

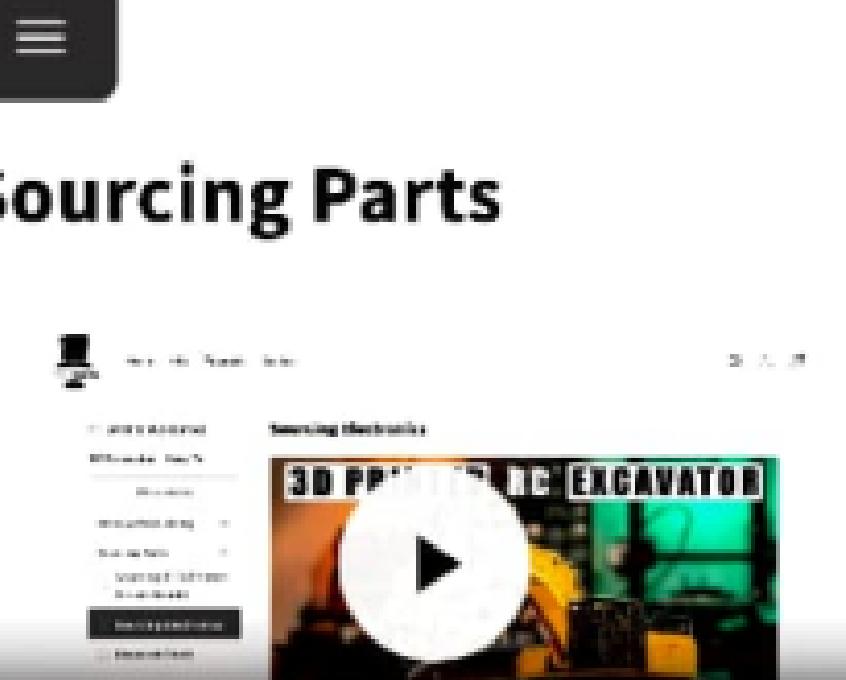
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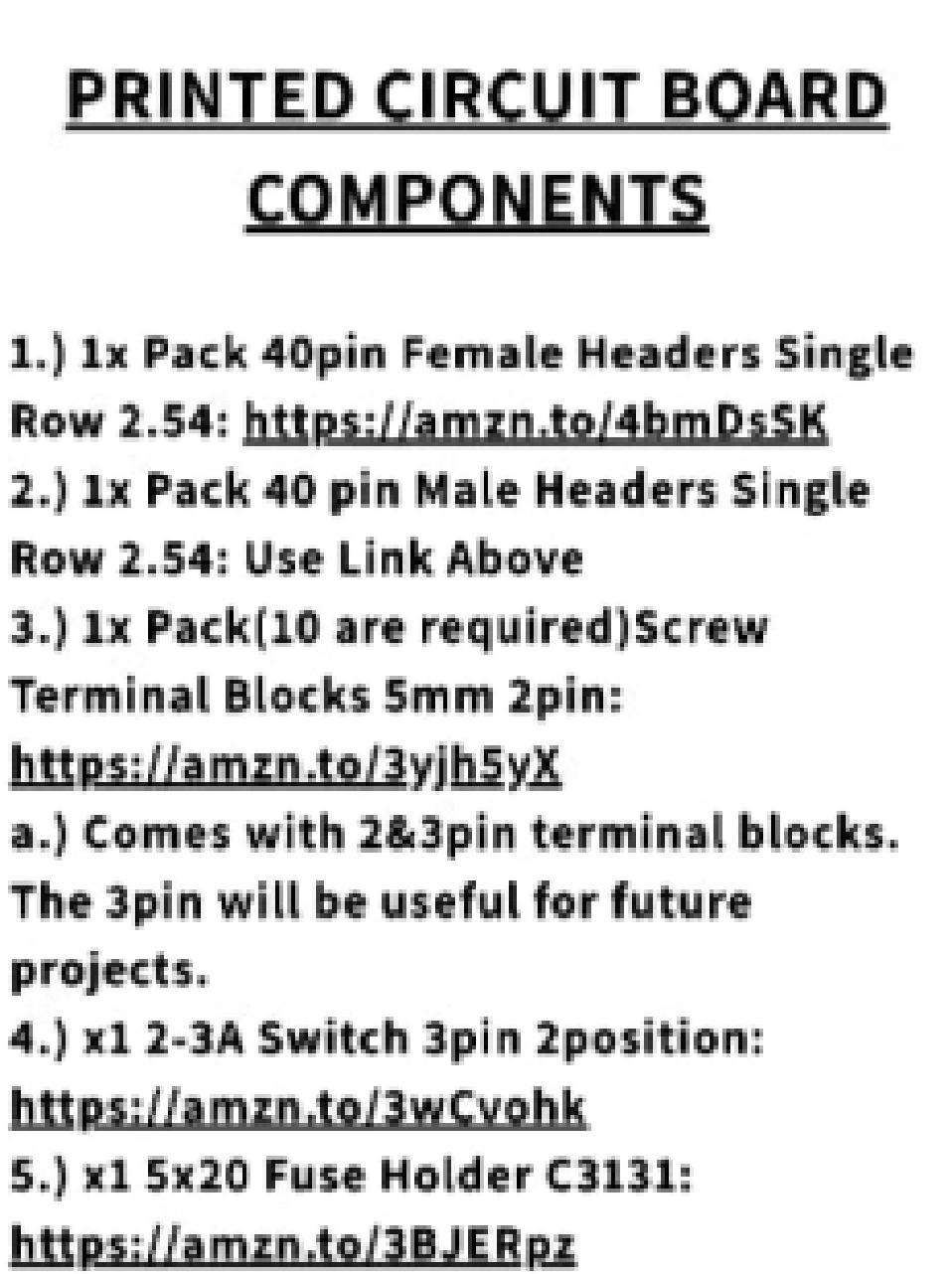
RC Excavator - How To

(Requires ProfessorBoots Workshop) In this tutorial I'll take you step by step through sourcing all the required parts such as the PCB(Printed Circuit Board), N20 Motors e.t.c. Then we'll assemble the excavator step by step!

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Sourcing Parts



Below you'll find a list of all the electrical components and hardware required as well as some affiliate reference links you can use to double check your components. Remember you can find pretty much all of these parts for cheaper on Aliexpress but will likely take a little longer to arrive. Always double check reviews and delve into the part description to make sure you're really getting what's advertised.

PRINTED CIRCUIT BOARD

COMPONENTS

- 1.) 1x Pack 40pin Female Headers Single Row 2.54: <https://amzn.to/4bmDsSK>
- 2.) 1x Pack 40 pin Male Headers Single Row 2.54: Use Link Above
- 3.) 1x Pack(10 are required)Screw Terminal Blocks 5mm 2pin: <https://amzn.to/3yjh5yX>
- a.) Comes with 2&3pin terminal blocks. The 3pin will be useful for future projects.
- 4.) x1 2-3A Switch 3pin 2position: <https://amzn.to/3wCvohk>
- 5.) x1 5x20 Fuse Holder C3131: <https://amzn.to/3BJERpz>
- 6.) x2 CR123A Battery Holders: <https://amzn.to/3wE5Xw4>
- 7.) x2 4K7 ohm Resistors are optimal but pretty much anything between 2-6k will likely work just fine.
here's a kit that comes with a bunch of different values: <https://amzn.to/3UZMQxT>

All Other Components

- 1.) 1x ESP32 30Pin Development Board(Micro USB): <https://amzn.to/4bzrJzC>
- 2.) 4x DRV8833 H-Bridges: <https://amzn.to/3UKd3H7>
- 3.) 1x Buck Converter:<https://amzn.to/3QMb2cc>
- 4.) x3 100RPM 12v N20 Motor: <https://amzn.to/4e5HS0A>
- 5.) x4 1000RPM 12v Threaded Shaft m4 55mm N20 Motor: [Aliexpress](https://amzn.to/3wCvohk)
- a.) Make sure to select "12v"!
- 6.) --MG90S Servos:<https://amzn.to/4bhSGfF>
- a.) No servos are required for the base model but I plan on using them for future attachments!
- 7.) x2 125v 5x20mm 5a Fast Blow-Glass fuses: <https://amzn.to/4dKQVW3>
- 8.) x2-4 5v LEDs: <https://amzn.to/3wscS1F>
- 9.) x2-4 5v LED Holders: <https://amzn.to/3V3ZpjL>
- 10.) MCP23017: <https://amzn.to/3ynr9qD>
- 11.) x1 2.6mm Truss Head Screw kit: <https://amzn.to/3znOCsi>
- a.) The kit contains 2.3 and 2.6mm screws but we'll only be using the 2.6mm size.
- b.) If the first option is sold out these will also do the trick just sub in the 12mm screws when 10mm are called for <https://a.co/d/d64GyEw>.
- 12.) x1 Metric screws and nuts kit: <https://amzn.to/44NruyP>
- a.) This is just for the 4x m4 nuts required for the push rods, you can pick up a couple m4 nuts for a couple cents at your local hardware store.
- 12.) 22awg Wire(Preferably 2 different colors): <https://amzn.to/4aoeO2P>
- 13.) x2 Fenix Batteries: <https://fenix-store.com/products/fenix-arb-l16-700up-usb-rechargeable-16340-battery>

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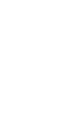
Required Tools

REQUIRED TOOLS

- 1.) Soldering Iron:
- 2.) Small Wire Cutters:
- 3.) Small-Medium Phillips head Screw Driver:
- 4.) Small Flathead screwdriver:
- 5.) (Optional but Recommended) Hot Glue Gun:
- 6.) (Optional but Highly Recommended) Multimeter for testing output voltage:
- 7.) And of course a 3D Printer...

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Soldering H-Bridges & Buck Converter

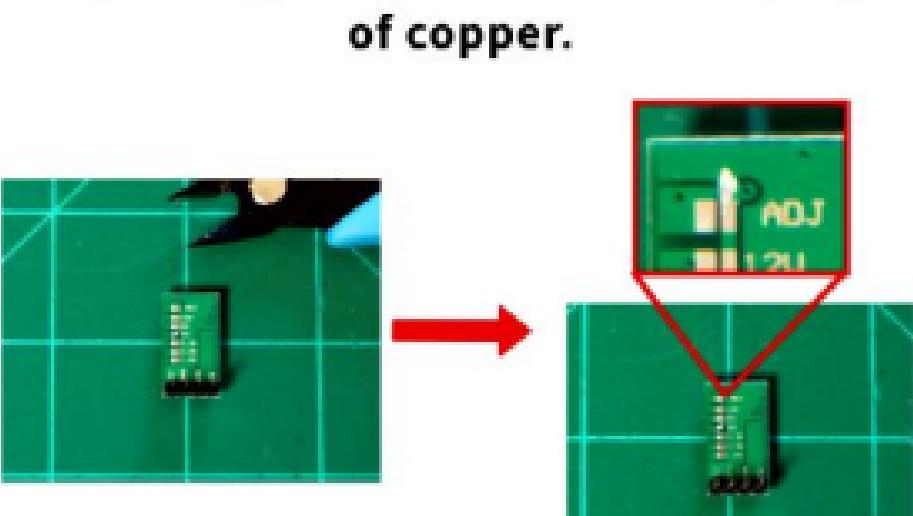
Tools Required

- Soldering Iron
- Small Wire Cutters

H-Bridge Steps

1.) Insert the 2 rows of 6pin male headers from the bottom and solder(repeat 4 times).

NEXT

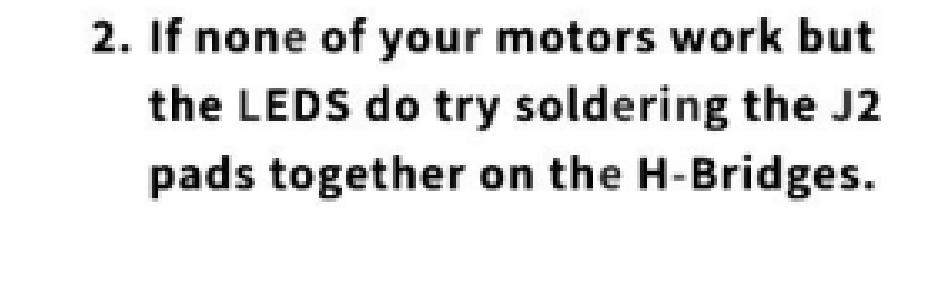


2.) Solder on a 4pin Male header.



3.) Using a small pair of wire cutters cut the trace just above "ADJ". Make sure its deep enough and removes the top layer of copper.

4.) Using a breadboard, multimeter and DC power supply input 8v into the "IN+" pin, "GND" to the GND on your power supply and multimeter, "VO+" to the positive lead on your multimeter. Measure the voltage output of the buck converter. It should read 5v, if it doesn't and your solders look good try cutting the trace deeper as it could still be partially connected.



Potential Problems

1. Due to the wide range of quality found in esp32 dev boards It has come to my attention that occasionally they will not properly pair to ps3 controllers when powered off 5v. I have not personally encountered this but if your esp32 will only pair to the ps3 controller when its plugged in via USB try altering your buck converter to supply 5.5v instead of 5v.
2. If none of your motors work but the LEDS do try soldering the J2 pads together on the H-Bridges.

COMPLETE AND CONTINUE >



Soldering Components to PCB

Tools Required

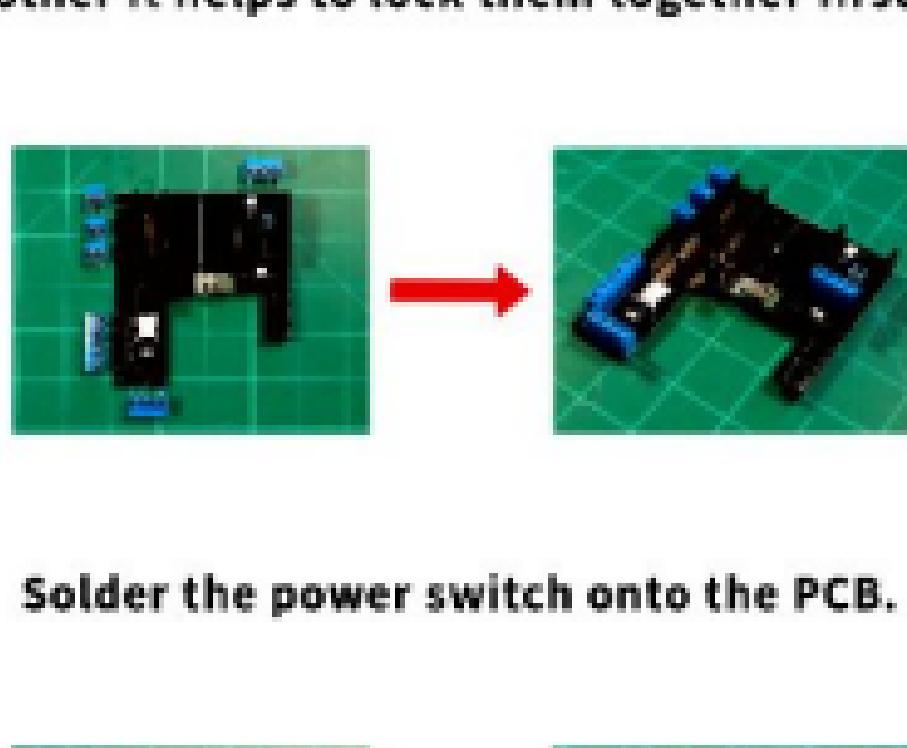
- Soldering Iron
- Small Wire Snippers

STEPS

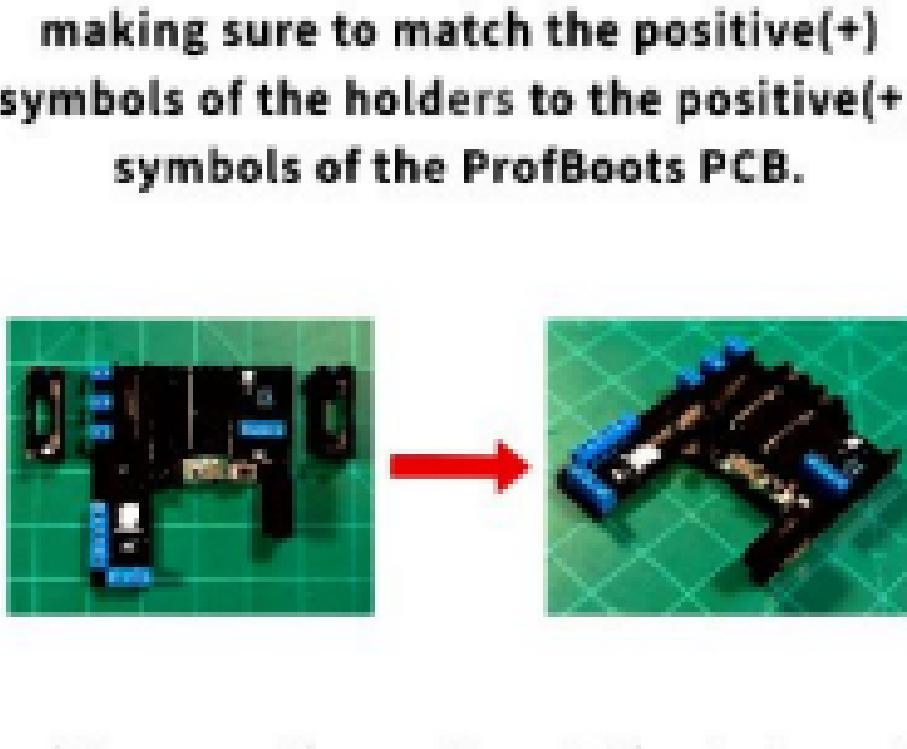
Solder a MCP23017 port expander directly onto the PCB aligning the small circular notches.



Solder on a completed 5v buck converter.



Solder 2 resistors onto R1 and R2. Resistor size 4k7 is optimal but anything between 2k and 8k will likely work just fine as these simply pull up the two data lines coming off the MCP23017 to 5v.



With everything soldered flip the board over and trim any pins that stick out excessively.



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Soldering Wires to N20 Motors

Tools Required

- Soldering Iron
- Wire Strippers
- Small Wire Cutters

STEPS

1. Cut the following lengths of wire using 22AWG wire (Note: If you really want to get fancy use two different colors so you can match one color to the positive terminal of the N20 Motor)
 - a. Cut 2 pairs of 40cm wires
 - b. Cut 2 pairs of 20cm wire
 - c. Cut 1 pair of 10cm wire
 - d. Cut 2 pairs of 15cm wire
2. Using wire strippers strip one end back about 3mm and the other end back 8mm.
3. Solder on the stripped 3mm side of the corresponding wire lengths to the N20 motors as ordered below (Note: coating both ends in some flux can really make your life easier especially if you haven't soldered much)
 - e. Solder 2 Pairs of 20cm wires onto 2 100rpm N20 Motors.
 - f. Solder 1 Pair of 15cm wires onto 1 100rpm N20 Motor.
 - g. Solder 1 Pair of 10cm wires onto 1 1000rpm Threaded Shaft N20 Motor.
 - h. Solder 2 Pairs of 40cm Wires onto 1 1000rpm Threaded Shaft N20 Motor.
 - i. Solder 1 Pair of 15cm wires onto 1 1000rpm Threaded Shaft N20 Motor.
1. I recommend securing the wires directly to the standard N20 motors with 9mm shafts using some hot glue, on the threaded N20 motors I hot glue the wires into place after placing them in the 3D printed motor holders.

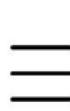
COMPLETE AND CONTINUE >



ESP32 Dev Board Add-On

STEPS

- 1. In the Arduino IDE navigate to File->Preferences**
- 2. In the "Additional boards manager URLs:" dialogue box copy and paste the following link**
 - a.**
https://raw.githubusercontent.com/espressif/arduino-esp32/package_esp32_index.json
 - b. Click "OK"**
- 3. Now open the boards manager by going to "Tools -> board -> board Manager"**
 - c. Search for "esp32" and click the install on the one created by Espressif Systems**
- 4. Select your board by going to "Tools -> board -> esp32/esp32Arduino -> esp32 Dev Module"**



Downloading GitHub Code

STEPS

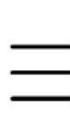
- 1. Using the GitHub Link below
navigate to the "ProfBoot/Mini-
Excavator" Repository**
 - a.**
https://github.com/ProfBoots/Mini_Excavator.git
- 2. Once there click the green "Code" drop down and "Download ZIP"**
- 3. With the folder downloaded right click and "extract all"**
 - b. If you don't "Extract all" it can cause compiling errors"**
- 4. Now open the "Mini_Excavator_Code" sketch with the Arduino IDE.**

COMPLETE AND CONTINUE >

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Installing Libraries

STEPS

1. Navigate to Manage Libraries by going to "Sketch -> Include library -> Manage Libraries"
2. Search for and install "ESP32Servo" by "Kevin Harrington"
3. Search for and install "PS3 Controller Host" by "Jeffrey van Pernis"
4. Search for and install "Adafruit MCP23017 Arduino Library" by "Adafruit"

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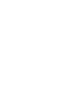




SixAxisPairTool and PS3 Controller

SixaxisPairTool Steps

1. In your desired search engine search of "SixaxisPairTool".
2. A variety of different websites will appear, carefully select your desired platform to download it. If the website looks sketchy it probably is and don't download anything from it. I personally used LO4D.com to download my version.
3. Once downloaded go through any setup steps required until you have the application open.
4. With the "SixaxisPairTool" open plug your PS3-Controller in via USB to your computer.
5. The "SixaxisPairTool" should automatically detect your PS3-Controller and display the MAC address.
6. Copy that MAC address and paste it into the Arduino sketch where it says "Ps3.begin("MAC Address").



Upload & Settings

STEPS

1. Connect your esp32 dev board to your computer via micro-usb. Select the appropriate com port by navigating to "Tools -> Port -> Com#"
 - a. The com port of your ESP32 should show up when you plug it in so if you're not sure unplug it check what's available then plug it back in and see if any new com ports show up.
 - b. A secondary option is to navigate to "device manager -> ports" if you're using windows and plug/unplug your esp32 to determine which com port it is.
2. With the appropriate com port selected upload your sketch by clicking the right arrow at the top of the Arduino IDE.
3. We will double check that the sketch was uploaded successfully later in this workshop.

Verify the following if you're having trouble uploading the code

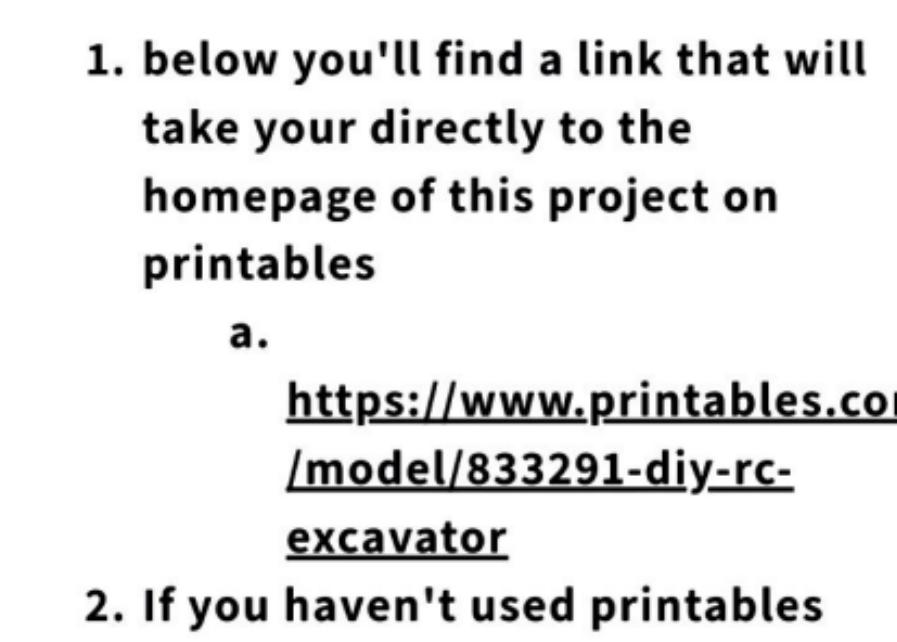
1. Tools > Upload Speed > 115200 from the Arduino IDE menus.
2. If you have an error related to "LedCDetachPin" This was caused by the release of 3.0.0 of the espressif "esp32" board. You'll want to use "esp32" version 2.0.17 otherwise the compiler will not work with library "ESP32Servo". Version 3.0.0 of the Espressif "esp32" board has broken some of the code - they note this in their release.

COMPLETE AND CONTINUE >



Accessing 3D Files

PRINTABLES that's where!



1. below you'll find a link that will take your directly to the homepage of this project on printables
 - a.
<https://www.printables.com/model/833291-diy-rc-excavator>
 2. If you haven't used printables before no worries its a great platform! Start by scrolling down until you see an option bar with "Details, Files, Makes & Comments e.t.c". Click on files.
- Details Files Makes & Comments Remixes Related models Collections User print files
1. There should be 4 folders
 - a. Individual .STEP files - This is for people who want to import the files into their own CAD software and edit them.
 - b. Individual .STL files - This is for directly importing them into your 3D Printing Slicer without modification.
 - c. Attachments - Parts that I've created that can be swapped directly onto the quick swap attach plate.
 - d. Groups - These are big group files with everything organized into the colors/materials I like. For example you'll see "Main Color PLA" and "Secondary Color PLA" everything that would act as the base color will be placed in "Main Color PLA" and more accent styled colors will be placed in "Secondary Color PLA". These are all .STL files so that you can load them into



Material & Infill

Material

PLA & TPU

For the PLA parts I like to use 15-25% infill with a wall thickness of 2-3. I recommend using a newly opened filament roll or one that's been properly dried as any warping could cause issues. Keep in mind not all PLA filament is created equal with some being extremely brittle ("Ask me how I know").

The TPU parts consist of tracks, railings, mats, and the exhaust. I like to use 10% infill with a wall thickness of 2. I recommend 95A for the tracks as it provides a good amount of flexibility though won't stretch so much as to cause slipping.

COMPLETE AND CONTINUE >



Prepping Prints

STEPS

1. Once you have finished printing, remove any support material placed in the previous lesson.
2. Take care to really smooth/clean out the tracks as this is where most of the friction can and will occur.

COMPLETE AND CONTINUE >





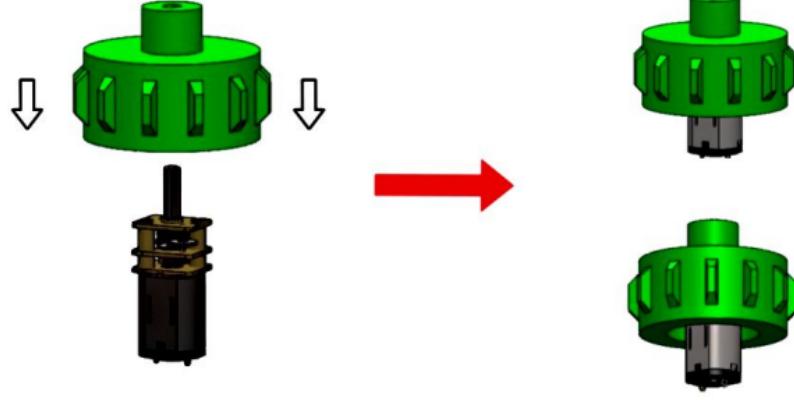
Pressing Drive Gears onto N20 Motors

Parts Required

- x2 3D Printed Drive Gears
- x2 100RPM 12v N20 Motor

STEPS

1.) Press the drive gear onto the N20 motor as far on as you can using just your hand.



2.) If the drive gear isn't fully seated use a vice to press it the rest of the way on. Another option is to gently tap it on using a hammer.

WARNING: If too much pressure is applied, permanent damage may occur and the N20 Motor may no longer work properly.

COMPLETE AND CONTINUE >



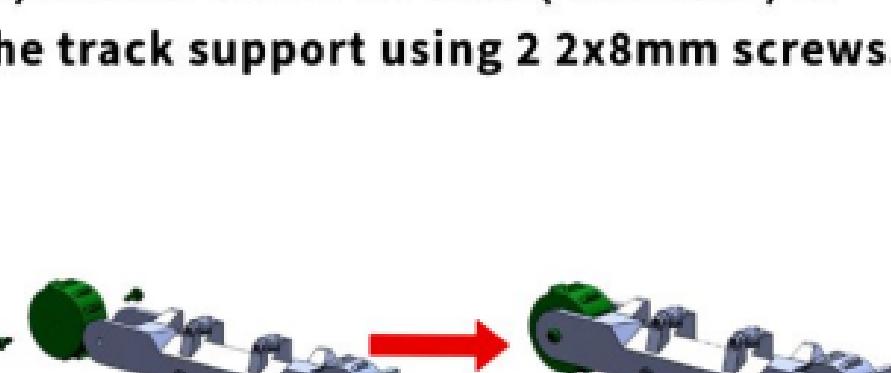
Securing Drive Gears to Track Support

Parts Required

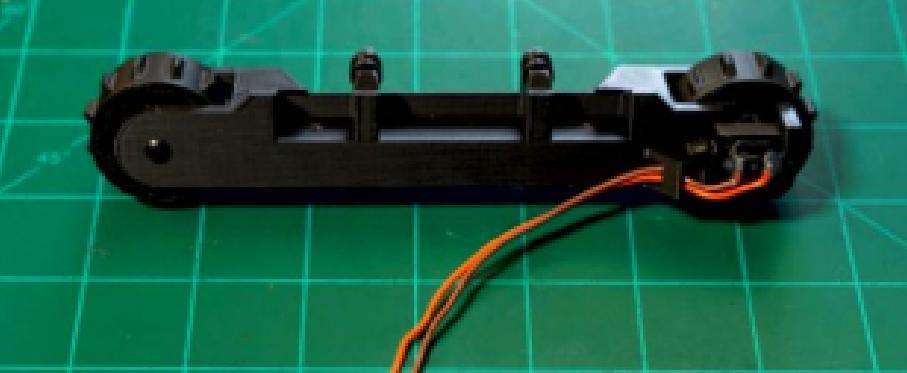
- 4x 2.6x8mm Screws
- 10x 2.6x6mm Screws
- 2x Drive Gear assemblies(What we made in the previous step)
- 4x 3D Printed Upper Track Rollers
- 4x 3D Printed Lower Track Roller
- 2x 3D Printed Track Motor Lock
- 2x 3D Printed Track Support
- 2x 3D Printed Drive Gear(No Motor)

STEPS

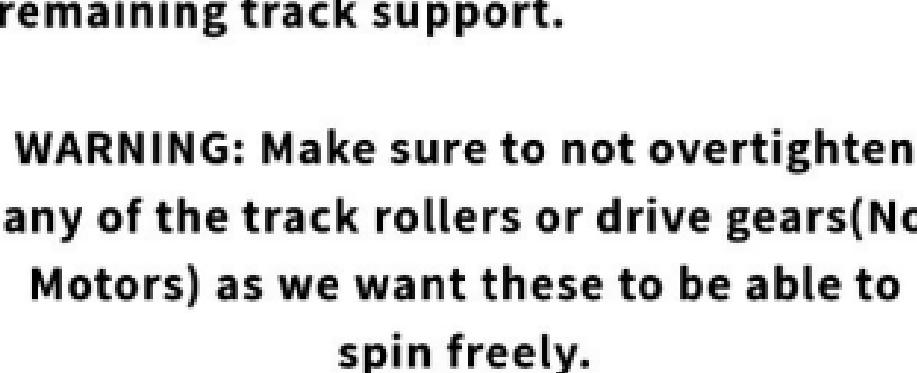
1.) Press the drive gear assembly down onto the track support(should pop into place).



2.) Lock the exposed portion of the N20 motor down into place using a 3D Printed Track Motor Lock and 2x6mm Screw.



3.) Secure 2 upper and lower track rollers to the track support using 4 2x6MM screws.



4.) Secure the Drive Gear(No Motor) to the track support using 2 2x8mm screws.



5.) Route the N20 motor wires through the wire holders as shown.

6.) Repeat all the above steps for the remaining track support.

WARNING: Make sure to not overtighten any of the track rollers or drive gears(No Motors) as we want these to be able to spin freely.

[COMPLETE AND CONTINUE >](#)



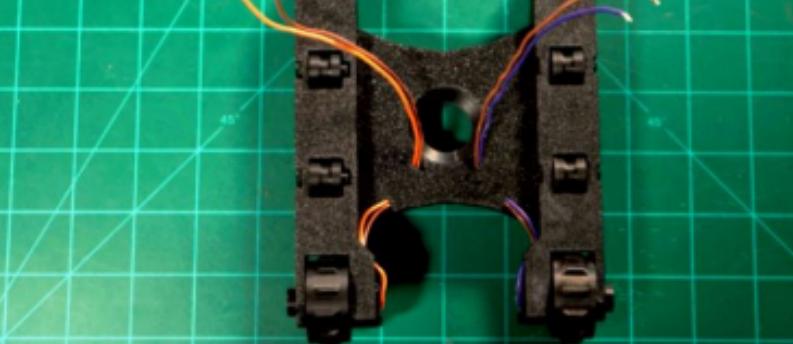
Securing the Lower Frame to the Track Supports

Parts Required

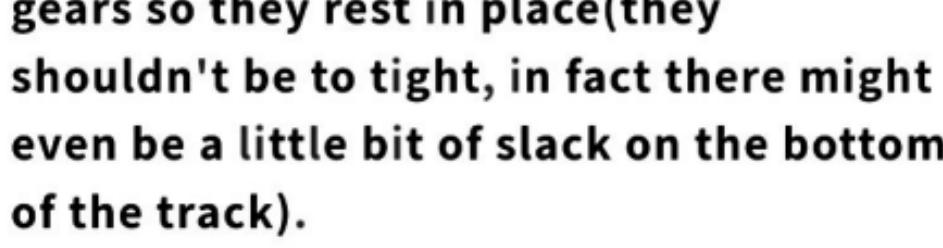
- 4x 2.6x8mm Screws
- 2x Track Support Assemblies(what we did in the previous step)
- 1x 3D Printed Lower Frame
- 2x 3D Printed TPU Tracks

STEPS

1.) Interlock the lower frame together with the two track support assemblies making sure that the wire channel on the lower frame aligns with the rear motors(this is where we'll run the wires)and secure using 4x 2x8mm screws.



2.) Route the N20 motor wires in and out of the channels on the lower Frame.



3.) Take x2 3D Printed TPU tracks and gently press them around on the drive gears so they rest in place(they shouldn't be to tight, in fact there might even be a little bit of slack on the bottom of the track).



COMPLETE AND CONTINUE >



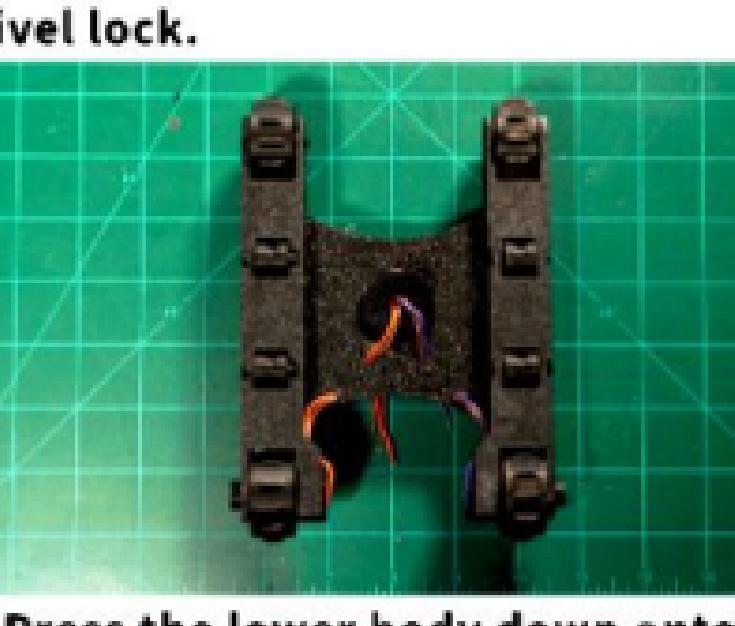
Swing Left/Right Assembly

Parts Required

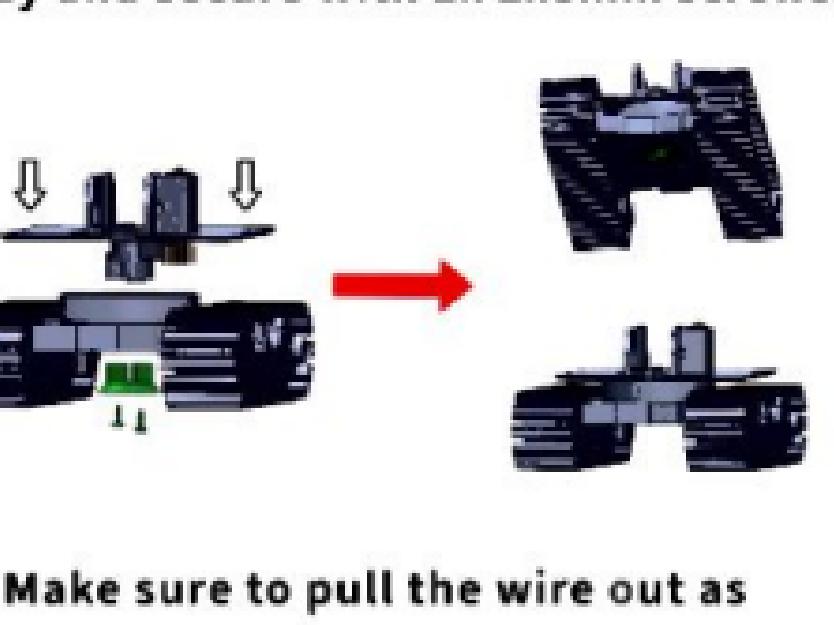
- 4x 2.6x8mm Screws
- 1x 100RPM 12v N20 Motor
- 1x 3D Printed Pinion Gear for Excavator Rotation
- 1x 3D Printed Main Boom Holder
- 1x 3D Printed Lower Body
- 1x 3D Printed Swivel Lock

STEPS

1.) Insert the N20 Motor into the 3D printed main boom holder



2.) With the motor in place press the 3D printed pinion gear onto the N20 motor from the bottom using just your hand and then if required either a vice or by gently tapping with a hammer the rest of the way on.



3.) Secure the main boom holder to the lower body using 2x 2x6mm Screws.



4.) Route the N20 Motor wires coming from the tracks through the center of the swivel lock.



5.) Press the lower body down onto the lower frame while routing the track N20 motor wires up through the tall vertical shaft.

6.) Press the swivel lock into place so that it properly meshes with the lower body and secure with 2x 2x8mm screws.

7.) Make sure to pull the wire out as much as you can so that there isn't too much hanging below the swivel lock.

COMPLETE AND CONTINUE >

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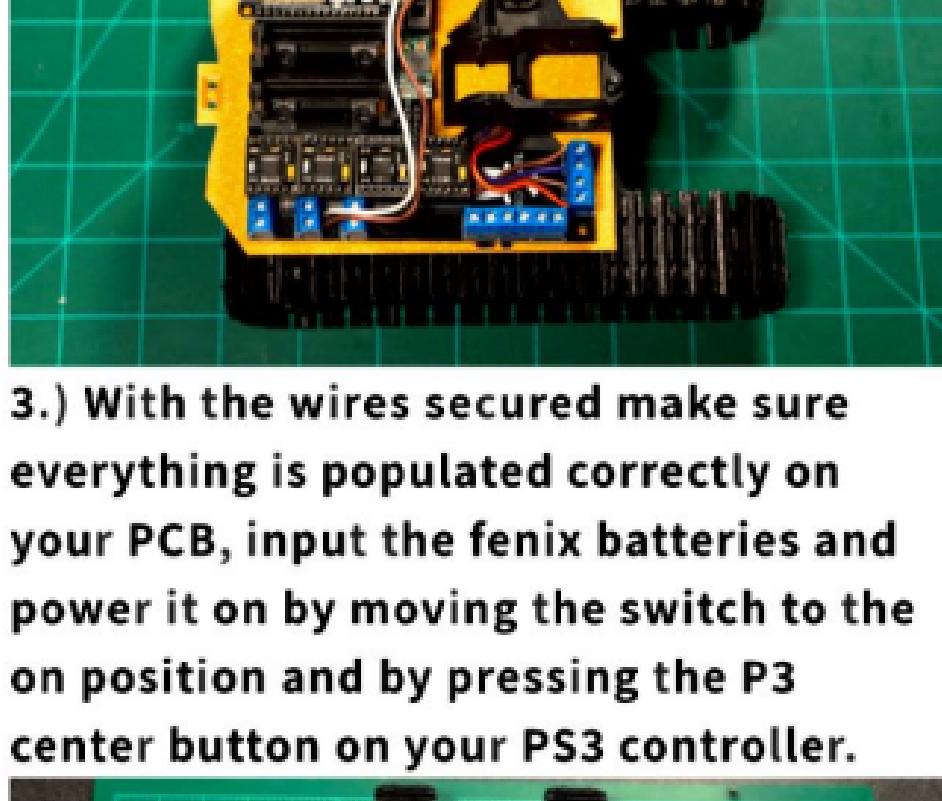
Routing Wires and securing PCB

Parts Required

- 1x 2.6x6mm Screw
- 1x ProfessorBoots Completed PCB

STEPS

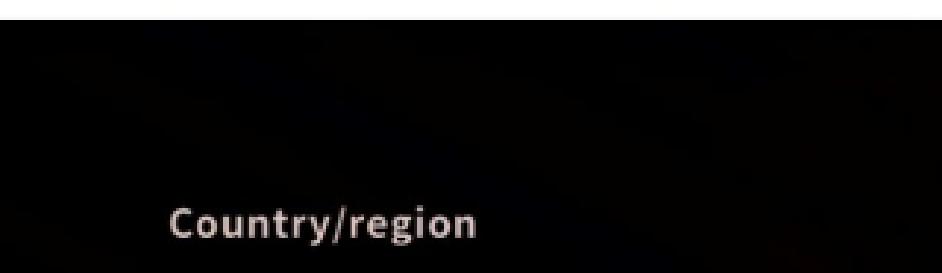
1.) Place the PCB so that the motor wires come up over the side and then secure the rear left corner into place using 1x 2x6mm screw.



2.) Route the wires from the track and pivot motors into their respective terminal blocks for L-MTR, R-MTR and PIVOT. For the track wires you may have to push and pull on each individual wire to determine which wires go to which motor. For every terminal block on this PCB, the correct orientation is to have the positive wire on the right. You may also now populate the ESP32 development board.



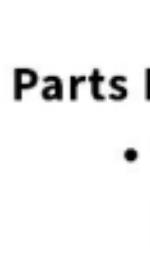
3.) With the wires secured make sure everything is populated correctly on your PCB, input the fenix batteries and power it on by moving the switch to the on position and by pressing the P3 center button on your PS3 controller.



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Motor Holders and Push Rods

Parts Required

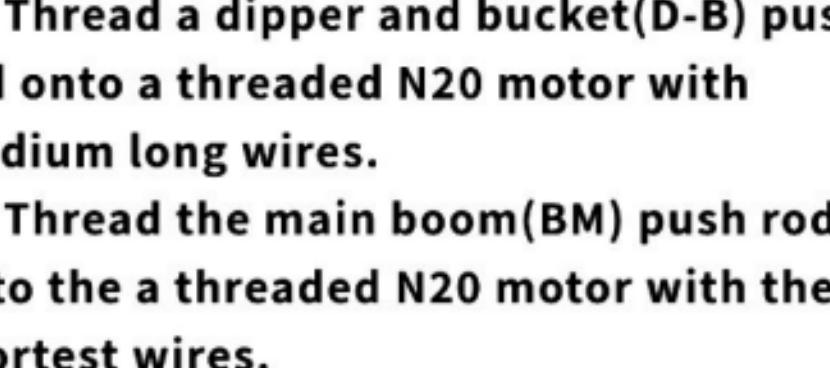
- 4x Threaded M4 1000rpm N20 Motor
- 4x M4 Hex nut
- 4x 2.6x6 Screws
- 4x 3D Printed Motor Holder & Lock
- 2x 3D Printed Dipper and Bucket Push Rod
- 1x 3D Printed Main Boom Push Rod
- 1x 3D Printed Thumb Push Rod

STEPS

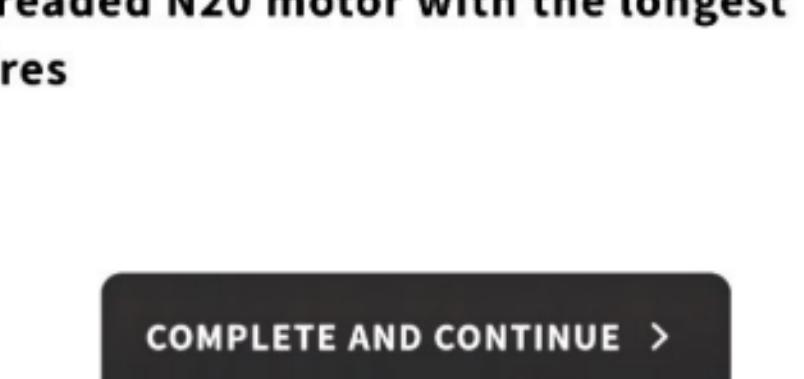
1.) Insert each threaded N20 motor into a 3D printed motor holder.



2.) Route the wires through the motor locks and secure each in place using a 2x6 screw.



3.) Press a M4 hex nut into each of the Push Rods.



4.) Thread a dipper and bucket(D-B) push rod onto a threaded N20 motor with the longest wires.

5.) Thread a dipper and bucket(D-B) push rod onto a threaded N20 motor with medium long wires.

6.) Thread the main boom(BM) push rod onto the a threaded N20 motor with the shortest wires.

7.) Thread the thumb(T) push rod onto a threaded N20 motor with the longest wires

COMPLETE AND CONTINUE >



Boom & Dipper Assembly

Parts Required

- 2x 2.6x8mm Screws
- 4x 2.6x6mm Screws
- 1x 3D Printed Main Boom
- 1x 3D Printed Dipper

STEPS

1.) Mount a N20 motor with medium long wires plus a dipper and bucket push rod to the main boom using 2 2x6mm screws.



2.) Mount a N20 motor with long wires plus a dipper and bucket push rod to the top of the dipper using 2 2x6mm screws.

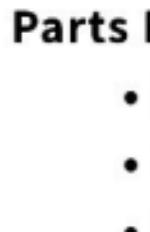
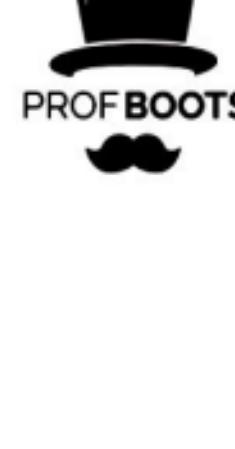
3.) mount a N20 motor with long wires plus a thumb push rod to the bottom of the dipper using 2 2x6mm screws.



4.) Attach the dipper to the N20 motor mounted to the main booms push rod using 2 2x6mm screws.

5.) Route each motors wires as shown(Your wires will likely be longer than what's shown in the photo) making sure to leave enough slack so that the arm can move freely.

COMPLETE AND CONTINUE >



Bucket Assembly

Parts Required

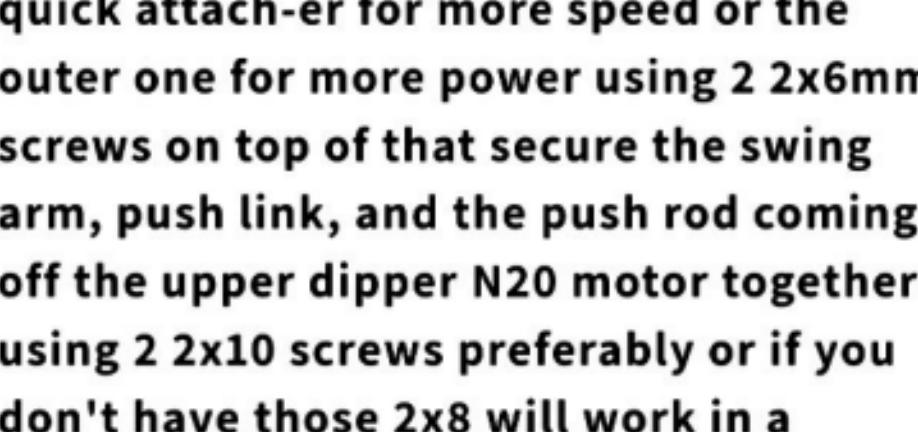
- 2x 2.6x6mm Screws
- 4x 2.6x8mm Screws
- 2x 2.6x10mm Screws
- 1x 3D Printed Quick Attach-er
- 1x 3D Printed Bucket
- 1x 3D Printed Bucket Swing Arm
- 1x 3D Printed Bucket Push Link
- 1x 3D Printed

STEPS

1.) Start by pressing the bucket onto the quick attach-er.



2.) Secure the bucket swing arm to the dipper using 2 2x6mm screws.



3.) Secure the quick attach-er to the dipper using 2 2x8mm(Or 2x10) screws.



4.) Depending on how much power or speed you want from the bucket secure the push link via the inner slot of the quick attach-er for more speed or the outer one for more power using 2 2x6mm screws on top of that secure the swing arm, push link, and the push rod coming off the upper dipper N20 motor together using 2 2x10 screws preferably or if you don't have those 2x8 will work in a pinch.



[COMPLETE AND CONTINUE >](#)



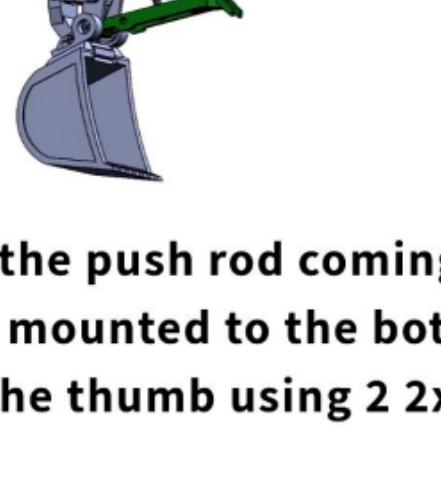
Thumb Assembly

Parts Required

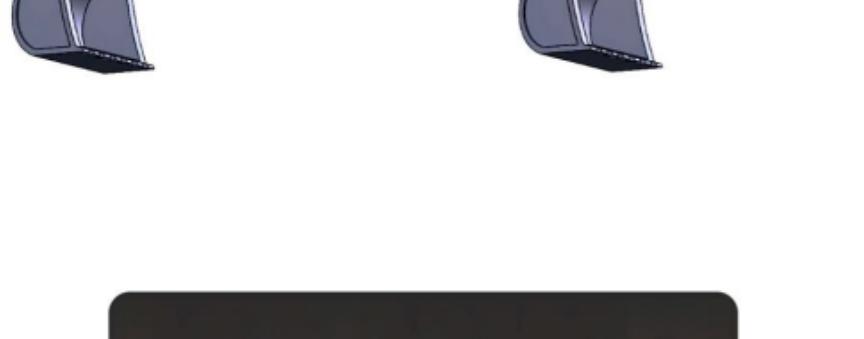
- 2x 2.6x6mm Screws
- 1x 3D Printed Thumb

STEPS

1.) Loosen the 2 2x8mm or 2x10 screws holding the quick attach-er to the dipper. Slide the thumb into place on the bottom. Tighten the screws back up to hold it in place.



2.) Secure the push rod coming off the N20 motor mounted to the bottom of the dipper to the thumb using 2 2x6mm screws.



[COMPLETE AND CONTINUE >](#)

Country/region

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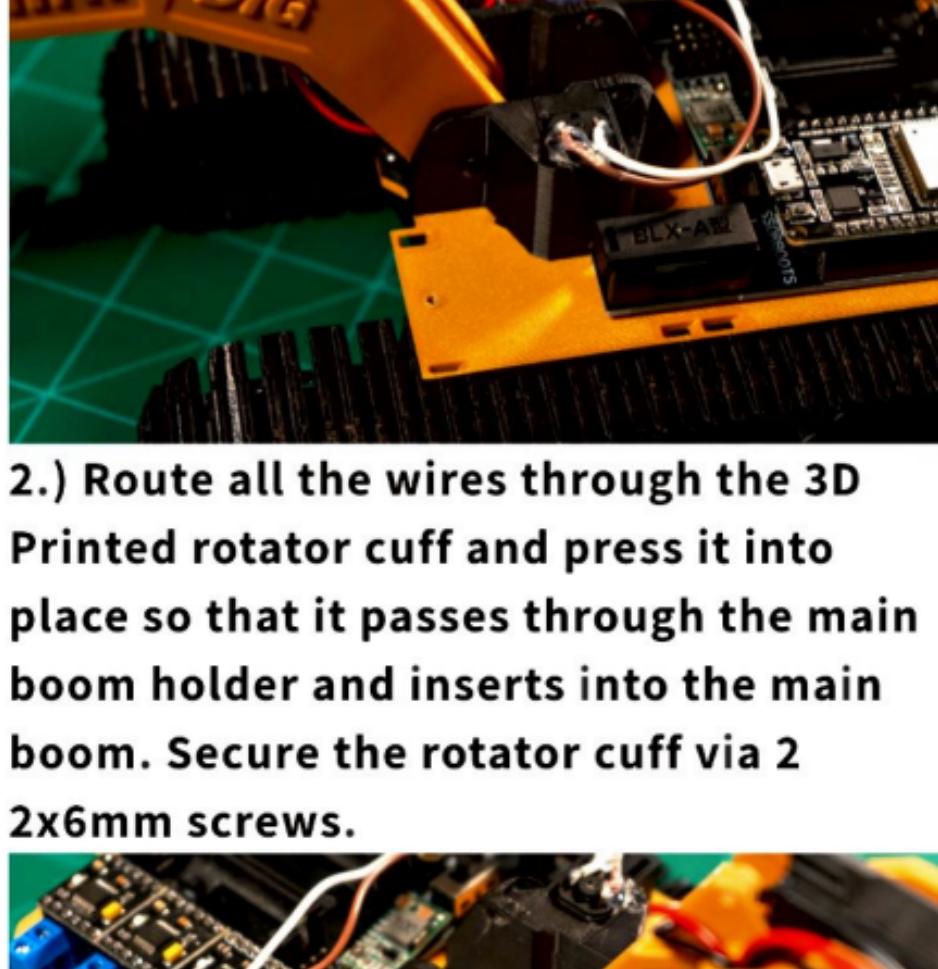
Securing Arm to Chassis

Parts Required

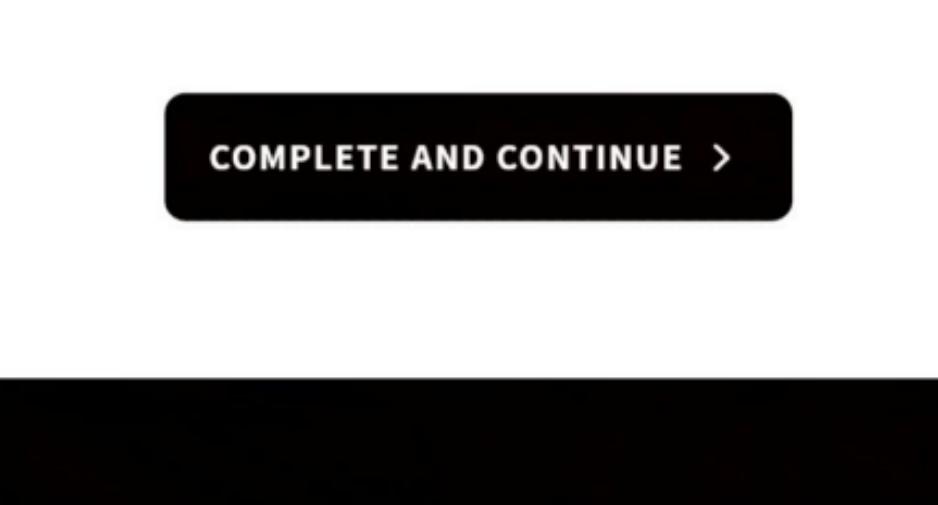
- 3x 2.6x6mm Screws
- 1x 3D Printed Rotator Cuff

STEPS

1.) With the wires routed through to the bottom of the main boom insert it into the main boom holder and gently pass all the wires through the right side if looking from the back. Secure the left side with a 2x6mm screw.



2.) Route all the wires through the 3D Printed rotator cuff and press it into place so that it passes through the main boom holder and inserts into the main boom. Secure the rotator cuff via 2 2x6mm screws.



[COMPLETE AND CONTINUE >](#)

Country/region

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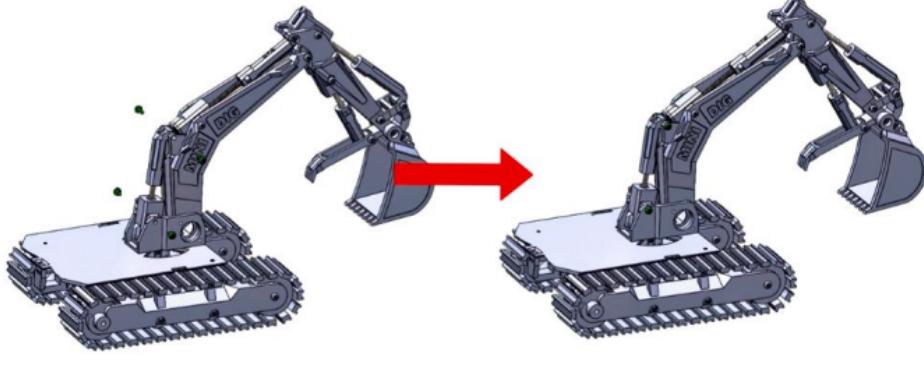
Main Boom N20 motor

Parts Required

- 1x Main Boom N20 Motor & Push Rod Assembly.
- 2 2.6x6mm Screws
- 2 2.6x8mm Screws

STEPS

1.) Secure the N20 motor assembly to the rear portion of the main boom holder using 2 2x6mm screws followed by the main boom push rod to the main boom using 2 2x8mm screws.



COMPLETE AND CONTINUE >

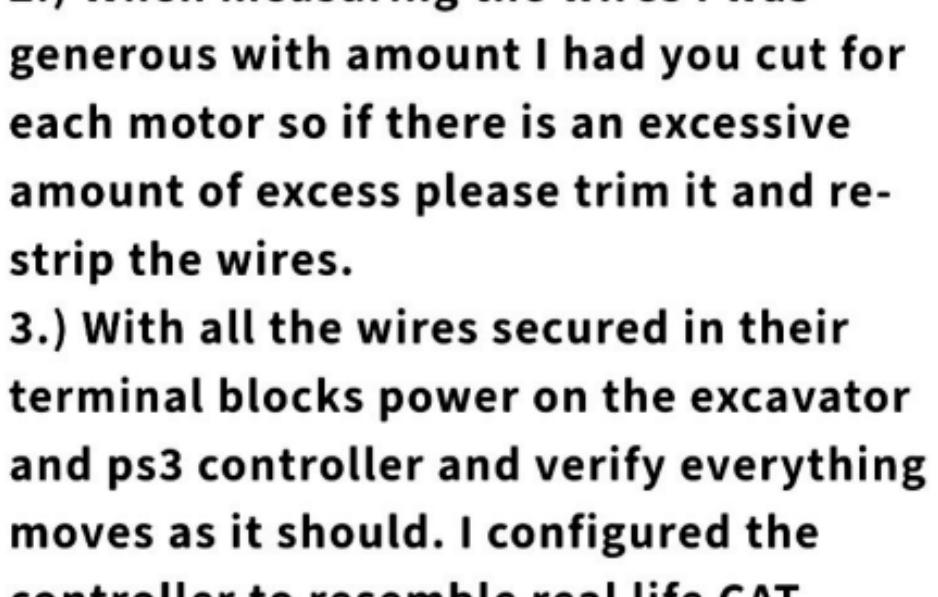
Country/region



Routing Wires

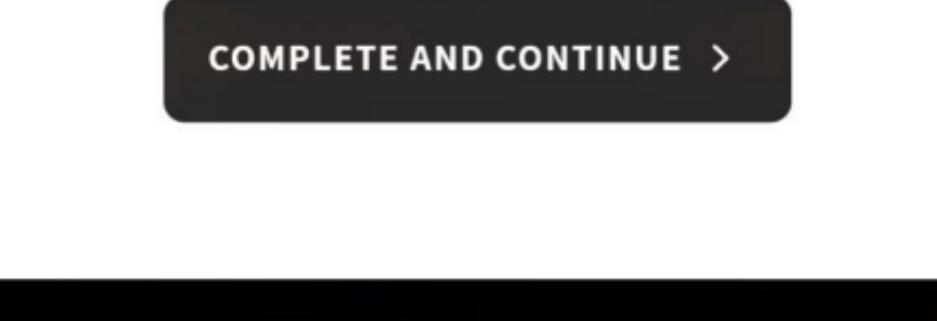
STEPS

1.) Route the main boom, dipper, bucket and thumb wires into their respective terminal blocks. Some things to keep in mind are depending on the version of your PCB the dipper terminal block may be labeled "S-BOOM" or "DIPPER" and the bucket terminal block is labeled "TILT-ATCH".



2.) When measuring the wires I was generous with amount I had you cut for each motor so if there is an excessive amount of excess please trim it and re-strip the wires.

3.) With all the wires secured in their terminal blocks power on the excavator and ps3 controller and verify everything moves as it should. I configured the controller to resemble real life CAT controls or "ISO" controls so the left joystick should control the main pivot and dipper, and the right joystick the main boom and bucket.



[COMPLETE AND CONTINUE >](#)

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Prepping Parts

Parts Required

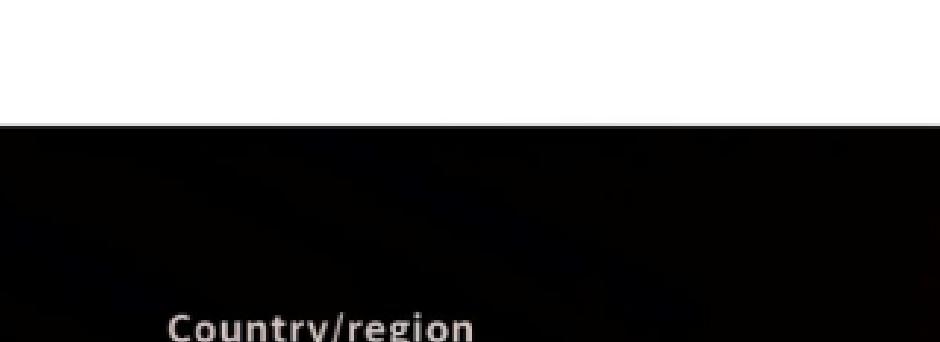
- 2x 5v LEDs
- 2x 5mm LED Holders
- 1x 3D Printed Cab
- 1x 2.6x6mm Screw

STEPS

- 1.) Measure and cut the wires from the back of LEDS to 12.5cm.
- 2.) Strip back all ends 1cm.
- 3.) Twist together the 2 yellow wires and the two white wires.
- 4.) Insert the 5mm LED holders into the cab.
- 5.) Route the LED wires through the provided channel in the top of the cab.
- 6.) Insert the LED's into the LED holders from back the backside and push forward until they sit flush with the end.



- 7.) Secure the cab into place by pressing the clips into position and then locking down with a 2x6mm screw.



- 8.) Temporarily remove the ESP32 and route the wires from the back of the cab into the "CAB-LIGHTS" terminal block, making sure the positive wires(Yellow in my case) go the right side of that terminal block denoted by the positive(+) symbol. Replace the ESP32 afterward. The lights can be toggled ON/OFF by pressing the left joystick.

COMPLETE AND CONTINUE >

Country/region

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Rear Cover Assembly

Parts Required

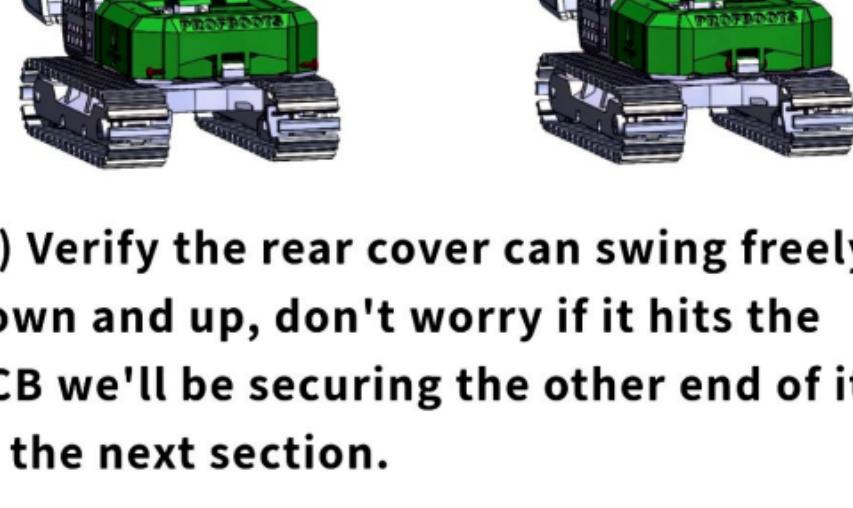
- 2x 2.6x6mm Screws
- 2x 2.6x8mm Screws
- 1x 3D Printed Cover Swivel
- 1x 3D Printed Rear Cover

STEPS

1.) Secure the cover swivel into place using 2 2x6mm Screws



2.) Secure the rear cover to the cover swivel using 2 2x8mm Screws



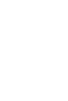
3.) Verify the rear cover can swing freely down and up, don't worry if it hits the PCB we'll be securing the other end of it in the next section.

[COMPLETE AND CONTINUE >](#)

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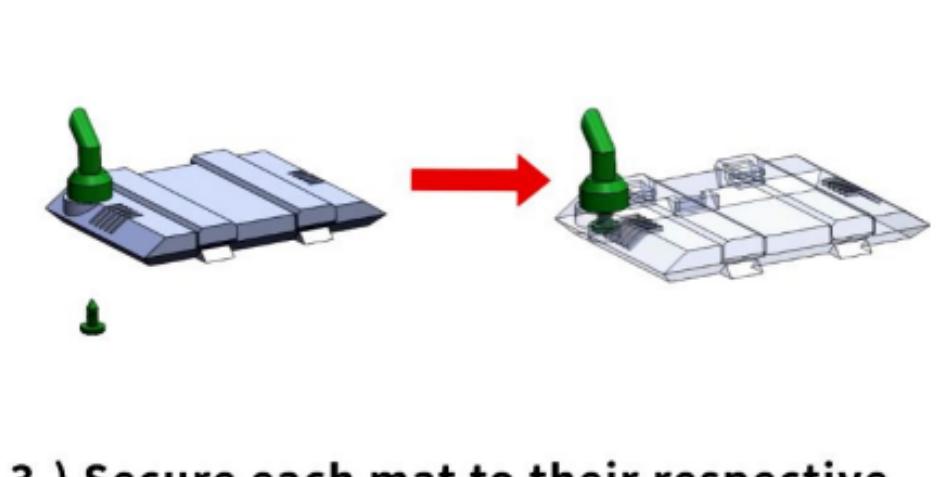
Mats, Rails, Step, and engine cover.

Parts Required

- 5x 2.6x6mm Screws
- 1x 2.6x8mm Screw
- 1x 3D printed TPU Guardrail
- 1x 3D Printed TPU Rear Cover Mat
- 1x 3D Printed TPU Step Mat
- 1x 3D Printed TPU Exhaust
- 1x 3D printed Engine Cover
- 1x 3D Printed Step

STEPS

1.) Sandwich the PCB between the 3D printed step and lower body using a 2x8mm screw threaded in from the bottom.



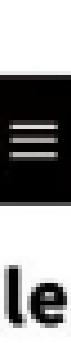
2.) Secure the exhaust to the engine cover using a 2x6mm Screw.



3.) Secure each mat to their respective position using a 2x6mm screw. Secure the guardrail using 2 2x6mm screws. Place the engine cover on by first inserting the front two wedges and then pressing the back down.



COMPLETE AND CONTINUE >



Electrical Slip Ring Upgrade

Parts Required

- 1x 6 Wire Electrical Slip Ring
<https://amzn.to/3wraGRE>
2. 1x 3D Printed "Lower Body with Slip Ring"
3. 1x 3D Printed "Swivel Lock with Slip Ring"
4. 1x 2.6x8mm Screws + the 2 we'll be removing from the old setup.

STEPS

- Attachments can be downloaded on printable's under the "Files" section in their corresponding folders.

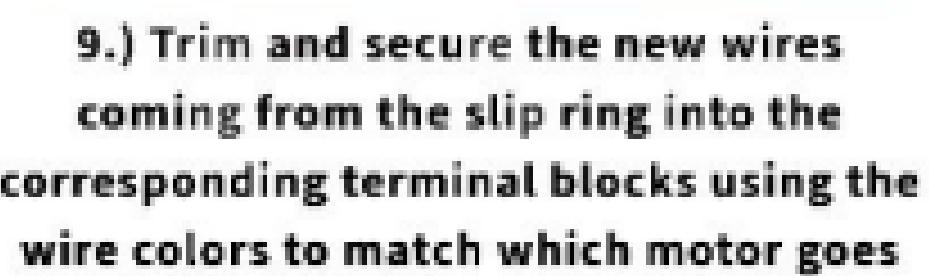
Model files

<input type="checkbox"/> Lower	1.0 MB
<input type="checkbox"/> Lower	1.0 MB
<input type="checkbox"/> Lower	1.0 MB
<input type="checkbox"/> Lower	1.0 MB
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<input type="checkbox"/> Lower	1.0 MB

1.) Remove the batteries.



2.) Remove the step, then unfasten the screws holding the Profboots PCB, main boom holder, upper body and cab to the lower body.



3.) Disconnect the L-MTR and R-MTR(Push blade if installed) wires from their respective terminal blocks and unsolder them from the motor terminals. Extract the wires completely



4.) Unscrew the 2 2.6x8mm screws holding the swivel lock to the lower body. Remove the swivel lock and lower body.



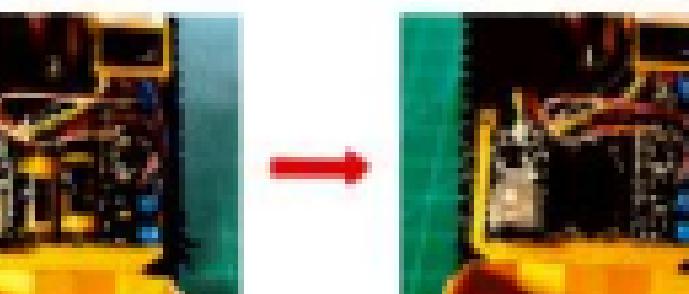
COMPLETE AND CONTINUE >



IF YOU DOWNLOADED YOUR MODEL BEFORE 5/11/2024 You'll have to also re-download/re-print the lower body which now has cutouts for the buck blade.

on print section edition

- 1.) Remove the batteries.**



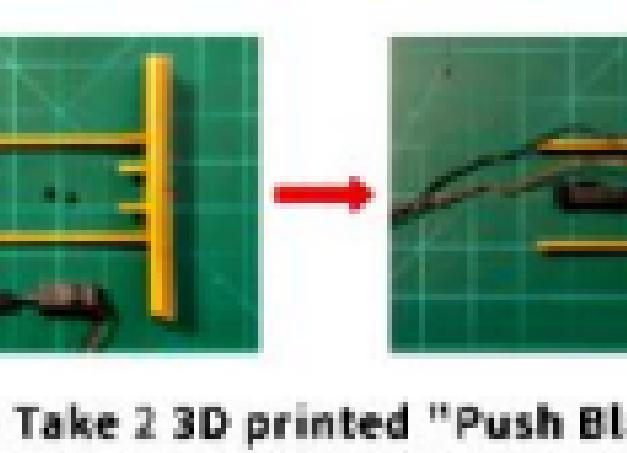
2.) Start by soldering on a set of 22awg wires measuring 30cm in length to the readied N20 motor(unless you're using the electrical slip ring then use the wires coming off of that but wait until everything is attached).



3.) Insert the N20 motor into the 3D printed "Motor Holder Push Blade" piece and secure in placing using a 3D printed "Motor Holder Lock" and 2.6x6mm screw. (Tip: Fill in the back of the "motor holder lock" gap with hot glue to relieve

nd thread
the nut side
the motor

-



-



- (Refer to the last picture)
Route the wires from the N2O motor
through the cutout on the push rod and
up the main shaft and into either
"AUX-ATCH" or "Thumb" terminal.



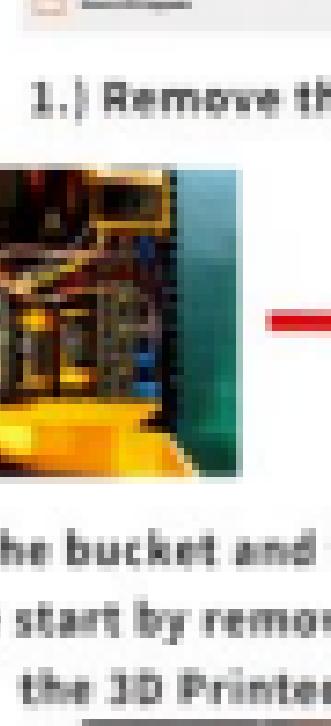
Use the "Thumb" terminal button.



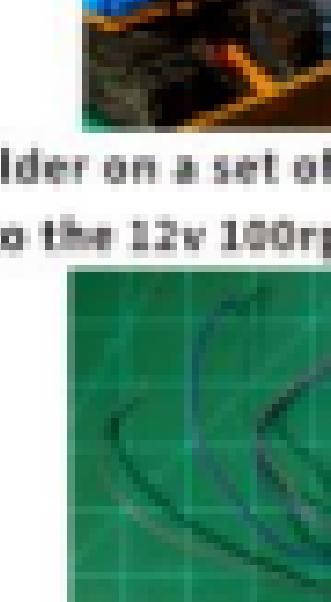
11. 3x 3D Printed
12. 1x 3D Printed
13. 1x 3D Printed
Link

• Attachment

- on printable's under the "Files" section in their corresponding folders.



1.) Remove the batteries.



If the bucket and thumb are installed please start by removing them as well as the 3D Printed "Attacher".



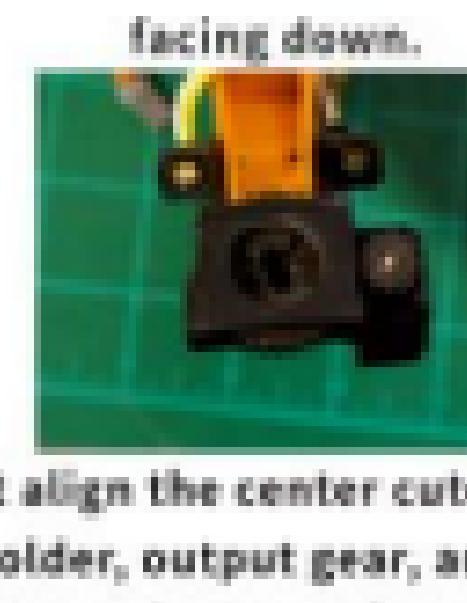
2.) Solder on a set of 22awg 50cm wires to the 12v 150rpm N20 motor.



3.) Attach the 3D printed "Rotating claw attacher" to the end of the dipper using 2 2.6x8mm screws, then secure the "Bucket push link" to the "Rotating Claw Attacher" using 2 2.6x6mm screws.



4.) Insert the 12v 1000RPM N20 motor into the rotating claw attacher. Route the wires back down the arm into either terminal block "Arm-ach" or "thumb" depending on your controller layout reference after stripping back the wires 1cm.



5.) Press the 3D printed "Pinion Gear for Claw Rotation Motor" onto the shaft of the N20 motor.

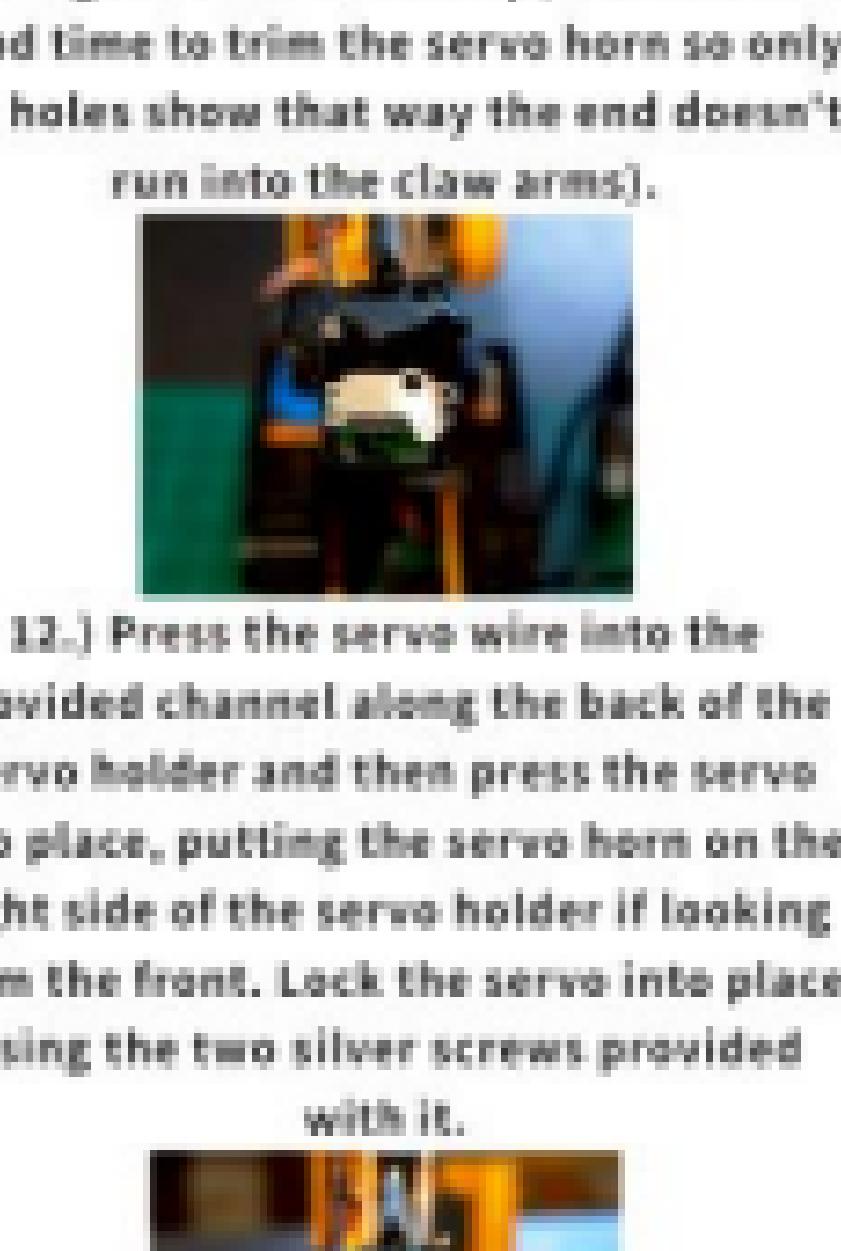
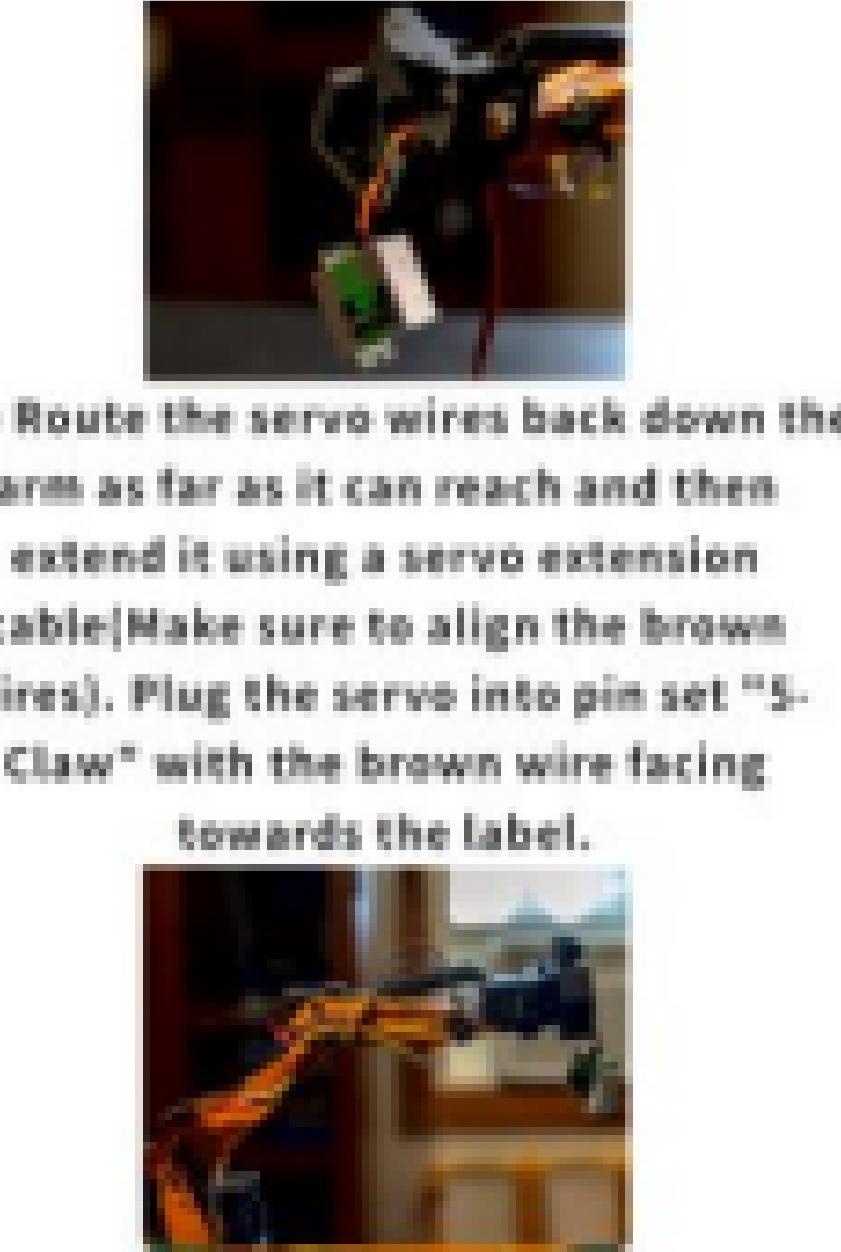


6.) Slide the 3D printed "Output Gear for Claw Rotation" into the rotating claw attacher with the cutouts on the gear facing down.

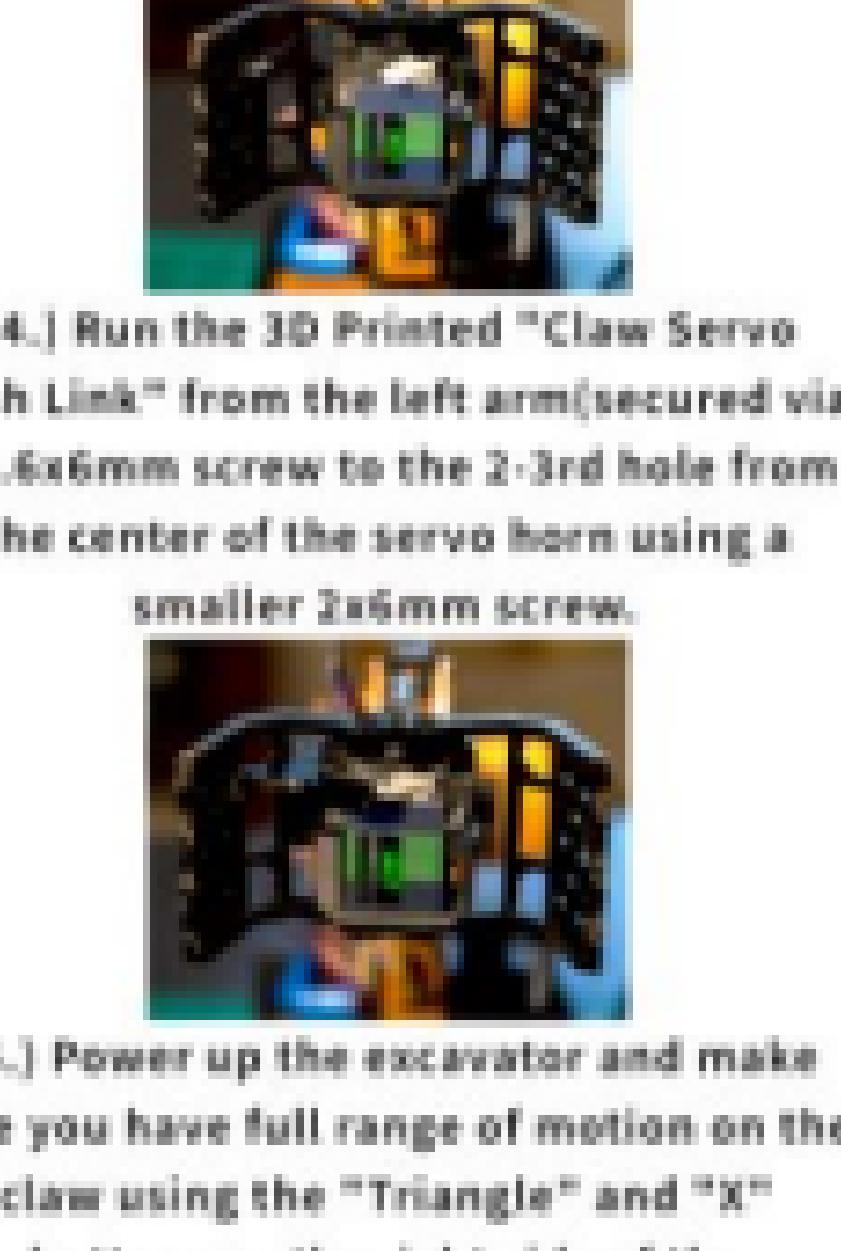


10

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3.) Secure both the left and right claw arms onto the servo holder using 4 6x8mm screws. Taking care to mesh the gears correctly.



buttons on the right side of the controller. If not power down and adjust the servo horn placement.

Country/region



Dipper Lights Upgrade

Parts Required

1. 2x 5v LEDS
2. 2x 5v LED Holders
3. 2x 2.6x6mm Screws
4. 2x 3D Printed "Boom LED Holder"

IF YOU DOWNLOADED YOUR FILES BEFORE 5/11/2024 you'll want to re-download/re-print the dipper as it now has additional holes for this upgrade.

STEPS

- Attachments can be downloaded on printable's under the "Files" section in their corresponding folders.

Details Files Makers & Comments Remixes Related models Collections User print files

Model files

Group Prints 5 files

Individual STL 35 files

Individual STEP 35 files

Push Shute Attachment 6 files

Routing Cover Attachment 6 files

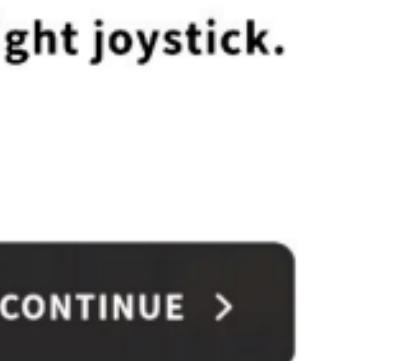
Electrical Slip Ring Upgrade 2 files

Boom LED Upgrade 1 file

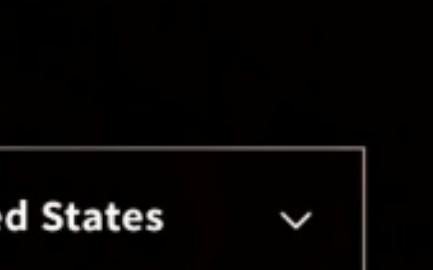
- 1.) Extend the wires from your LEDS an extra 20cm, so the overall length is at least 45cm.



- 2.) Secure 2x 3D printed "Boom LED Holders" to the dipper and press in the 5v LED holders.



- 3.) Insert the 5v LEDs from the backside and route the wire down the boom into the "AUX-LIGHTS" terminal block.



- 4.) Toggle the lights on/off by pressing down on the right joystick.

COMPLETE AND CONTINUE >

Country/region

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