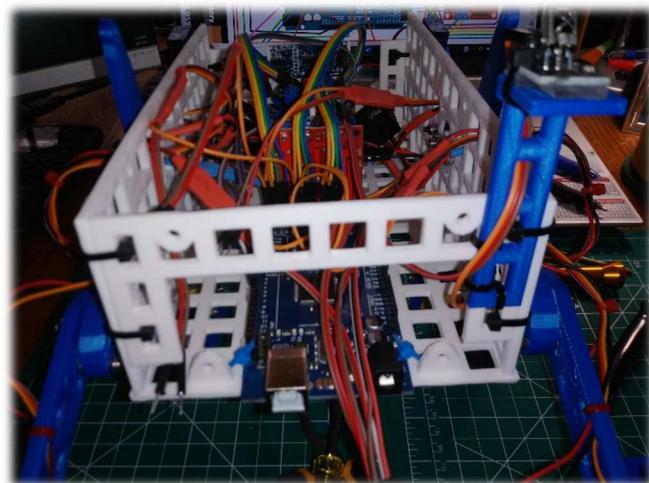
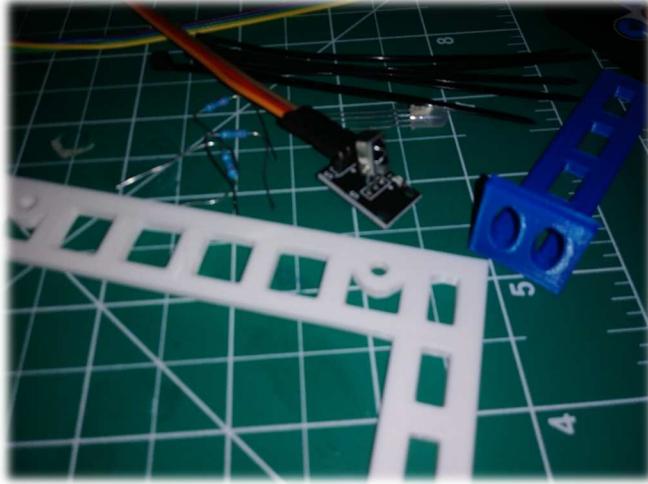


18) Then the yellow/orange data wires from the servos to the Arduino MEGA. Pics below show the shrink wrap on the brown-red-orange bundles from the servos and how the number of power and ground pairs will become an issue to keep organized without pulling the orange signal wires out of the Arduino when you try to wire the power.



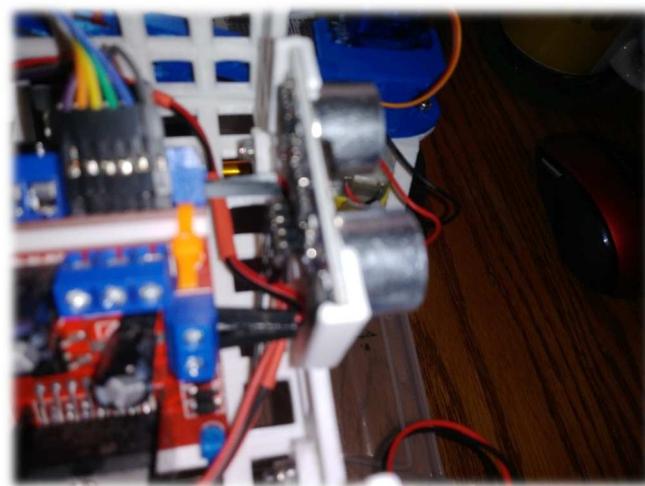
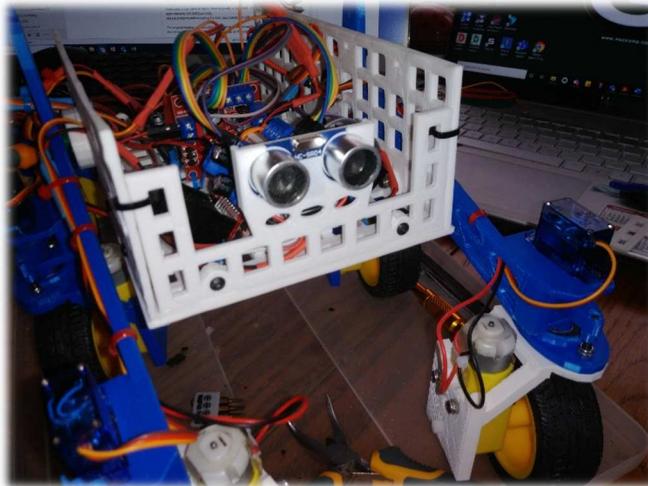
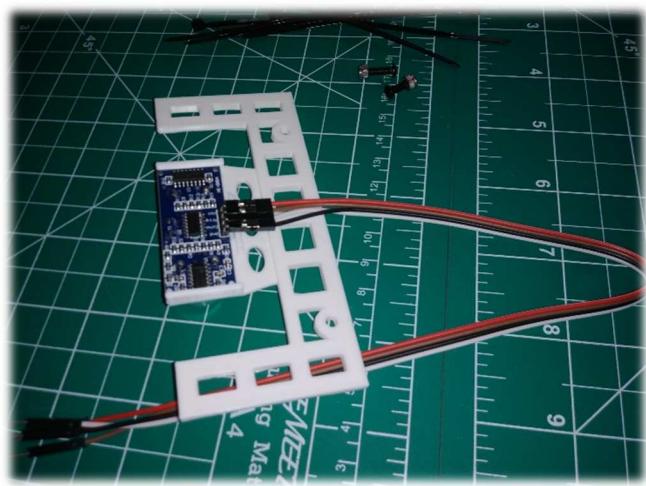
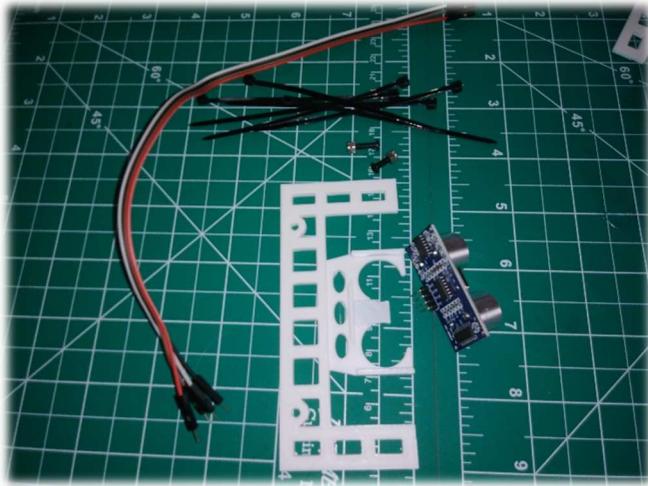
19) Next, attach “IRmast_Narrow” to “EndPlate_Small” with zip-ties. Using small piece of PU tape and zip-ties, attach IR receiver and Mounted RGB LED to “IRmast_Narrow”. LED not shown in photos yet.

Then attach power, ground, and signal feed wires to the IR receiver and LED. Mount the “EndPlate_Small” to the “Side Plates” with zip-ties on the sides (screws and nuts to the “Top Plate” will come later. Finish connecting the signal wires to the Arduino MEGA (1 from the IR receiver and 3 from the LED). During this assembly I switched to a mounted LED with built in resistors.



20) Then attach the HC-SR04 ultra sonic sensor to the “EndPlate_HCSR04” (should just snap in place) followed by the power, ground, and 2 sensor wires (double check length as they have a long way to go up near the Arduino – I used 12” ones). Attach the “EndPlate_HCSR04” to the “BasePlate” with 2 ea M3 x 10 crews with lock nuts and zip-ties at the sides. Plug in the 2 sensor wires to the Arduino.

Note how jammed the L298N red-black pair of connections are against the “EndPlate_HCSR04. **The L298N mounted drivers should be moved one grid square further toward front to allow more space here. Allow 2 grid squares worth of space between edge of L298N and “End Plate_HC-SR04” sensor. Looks like we planned to in Step 06 but it didn’t happen.**

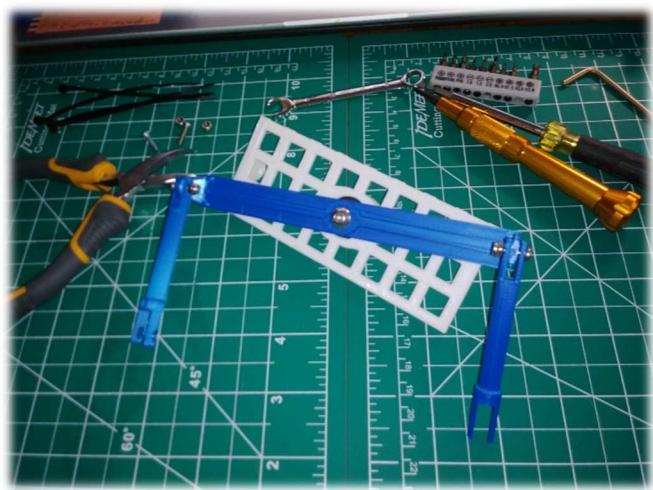
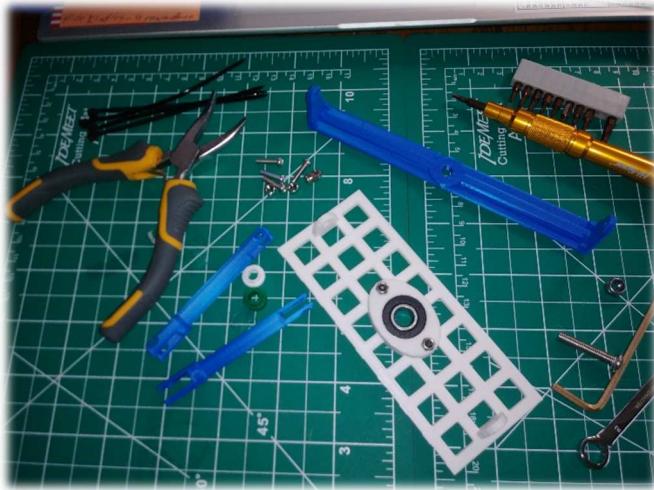


21) Attach the “Rocker Pivot Arm” to the “Top Plate - Bearing Pivot” with a M5 x 25 screw, lock nut, plus “Thin & Normal Bearing Hubs”. Note the M3 x 15 screws installed to hold the top pivot bearing back in Step #06 need to face the interior to allow clearance for the “Pivot Arm” to move. Had to switch mine at this point.

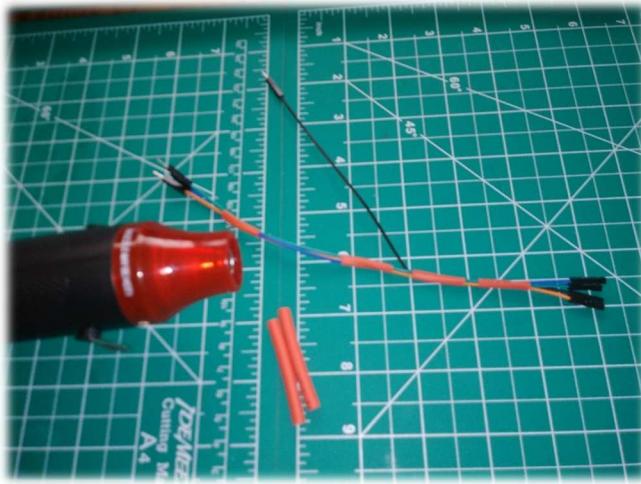
Then install the narrow end of the “Rocker Connectors” (flat side down) to the “Rocker Pivot Arm” with M3 x 15 screws & locknuts, nuts on the inside, and leave just a little loose so the “Pivot Arm” can move.

Attach the “Top Plate – Bearing Pivot” to the “Side Plates” with M3 x 10 min. screws & lock nuts. Some long narrow needle-nose pliers or forceps are handy here to hold the nut while beginning to thread.

Then finish attaching “Rocker Connectors” to the “Rocker Arms” with M3 x 15 screws & lock nuts and again leaving a little loose.



22) Couple wiring examples below. Example of shrink wrap on RGB LED leads with ground plus Active Buzzer wires. Usually plug buzzer directly into pin 11 and ground (fits well plus stays in and out of the way) but we are using pin 10 so there isn't enough room to securely jam both the buzzer and pin connector adjacent to one-another.



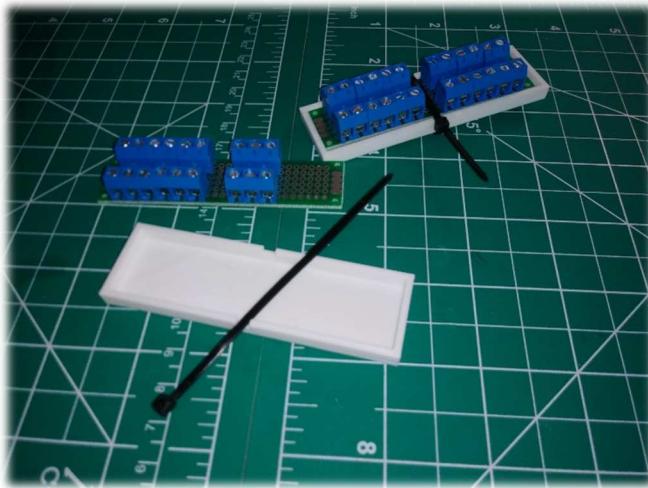
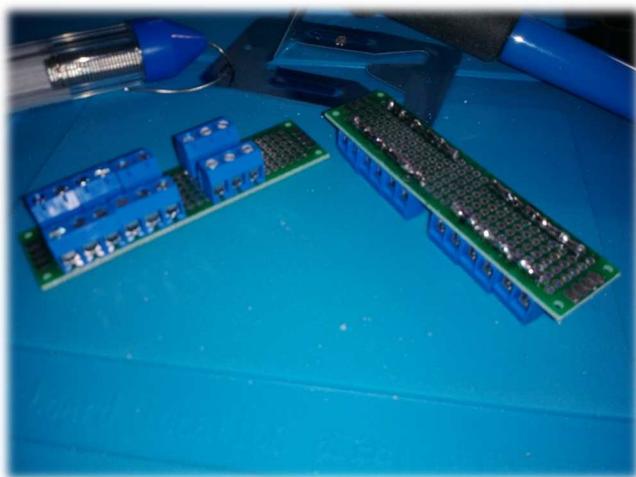
23) Build the power connection prototype board by soldering terminal blocks to be used to feed power and ground to the various elements. This will save headaches later from power wires coming loose. I also tried low temp solder wire groups for the power connection but this makes the rat's nest of wiring worse.

Below are planned power connections:

- a) Front Battery Box
 - i). Left front L298N driving front two DC Motors
 - ii). Left and right front Steering Servos
 - iii). HC-SR04 Ultrasonic Distance Sensor
 - iv). Common ground
 - v). Feed from Front Battery Box
 - vi). Common Grounds to other two Terminal Blocks
- b) Middle Battery Box
 - i). Right front L298N driving middle two DC Motors
 - ii). Left and right middle Steering Servos
 - iii). Arduino MEGA 2560 with Active Buzzer
 - iv). RGB (red-green-blue) LED (power is fed from PWM pins)
 - v). Common ground
 - vi). Feed from Middle Battery Box

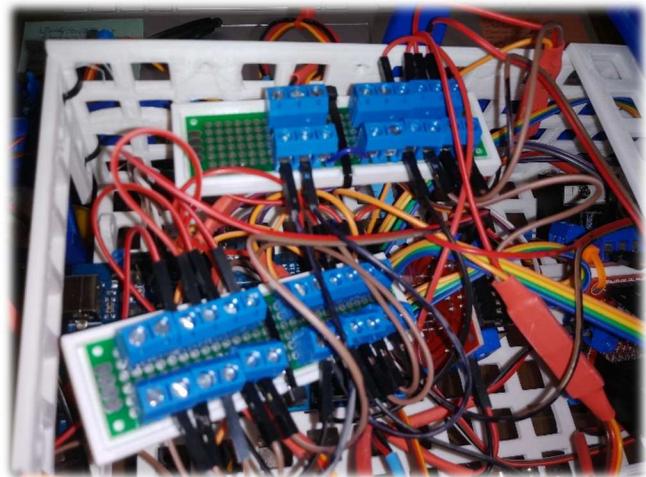
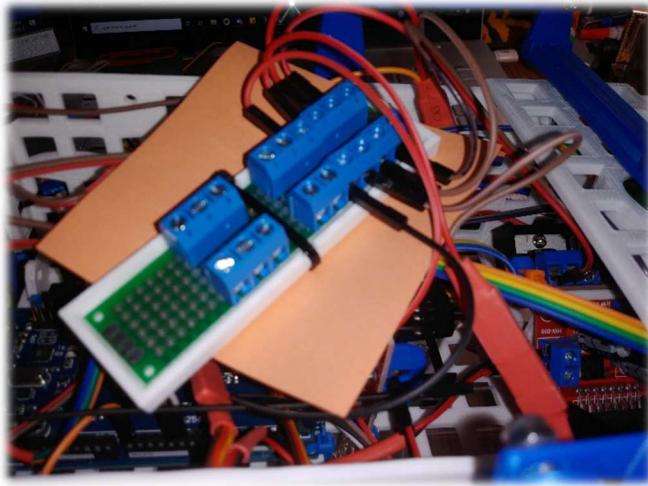
c) Rear Battery Box

- i). Rear L298N driving rear two DC Motors
- ii). Left and right rear Steering Servos
- iii). Infra-red (IR) Receiver
- iv). Common ground
- v). Feed from Rear Battery Box



24) Systematically and slowly connect the signal wires only, from servos, sensors, etc. to the appropriate Arduino MEGA 2560 pins. See the wiring sketches and Hardware List which also notes connection pin numbers. Make sure each is secure and route the wires where they can be a little out of the way and subject to less jostling and pulling as further wires are worked in.

Then lay the Power Terminal Blocks Trays on top of the cushion of wires toward rear of the SISU_04. Easier to work with than if they were secured somewhere. If this bothers you, zip tie them to the bottom of the “Top Plate - Large” where the batteries will be on the outside. Systematically and slowly connect each power and ground lead from the motors, sensors, etc. Again, see the wiring and terminal blocks sketches.

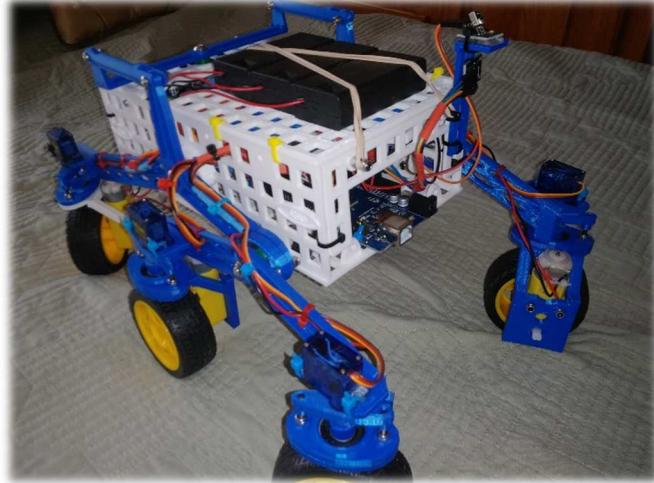
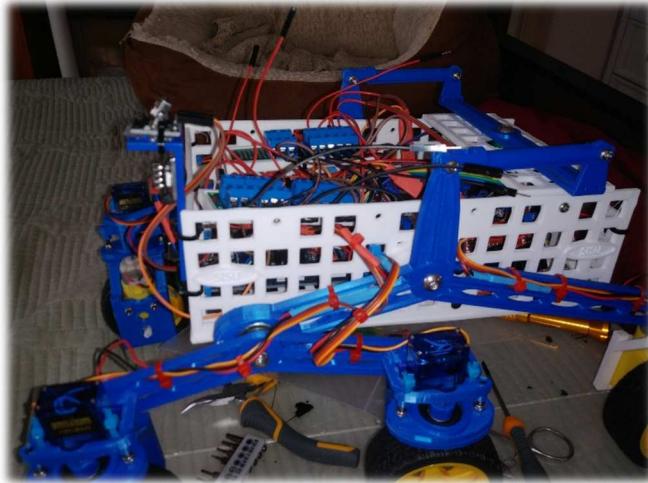


25) Attach the red-black wire pairs from the **empty** Battery Boxes to the appropriate terminals. I used Dupont connector wires for this so they can be easily disconnected later if need be. See the Power Terminal Blocks sketch.

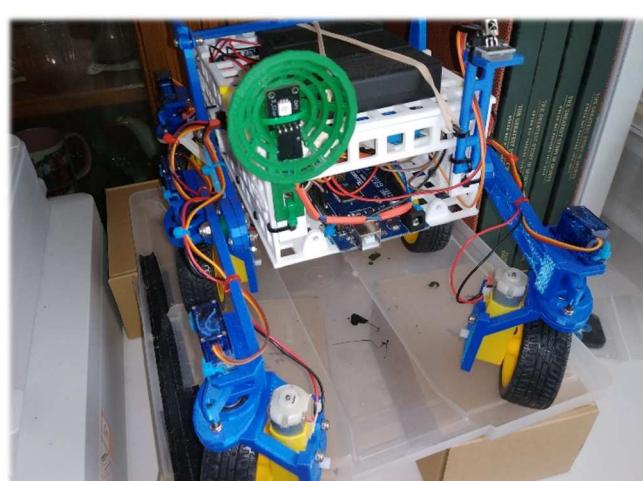
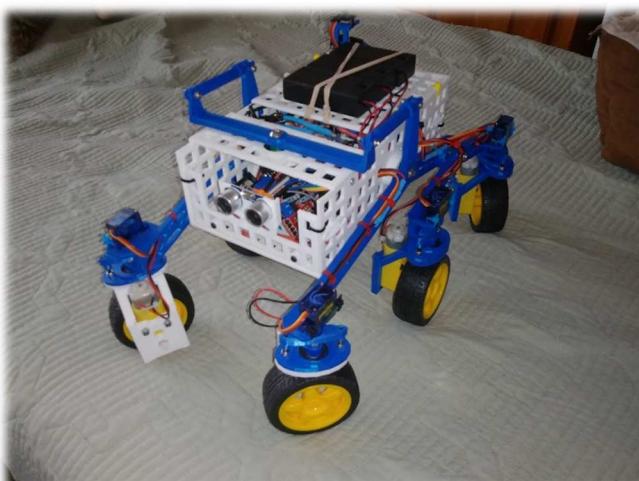
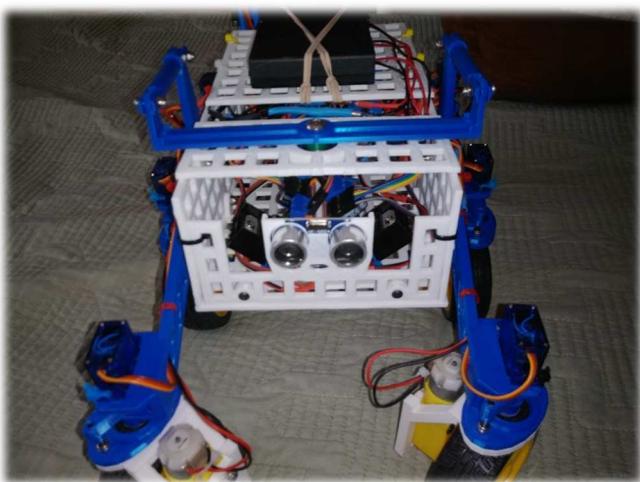
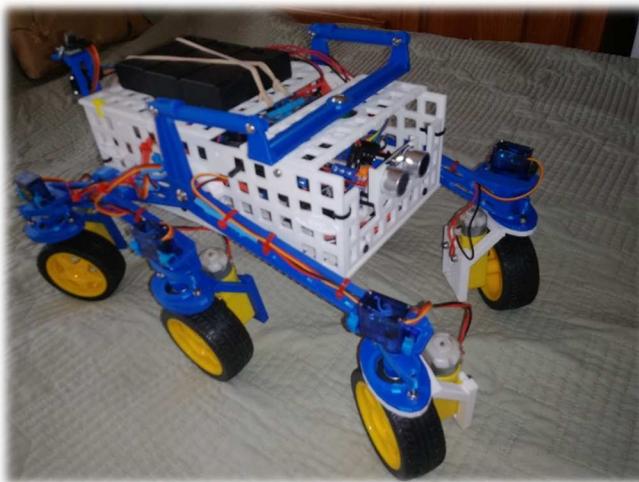
Attach the “Top Plate – Large” to the “Rear Plate” already mounted on the SISU_04 with 2 ea M3 x 20 screws and 4 ea lock nuts. The second lock nut on each is attached to the end of the screws for looks only (instead of just a plain screw end). These provide a quick release hook-on point for the rubber bands that will hold down the Battery Boxes.

If you installed the “Rear Plate” with 4 zip-ties back in step #19, snip the top 2, allowing the “End Plate” to tip back a bit so the M3 x 20 screws can be slipped in and the lock nuts tightened.

I then added zip-ties to the “Side Plates” to secure the “Top Plate”. If you are good holding a nut with the forceps, use M3 x 15 or 10 screws and lock nuts instead.

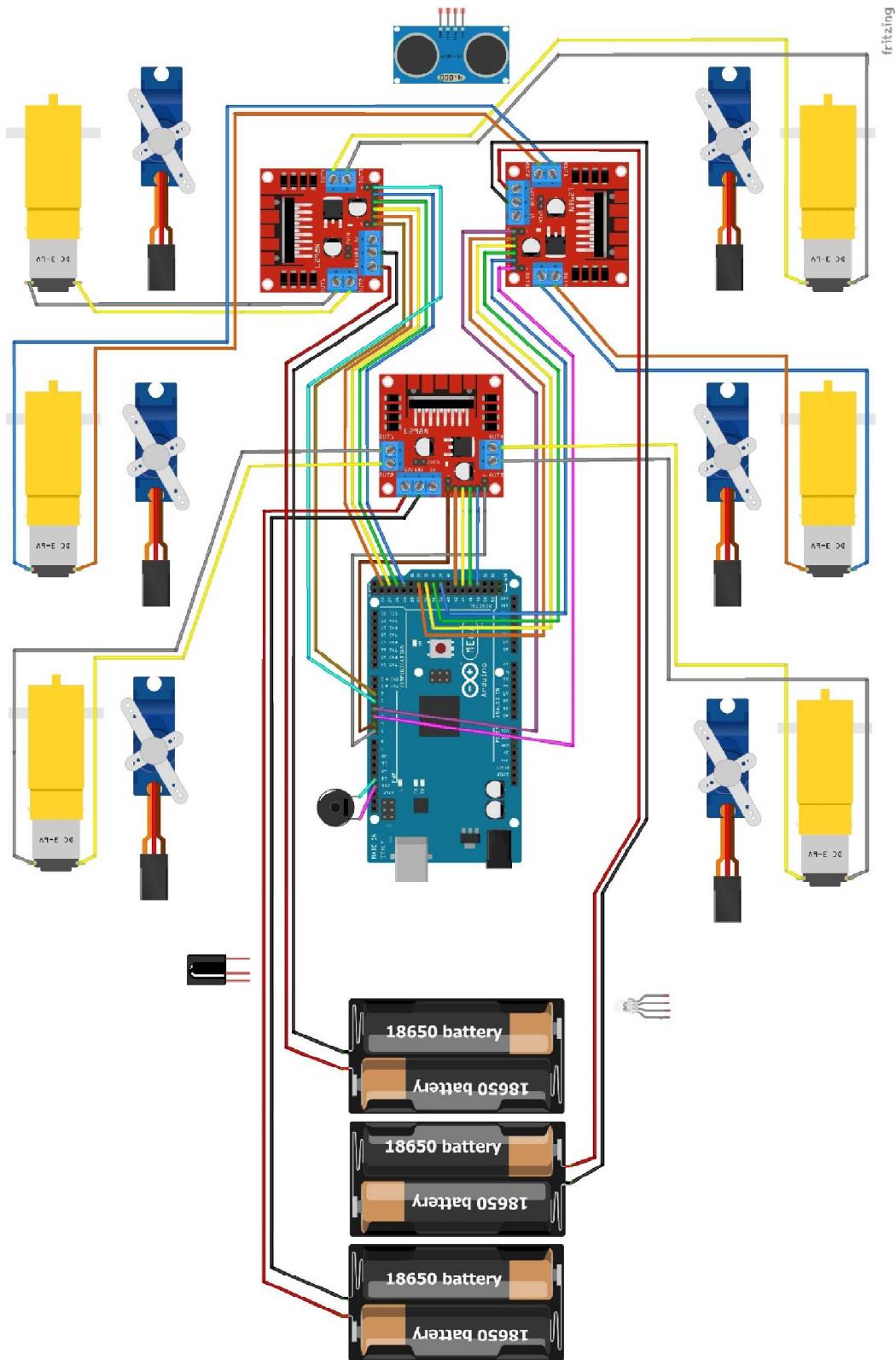


26) Make sure the battery boxes are each switched to the “OFF” position and insert your LiPo batteries. Secure the battery boxes with rubber bands. DONE, at least with this part. Now you hope all your wire connections are secure so you don’t have to hunt for a fault at start-up.

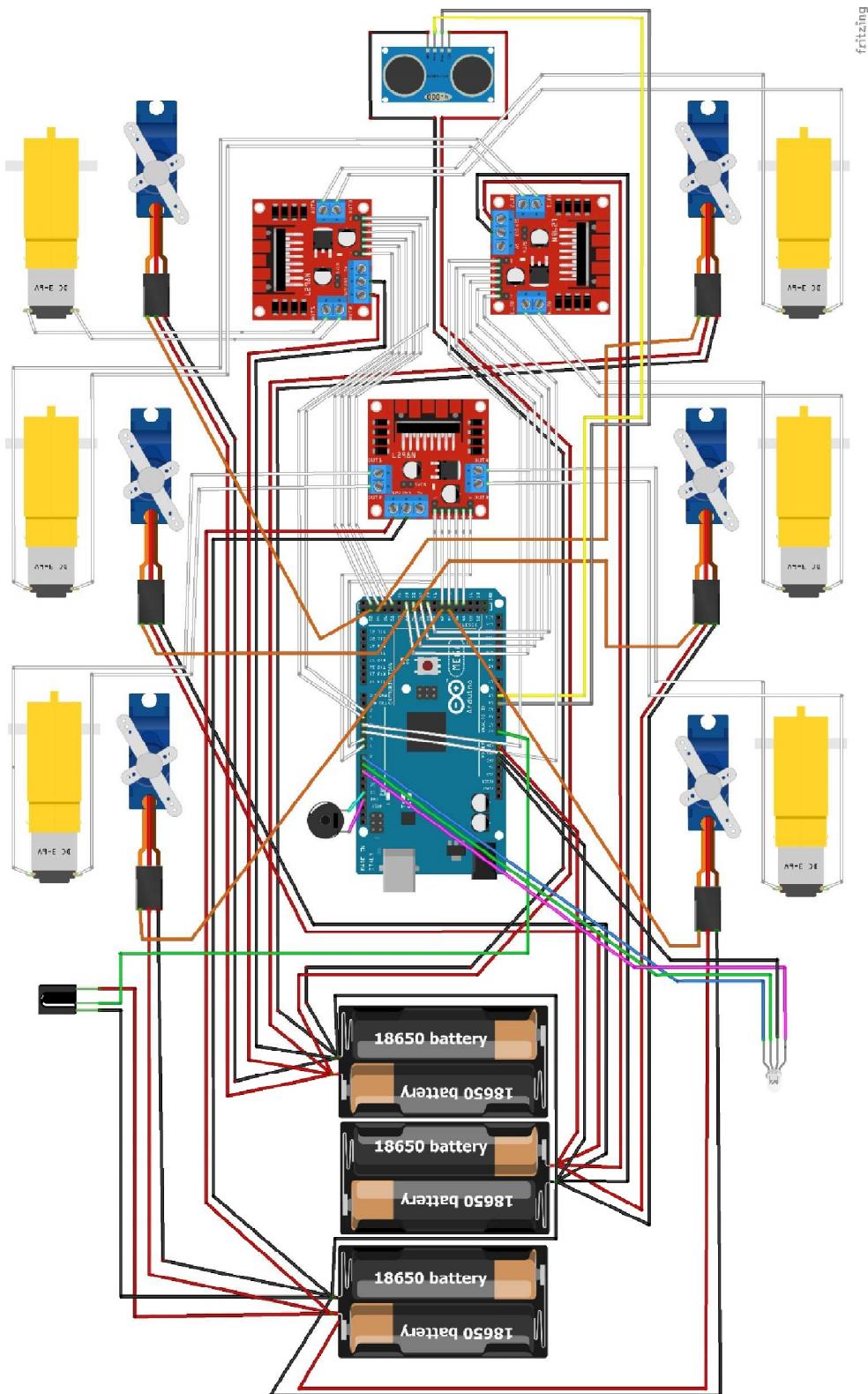


Late add – Dish Mast for rear for LED or IR receiver

SISU_04 - L298N's Wiring

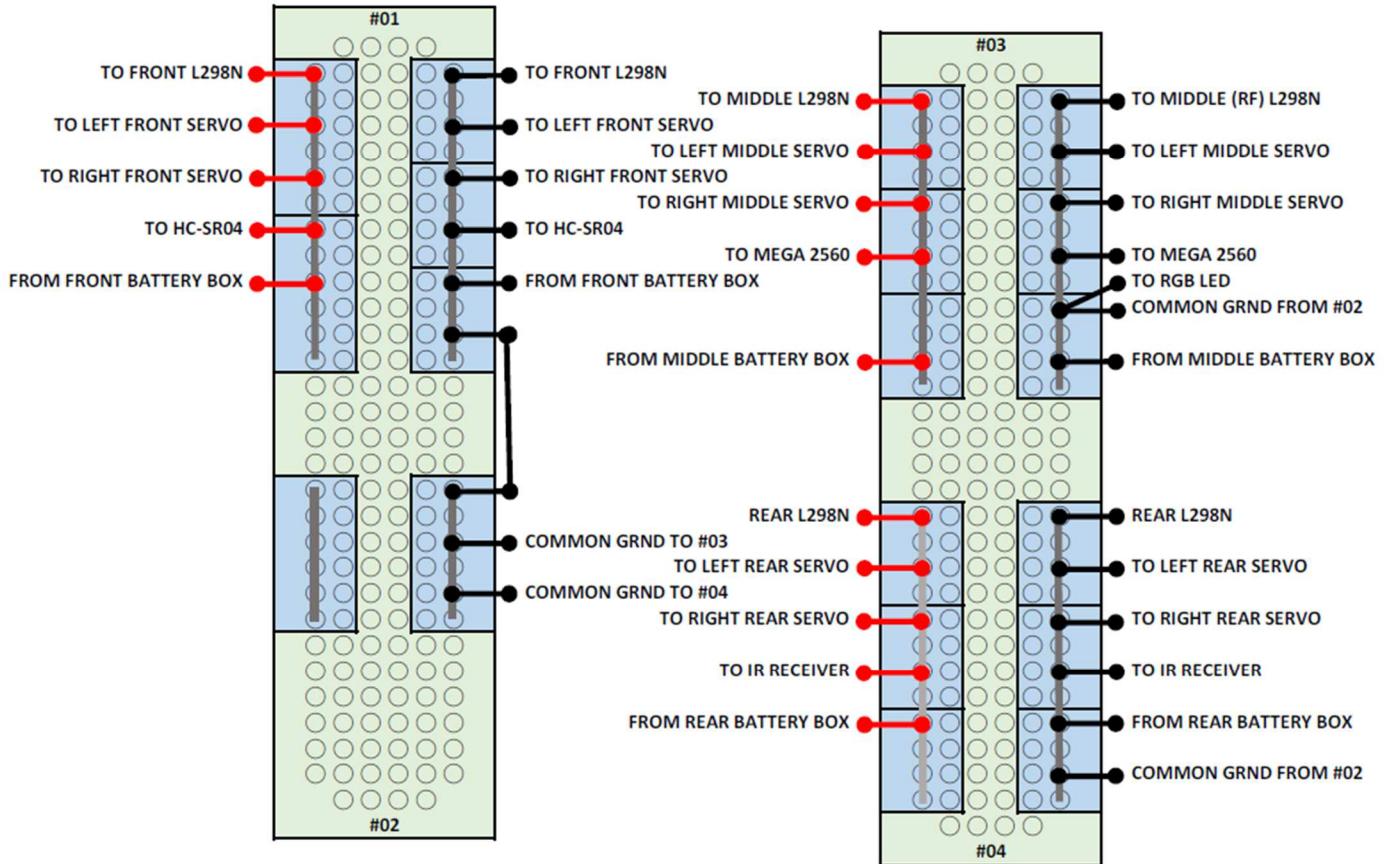


SISU_04 - Servos and Sensors Wiring



SISU_04 - Power Terminal Blocks

POWER TERMINAL BLOCKS



X

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SISU_04_Hardware (& Connections)

02-15-22

Last Rev. 04-07-22

By: Dave C.

6 wheel drive with 6 wheel steering utility cart with rocker-bogie
suspension inspired by NASA 'Curiosity' & 'Perseverance' Mars Rovers.

HARDWARE

Power

- ___ 3 Switched LIPO 2 Battery Packs (14500s or 18650s) - Front-Middle-Rear
- ___ Power and Ground to Each Motor (via L298Ns) and Servo - Paired Front-Middle-Rear
- ___ Power and Ground to HC-SR04 Ultrasonic Distance Sensor from Front Battery Pack
- ___ Power and Common Ground to MEGA 2560, Buzzer, & LED from Middle Battery Pack
- ___ Power and Ground to InfraRed (IR) Receiver from Rear Battery Pack
- ___ Power and Ground Leads to Soldered Branches to Motors, Servos, MEGA, etc.

DC Motors with Wheels

- ___ Inexpensive 3-6V, geared side drive, DC motors, usually yellow, Approx. 90-200 RPM, with 65mm wheels
- ___ motorLF = Left Front DC Motor
- ___ motorRF = Right Front DC Motor
- ___ motorLM = Left Middle DC Motor
- ___ motorRM = Right Middle DC Motor
- ___ motorLR = Left Rear DC Motor
- ___ motorRR = Right Rear DC Motor

L298N Motor Drivers

- ___ L298N_F = L298N for Front Motors (located left front of chassis)
- ___ L298N_M = L298N for Middle Motors (located right front of chassis)
- ___ L298N_R = L298N for Rear Motors (located middle of chassis)

Steering Servos

- ___ Inexpensive SG90 servos, 180 degrees, nylon gears, usually blue like "Tower Pro"
- ___ ServOLF = Left Front Steering Servo
- ___ ServoRF = Right Front Steering Servo
- ___ ServoLM = Left Middle Steering Servo
- ___ ServoRM = Right Middle Steering Servo
- ___ ServoLR = Left Rear Steering Servo
- ___ ServoRR = Right Rear Steering Servo

Arduino MEGA 2560

L298N DC Motor Drivers

HC-SR04 Ultrasonic Distance Measuring

IRRec - Infrared Remote Receiver (with remote control)

Active Buzzer

3 Color RGB LED – mounted with built in resistors

Assembly Hardware

- ___ 11 ea m8 x 22 x 7T bearings (608-2RS) for wheel support/steering and rocker-bogie suspension
- ___ 11 ea m5 x 25 pan/cap-head Screws for bearings (flathead also works & allows screw to center in bearing)
- ___ 16 ea m3 x 10 pan or cap head screws for connections between structural parts
- ___ 15 ea m3 x 15 pan or cap head screws for bearing caps/clamps on rocker/bogie arms & rocker top pivot & Rocker Connectors
- ___ 2 ea m3 x 15 pan or cap head screws to protrude and provide connecting point for battery straps
- ___ 2 ea small rubber bands to serve as battery straps
- ___ m2.5 x 25 pan or cap head screws to attach motors to motor mounts
- ___ m3 x 25 pan or cap head screws for mounting on servo bearings to protrude into bearing clips
- ___ Small zip-lock cables for securing cables and some structural members including servos
- ___ Small roll Polyurethane (PU) tape to support/cushion Arduino to base plate
- ___ Set of wiring terminal blocks, small prototype boards, and soldering iron (w/ solder of course)

CONNECTIONS

DC Motors to L298N Motor Drivers (DOUBLE CHECK THESE)

- ___ motorLF Black Lead to L298N_F [OUT1] for Motor 'A'
- ___ motorLF Red Lead to L298N_F [OUT2] for Motor 'A'
- ___ motorRF Black Lead to L298N_F [OUT3] for Motor 'B'
- ___ motorRF Red Lead to L298N_F [OUT4] for Motor 'B'
- ___ motorLM Black Lead to L298N_M [OUT1] for Motor 'A'
- ___ motorLM Red Lead to L298N_M [OUT2] for Motor 'A'
- ___ motorRM Black Lead to L298N_M [OUT3] for Motor 'B'
- ___ motorRM Red Lead to L298N_M [OUT4] for Motor 'B'
- ___ motorLR Black Lead to L298N_R [OUT1] for Motor 'A'
- ___ motorLR Red Lead to L298N_R [OUT2] for Motor 'A'
- ___ motorRR Black Lead to L298N_R [OUT3] for Motor 'B'
- ___ motorRR Red Lead to L298N_R [OUT4] for Motor 'B'

L298N Motor Drivers to Arduino MEGA 2560

- ___ L298N_F Power and Ground Leads to Front Battery Pack
- ___ L298N_F [ENA] to 2 (Digital PWM I/O Pin to Control Motor 'A' Speed) (motorLF)
- ___ L298N_F [ENB] to 3 (Digital PWM I/O Pin to Control Motor 'B' Speed) (motorRF)
- ___ L298N_F [IN1] to 23 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT1]) (motorLF)

- ___ L298N_F [IN2] to 25 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT2]) (motorLF)
- ___ L298N_F [IN3] to 27 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT3]) (motorRF)
- ___ L298N_F [IN4] to 29 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT4]) (motorRF)
- ___ L298N_M Power and Ground Leads to Middle Battery Pack
- ___ L298N_M [ENA] to 4 (Digital PWM I/O Pin to Control Motor 'A' Speed) (motorLM)
- ___ L298N_M [ENB] to 5 (Digital PWM I/O Pin to Control Motor 'B' Speed) (motorRM)
- ___ L298N_M [IN1] to 33 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT1]) (motorLM)
- ___ L298N_M [IN2] to 35 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT2]) (motorLM)
- ___ L298N_M [IN3] to 37 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT3]) (motorRM)
- ___ L298N_M [IN4] to 39 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT4]) (motorRM)
- ___ L298N_R Power and Ground Leads to Rear Battery Pack
- ___ L298N_R [ENA] to 6 (Digital PWM I/O Pin to Control Motor 'A' Speed) (motorLR)
- ___ L298N_R [ENB] to 7 (Digital PWM I/O Pin to Control Motor 'B' Speed) (motorRR)
- ___ L298N_R [IN1] to 43 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT1]) (motorLR)
- ___ L298N_R [IN2] to 45 (Digital I/O Pin - On/Off for Motor 'A' Lead [OUT2]) (motorLR)
- ___ L298N_R [IN3] to 47 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT3]) (motorRR)
- ___ L298N_R [IN4] to 49 (Digital I/O Pin - On/Off for Motor 'B' Lead [OUT4]) (motorRR)

Steering Servos

- ___ Front Servo Power and Ground Leads to Front Battery Pack - Middle to Middle - Rear to Rear
- ___ servoLF to 22 (Digital I/O Pin for Position Control)
- ___ servoRF to 24 (Digital I/O Pin for Position Control)
- ___ servoLM to 32 (Digital I/O Pin for Position Control)
- ___ servoRM to 34 (Digital I/O Pin for Position Control)
- ___ servolR to 42 (Digital I/O Pin for Position Control)
- ___ servorr to 44 (Digital I/O Pin for Position Control)

Other Electronics Hardware

- ___ HCSR04Trigger to A4 (Analog/Digital I/O Pin to Send Ultrasonic Pulse from HC-SR04)
- ___ HCSR04Echo to A5 (Analog/Digital I/O Pin to Receive Ultrasonic Pulse Return to HC-SR04)
- ___ Active Buzzer to 13 (allows plugging directly into Arduino - Digital I/O Pin for Warning Beeps)
- ___ IRRec to A0 (Analog/Digital I/O Pin to Receive Infrared Remote Control Input)
- ___ LED_Red to 10 (Digital PWM I/O Pin for LED Red Output Intensity)
- ___ LED_Green to 9 (Digital PWM I/O Pin for LED Green Output Intensity)
- ___ LED_Blue to 8 (Digital PWM I/O Pin for LED Blue Output Intensity)

*/

SISU_04

04-18-22

Remote Control Handset Buttons

Example hexadecimal (Hex) codes (0x) shown below.

Codes need to be identified for your remote control handset and correct values entered into the Arduino Sketch (program/code).

Can use "Arduino Novice IR Code Checker" to find the hex codes.

- Thingiverse.com #5330554
 - Thangs.com #57838
- *****

DC Motor Speeds

(1) = Slow	(2) = Medium	(3) = Fast
0xFFA25D	0xFF629D	0xFFE21D

RGB LED Colors

(4) = Display Red	(5) = Display Green	(6) = Display Blue
0xFF22DD	0xFF02Fd	0xFFC23D

All 6 Wheels

(*) = Dog-leg Left	(0) = Center All	(#) = Dog-leg Right
0xFF6897	0xFF9867	0xFFB04F

Motion

(↑) = Forward	(OK) = Stop	(↓) = Backward
0xFF18E7	0xFF38C7	0xFF4AB5

Steering

(<) = Left 30 deg	(>) = Right 30 deg
0xFF10EF	0xFF5AA5

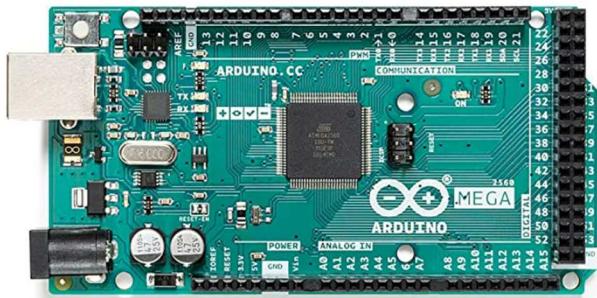


SISU_04

SISU_04 Hardware

Estimated Prices – March / April 2022 – below are screen clips from Amazon web site

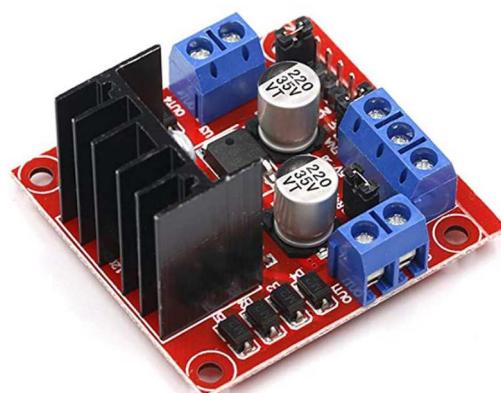
Adruino MEGA 2560 - \$24 to \$39



SG90 plastic Geared Servo - \$2 to \$4



DC Motor w/ Wheels, 3-6V, 1:48, 100-200rpm - \$4 to \$5 L298N DC Motor Drive Controller - \$3 to \$4



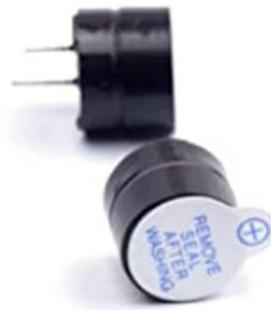
HC-SR04 Ultrasonic Distance Sensor - \$1 to \$2



InfraRed Receiver & Remote - \$4 to \$5



Active Buzzer - \$0.50 to \$0.75



Mounted RGB (red, blue, green) LED - \$1 to \$2



14500 or 18650 LiPo Batteries - \$4 to \$8 or \$6 to \$10



Switched Battery Holder - \$2 to \$3 or \$4 to \$6



Dupont/jumper Wires (try for 24-22Ga) - \$10 to \$15



Zip Ties – \$5



Shrink Wrap - \$6 to \$10



M5x25 Screws & Lock Nuts – \$10



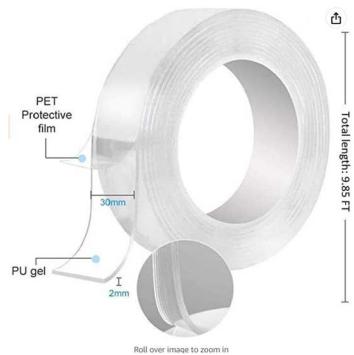
M8 x 22 x 7 T Bearings



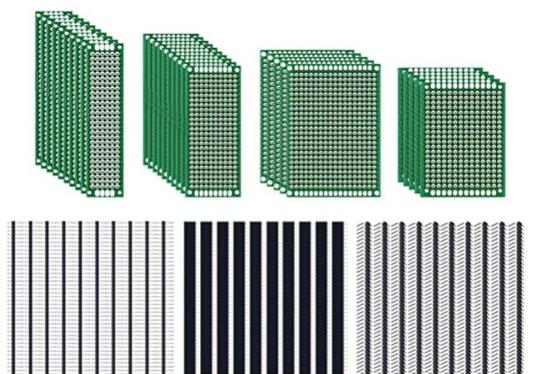
M2.5 x 25 & M3 x 15 & 25 Crews & Lock Nuts – \$12 to \$15



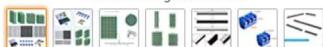
Polyurethane (PU) Gel Tape - \$8



Terminal Blocks and Prototype Boards - \$2 to \$4 in parts



Roll over image to zoom in





SISU_04_BasePlate_215Lx125Wx3T.stl



SISU_04_BearingCap.stl



SISU_04_BearingHub_5pt5_NORM.stl



SISU_04_BearingHub_5pt5_THICK.stl



SISU_04_BearingHub_5pt5_THIN.stl



SISU_04_BearingHub5pt5_ExtraThin.stl



SISU_04_BogieArm.stl



SISU_04_EndPlateHCSR04.stl



SISU_04_EndPlateMedium.stl



SISU_04_EndPlateSmall.stl



SISU_04_JRmast_Narrow.stl



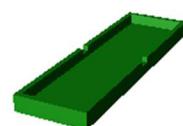
SISU_04_JRmast_Wide.stl



SISU_04_L298N_Brace.stl



SISU_04_MotorMount.stl



SISU_04_PowerTerminalTray.stl



SISU_04_RockerArmLeft.stl



SISU_04_RockerArmRight.stl



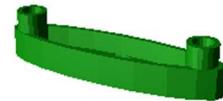
SISU_04_RockerConnector.stl



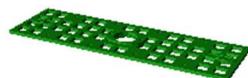
SISU_04_RockerPivotArm_150mm.stl



SISU_04_ServoBearingCap.stl



SISU_04_ServoClip.stl



SISU_04_SidePlate.stl



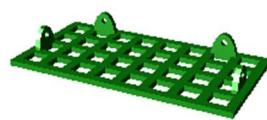
SISU_04_TopPlateBearingPivot.stl



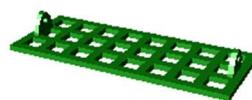
SISU_04_TopPlateLarge_125Lx125Wx3T
.stl



SISU_04_TopPlateMedium_95Lx125Wx
3T.stl



SISU_04_TopPlateSmall_65Lx125Wx3T.
stl



SISU_04_TopPlateTiny_50Lx125Wx3T.stl



SISU_04_DishMast.stl

x

Arduino Code

xTo be added here – probably 3 pages – incomplete as of 04-17-22x