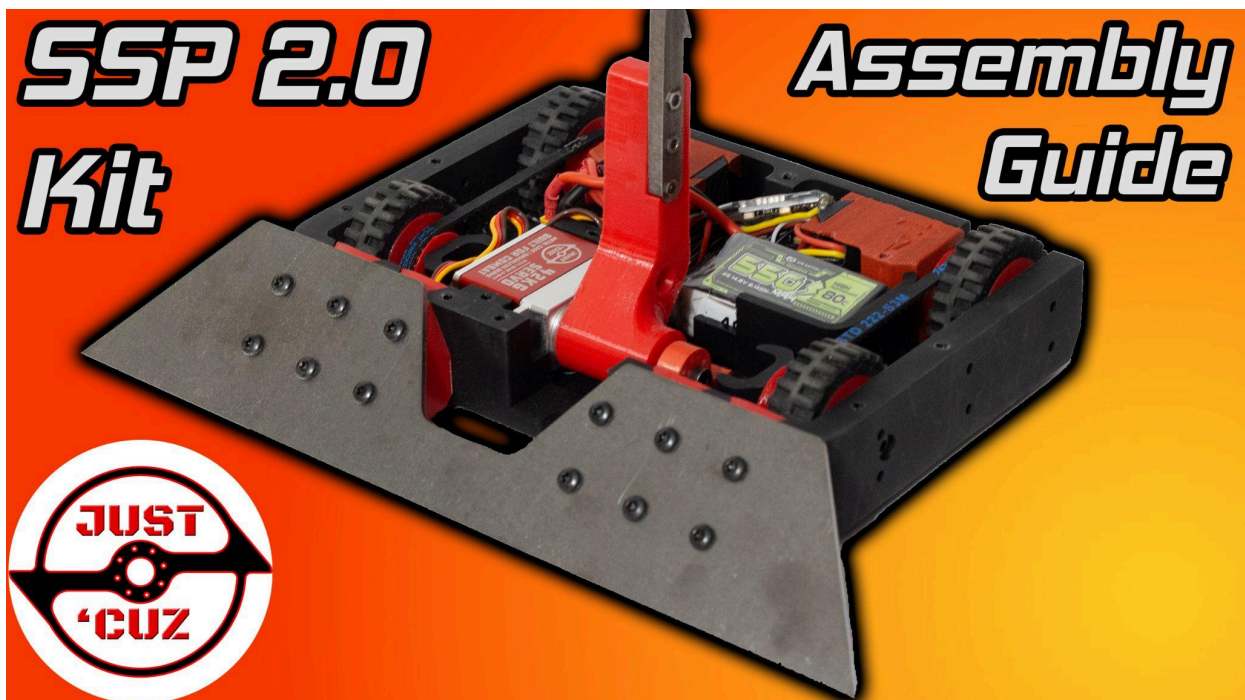


SSP 2.0 Kit Assembly Guide

Last updated 08/27/25.

Legacy SSP 1.0 instructions [can be found here](#).

This guide will be kept up to date as it can be edited on the fly, unlike video instructions. There may be additional pointers and troubleshooting steps here not in the videos, but in general, the videos guiding assembly should contain all you need. **Here is a public [full assembly guide video](#)!** Some specific topics have other unlisted videos or time-stamped video links throughout this guide.



[illegible]

SSP Kit - Parts Included (Brushless)

[12: Celebrate and Test Drive!](#)

[Vertical Spinner Module \(Optional addon\)](#)

[Tips and Tricks/FAQ](#)

[Q: The SSP 2.0 kit has so many configuration options! How do I pick the best one?](#)

[Q: What are the differences between the SSP 1.0 and 2.0? Maybe I have an SSP 1.0 kit and want to upgrade. What do I need?](#)

[Q: I bought an SSP 2.0 Standard kit, but want to upgrade to the Pro Brushless version. What do I need to buy?](#)

[Q: I really want the vertical spinner addon! Will this work with my kit?](#)

Recommended Extra Content:

- Basic Combat Robot Radio info:
 - ▶ [Mastering Combat Robot Radios - Mixing, Binding, Tuning, Programming and More!](#)
- Advanced OpenTX/EdgeTX Combat Robot Radio mixing:
 - ▶ [EdgeTX Mixing for Combat Robotics \[Tutorial\]](#)
- Battery safety (Absolute critical for any first-time builder!): [How to keep LiPos from burning down your house \(safe lipo charging\)](#)
- Radio programming text guide for Zorro/EdgeTX/OpenTX Radios: [Taranis Q X7 transmitter programming for combat robots](#)
- If you have an FS-i6, FS-i6X, TGY-i6, TGY-i6X, look here [FlySky FS-i6 transmitter programming for combat robots](#)
- **If you are new to soldering, check out this [awesome Soldering Crash Course video](#) by wermey**
- **For UK/British Builders** and others who need a power link instead of a switch - here is a guide on performing a [Motherboard power link mod](#).



What Else you'll Need:

Radio Control Transmitter, A.K.A. Radio

This guide and the associated videos currently cover the use of three different popular radio options. Compatible radios should work with AFHDS-2A receivers like the FS2A used here, or have a 4-in-1 multiprotocol module.

1. **Radiomaster Zorro (~\$130):** While not the cheapest, this option is the best value in my opinion for anyone who wants a game-pad style controller and is used to playing video games with a controller. If you live in the USA buy the **4-in-1 FCC version**, if elsewhere buy the 4-in-1 LBT version. Don't forget to buy the 18350 batteries as well! This radio runs open source OpenTX firmware out of the box.
2. **FlySky FS-i6(X):** the cheapest option worth getting at around \$50-65. It lacks a lot of advanced features but is more than capable of being a good starter radio. The X version barely costs extra and can be modded to run a more basic version of OpenTX, but this is outside the scope of these instructions.
3. **Radiomaster MT12:** ([Amazon](#)) ([Radiomaster](#)) If you have been racing RC cars before you may prefer this pistol grip style radio. The trigger controls forward/reverse and the steering wheel is for, well, steering. These are favored by some bot builders for making it easier to drive their bots especially in a straight line, but the downside here is controlling the lifting arm position can be difficult since driving becomes a two-handed practice. You need to choose how to assign that, either to a knob, switch, or button.

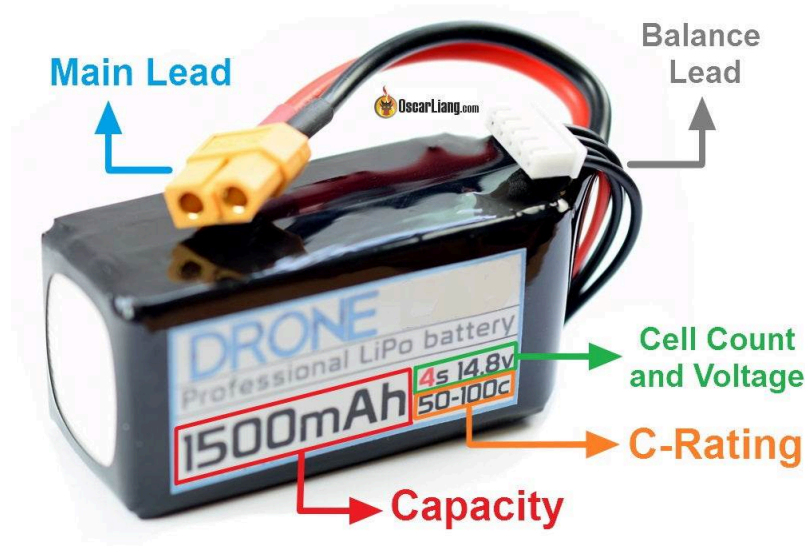
Lithium Polymer (LiPo) Battery Chargers

There are a ton more options for LiPo battery chargers. However, this is not an item where buying the cheapest working version is a good idea. LiPo batteries when mishandled or abused have a significant fire risk. However, they have by far the best power density and energy density of any consumer battery type, and are almost exclusively used in combat robotics, drones, and RC cars where allowed. When charged and handled correctly they pose little danger. It's recommended to always balance charge your battery - all LiPo batteries have a main power lead usually with an XT30 or XT60 connector, as well as a balance JST-SH connector with many small wires that connect to each cell separately. All good quality LiPo battery chargers have a way to connect the balance lead to ensure the cells are all kept at an equal voltage.

Currently the Standard/brushed kits will be shipping with a 3S 550mAh LiPo. The brushless kits will ship with a 4S LiPo, depending on availability this may be a 450mah or 550mah.

When [purchasing a lipo charger](#), pay attention to the reviews and ensure it's a decently reviewed one. A lot of chargers come with XT60 connector outputs among others, but not the smaller XT30 used for the SSP kit batteries. So you may need to cut off one of the useless ones and solder one of the XT30 male connectors included with your kit in its place. **Some brands a lot of builders like are Hota, SkyRC, Tenery, ISDT, Spektrum, and ToolkitRC.** Seth uses a Hota D6 Pro currently.





Tools and Equipment

You don't need a lot of tools to make this kit work for you and may even have all of these lying around. There are also cordless driver sets that come with 80% of what you need.

The full list includes:

1. 4mm L key/allen wrench
2. Torx Plus T15 bit/driver
3. Soldering iron/solder
4. Needle nose pliers
5. Radio and Charger - see above
6. Blue Loctite (242 or 243 is highly recommended)

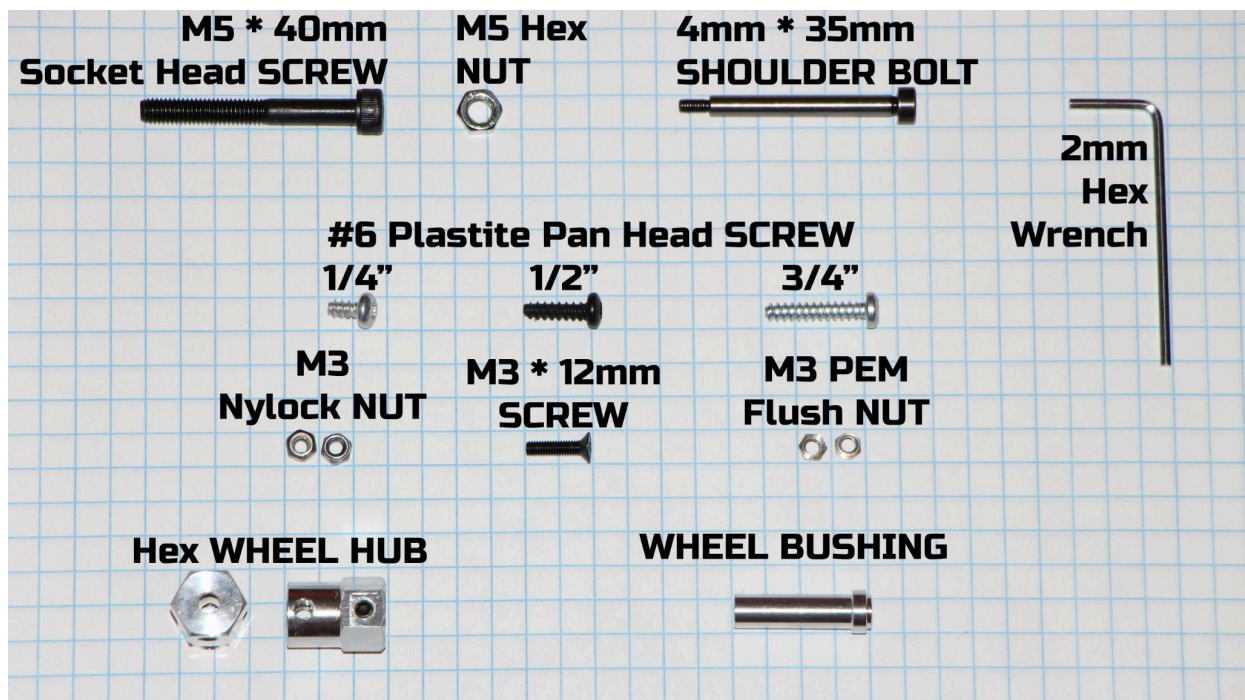
Optional but recommended:

- Heat Shrink or Kapton/Electrical Tape
- Hot Glue Gun
- Cordless drill/driver with clutch

The [main assembly video guide](#) has links to many of the above items in the video description. I've also uploaded the [SSP kit CAD to GrabCAD](#) as well as my website store listing. The GrabCAD listing contains a ton of useful 3D printable files such as the motherboard soldering jig tool shown in the videos below, the molds used to cast urethane wheels, and more!

Identifying Screws and Small Parts + Sourcing Spares

This is 1/4" grid size graph paper for scale!



Most hardware used in the SSP kit is available off-the-shelf from Amazon, McMaster Carr, or other online retailers. Most of this hardware is not sold individually on [JustCuzRobotics.com](https://www.JustCuzRobotics.com) but we do sell the custom parts like [shoulder bolts](#), [hex hubs](#), and [wheel bushings](#). You can buy

more [#6 x 1/2" plastite flat head screws](#) and [PEM nuts](#) on amazon, those are the most frequently replaced of the bunch. Besides screws and nuts, all other components can be purchased individually as spare parts and used for custom bots.

1: Prep Electronics - Motherboard & Receiver

Follow along with Seth as he wires everything for an SSP 2.0 kit in this [SSP 2.0 Electronics Video](#).

Parts and Tools Needed:

- 1X Motherboard
- 1X FS2A Receiver
- 4X pair XT30U connectors
- Soldering iron and solder
- Hot Glue Gun (strongly recommended)
- Fume Extractor (recommended, optional)

MOTHERBOARD QUICK START GUIDE

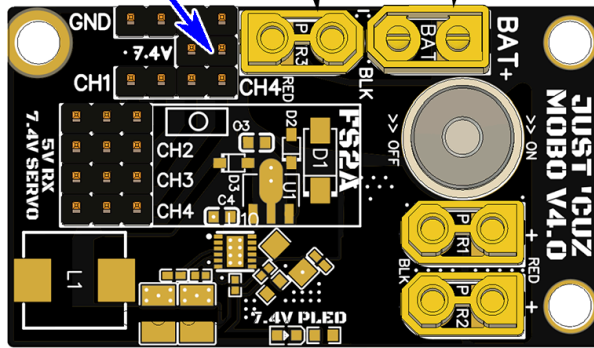
SOLDER ON CONNECTORS AS SHOWN!

V4: Receiver always gets 5V

Servos must connect to CH3 or CH4

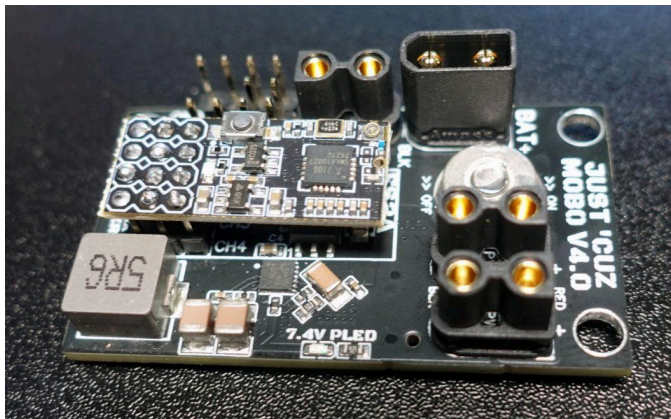
NOTE: PWR3 IS FLIPPED

BATTERY MALE XT30U CONNECTOR



ALWAYS SOLDER THE SWITCH NUT BEFORE USE

PWR 1, 2 & 3 FEMALE XT30U Connectors



Instructions: [Motherboard Soldering Video Timestamp](#)

- Follow all instructions in the video linked above,
- Or the text guide here: [Motherboard User Guide - Just 'Cuz Robotics](#)
- **Remember to solder around the switch nut!**
- 1. **Solder around the switch nut! Do not add solder to the screw-side.**
- 2. Solder on the XT30U Female connectors PWR 1 2 and 3, and ensure the orientation matches the PCB silkscreen markings in white and photos shown above.
- 3. Solder the XT30U Male battery connector
- 4. Carefully place the FS2A onto the motherboard with all pins aligned with the holes. The less the pins stick out, the easier this often will be. Leave about 1 mm of pin exposed.
- 5. The FS2A has 12 pin holes, 3 rows of 4. The top row is all signal channels 1-4. Then the second row is 5V, and third row is Ground.
 - a. Make sure to solder ALL 4 SIGNAL PINS with no bridging between pins.
 - b. Solder AT LEAST 1 of the second row 5V pins.

- c. Solder AT LEAST 1 of the third row ground pins.
 - d. Ensure there is no bridged solder between rows. Clean any excess or bridging away.
6. Heat up a hot glue gun and insulate exposed connections, but avoid covering the black bind button. (optional but recommended)

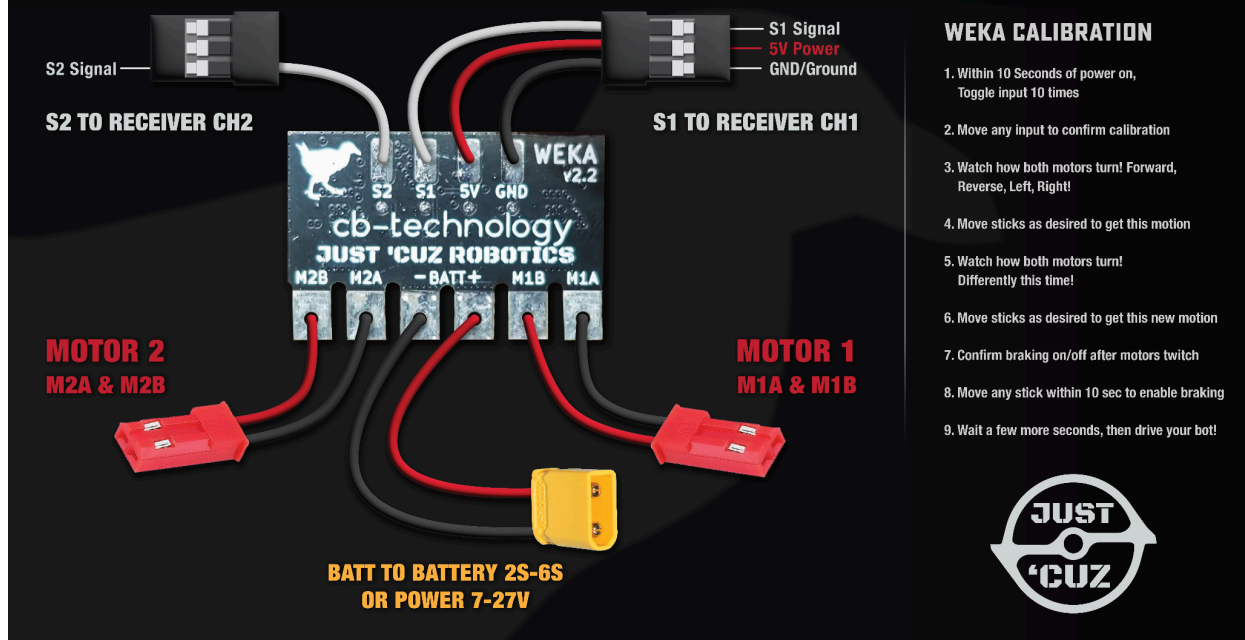
2A: Prep Electronics - Standard: WEKA and DartBox Dragon Motors

Parts and Tools Needed:

- 1X [WEKA 2X 20A Dual ESC](#)
- 2X Servo connectors
- 1X XT30U Connector with wire pigtails
- 2X JST Connector Pair or 2 red and 2 black wires for motors
- 1X Assembled Motherboard
- 2X DartBox Drive Motors
- 2X Motor PCBs
- Soldering iron and solder
- Wire stripper (or good flush cutters, or sharp knife)
- Heat Gun, or Lighter
- Fume Extractor (recommended, optional)

There are two videos showing how to use this ESC. There is a [dedicated video just about the WEKA](#) which goes over soldering and calibration in detail. The soldering process is also covered in the [SSP 2.0 Electronics Video](#).

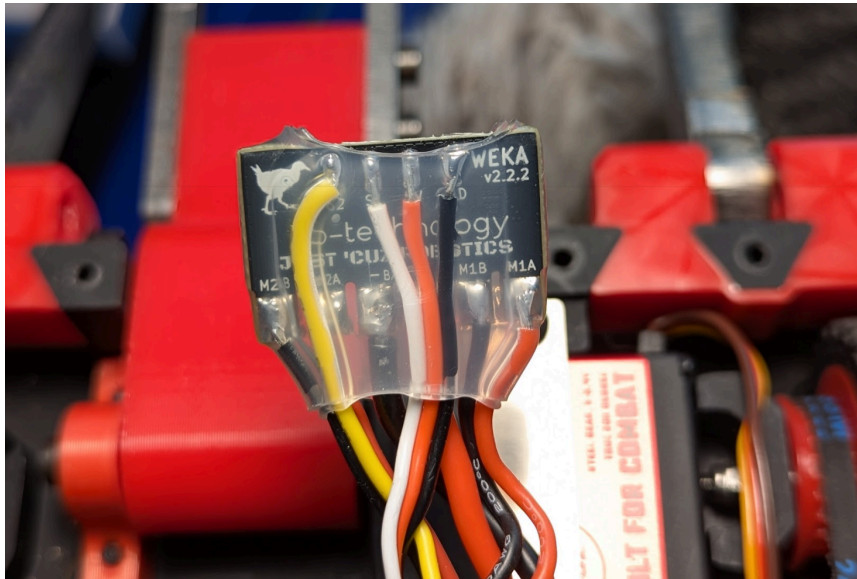
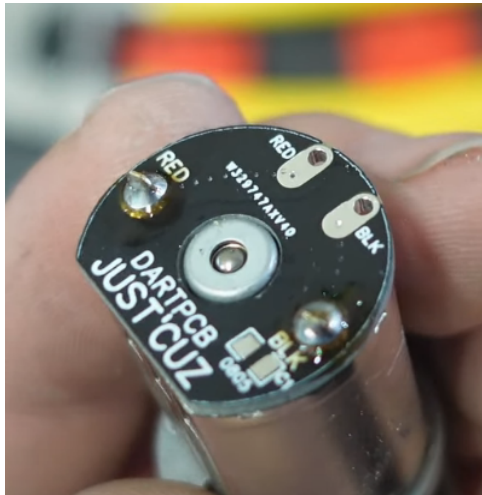
WEKA WIRING GUIDE



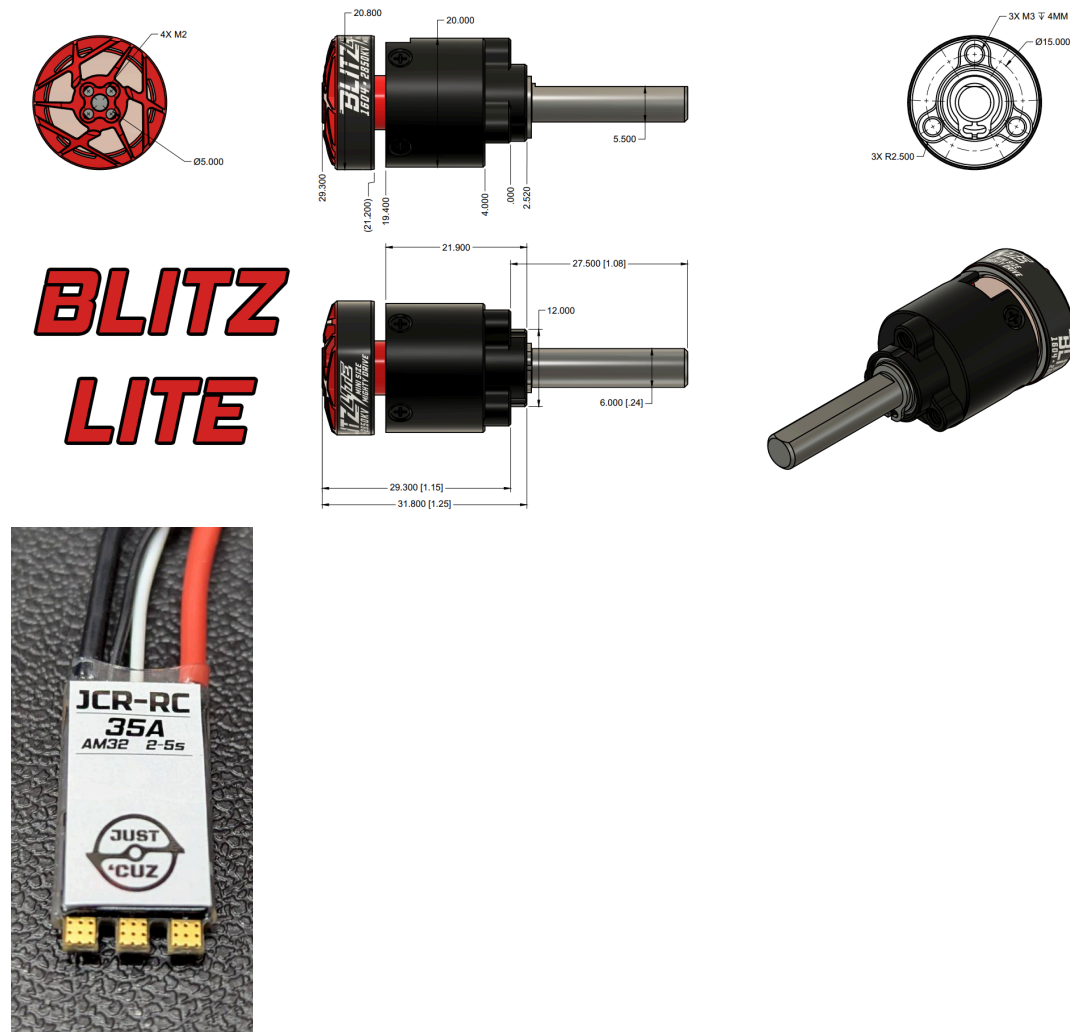
Instructions: [WEKA Timestamp](#)

1. The XT30U pigtail power wires should be just about the correct length for this but trim to the desired length if they are too long
2. If using JST connectors, you will be attaching the male end to the motors and the female to your WEKA
3. Solder the JST Female connectors as shown above to the WEKA motor ports. Red vs black doesn't matter for A and B
 - a. But if you are consistent with red A and black B it makes any spare motor a quick drop in swap!
 - b. **If you do not have the mating JST connectors, you may cut the red connectors off, strip and tin wire ends**, and direct solder them to your motors later on
4. Solder the red and black wires of the XT30U-M Male pigtail to the WEKA, red to BATT+ and black to BATT - as shown above.
5. Now for the hard part! Solder **BLACK** to **GND**, **RED** to **5V**, **WHITE** wire to **S1** and **Yellow** to **S2**.
 - a. If your WEKA came with two 3-pin servo cables instead of one 3-pin and one yellow wire single pin, you may cut the red and black wires off the second 3-pin and just wire the white to S2.
6. Insulate your WEKA with heat shrink or Kapton tape
7. With motor PCBs on a flat surface, tin the pads on top for the motor wires
8. Solder matching red and black wires or red JST male connectors to the indicated pads on top of the PCBs. Wires can face toward or away from the motor, we recommend towards plus a dab of hot glue to reinforce the connection.

9. Place motor PCBs on the back of the motors, with a red dot matching the indicated 'red' tab slot, then solder tabs in place



2B: Prep Electronics - Pro/Brushless: Blitz Lite Brushless & AM32 ESCs

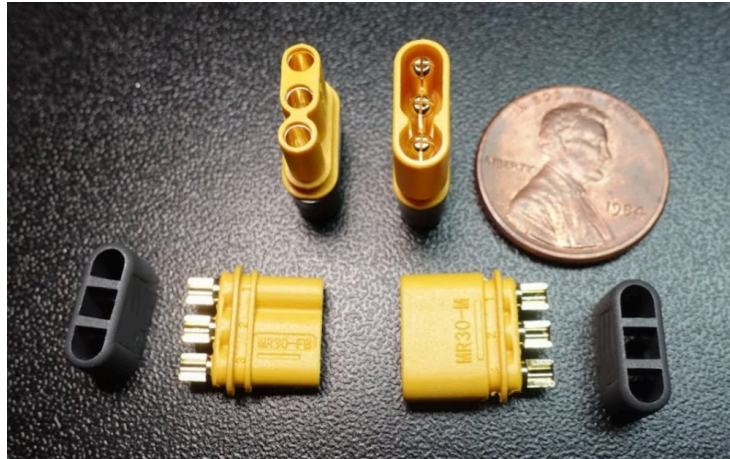


Parts and Tools Needed:

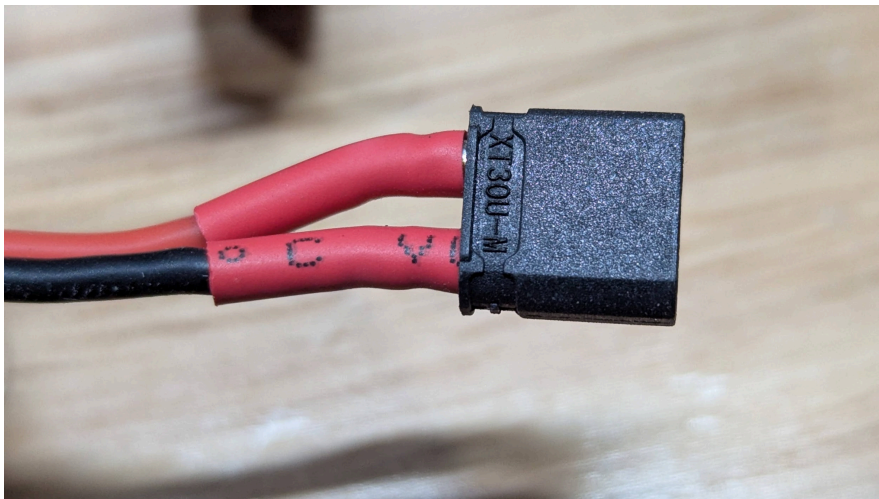
- 2X Brushless AM32 ESCs ([JCR-RC](#) or other [35A ESC](#))
- 2X [Blitz Lite Drive Motors](#)
- 2X XT30U-M connectors
- 2X MR30 connector pairs (optional)
- 1X Assembled Motherboard
- Soldering iron and solder
- Wire stripper (or good flush cutters, or sharp knife)
- Heat Shrink Tube (recommended) or electrical tape/kapton tape
- Heat Gun, or Lighter
- Fume Extractor (recommended, optional)

Instructions: [Blitz Lite + 35A ESC Wiring Video Timestamp](#)

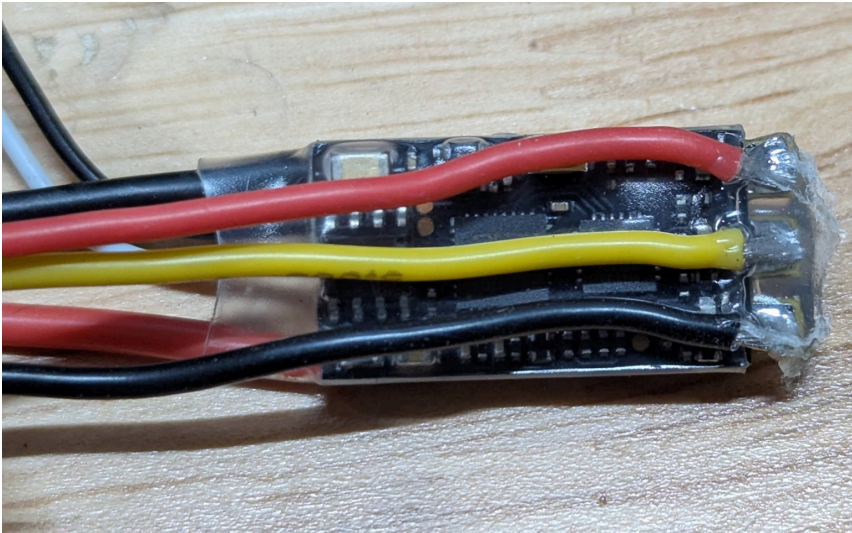
1. The ESC power wires should be just about the correct length for this but trim to the desired length if they are too long.
2. Same for the 3 motor phase wires, black red and yellow.
3. (Optional - not included) If using [MR30 connectors](#), you will be attaching the male end to the motors and the female to your ESCs with additional wires. The male end has pins and is labeled MR30-M, female is MR30-F.
 - a. If you wish to use MR30 connectors, cut the motor phase wires in half and solder the cut-off ends to the ESC phase pads. Color order does not matter; just be consistent.
 - b. Make sure to slide the grey piece onto the wires before soldering on the connector, then snap it into place. This replaces heat shrink.



4. Slide about 1/2" of heat shrink tube onto each of the red and black power wires on the ESCs.
5. If you cut any wires, strip about 1/4" of insulation off each and twist the ends.
6. Solder XT30U connectors to the ESCs for power - **RED** to the (+) flat side, **BLACK** to the (-) rounded side. Plugging the connectors into the Motherboard and using it as a jig helps a lot here.
7. Heat up the heat shrink to insulate these connections.



8. Next we need to solder the motor phase wires to the ESC. The color order doesn't really matter, but for consistency, do **Black** to the left most pad, followed by **Yellow** and then **Red**.
9. Now that all the soldering is done let's connect it all and test! Plug in your battery and nothing else into the motherboard, then turn it on (use the provided 3/32 hex key to tighten the screw accessed on the bottom just til snug). You should see a bright LED on the Motherboard and a flashing blue LED on the FS2A.
10. Wire the ESC servo connectors to the motherboard vertical pins next to the FS2A, with both signal connectors going to CH1 and CH2 on the motherboard. **The left/right can be flipped in your transmitter but for consistency, Right to CH1, Left to CH2.** These are the two **without a center pin!** (Again, black wire facing the outer edge of the Motherboard, white facing the inner.)
11. Double-check the connector orientation on the ESCs and Motherboard XT30s. Now connect the ESC power XT30Us to any 2 open XT30U ports on the Motherboard. **IF THIS IS INCORRECT YOU MAY DESTROY YOUR ESCS WHEN POWERED!**
12. If your motors have MR30 connectors, now plug in your motors.
13. The wiring is pretty much done! Insulate any exposed connections with hot glue.



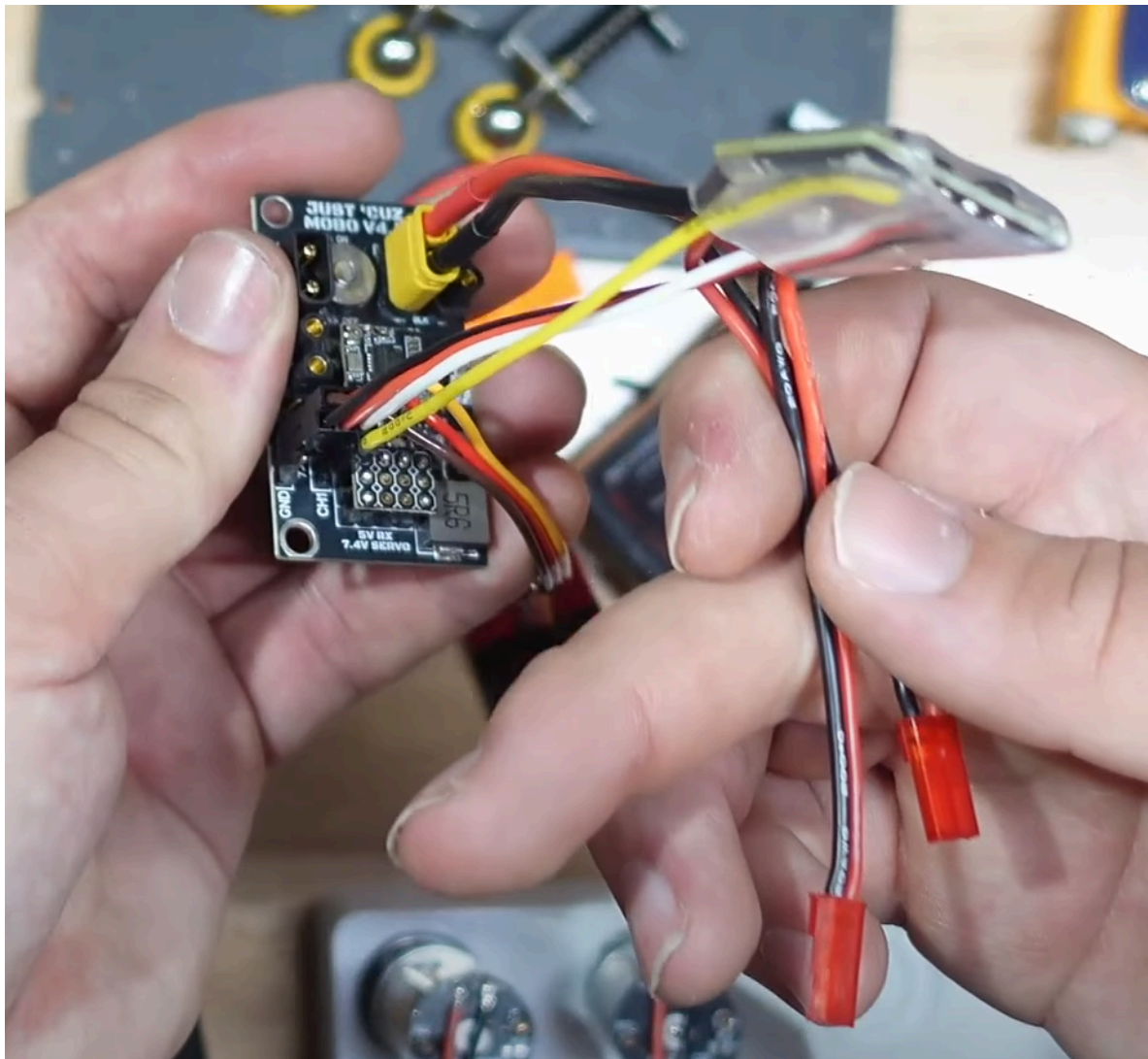
3: Test Electronics

Parts and Tools Needed:

- Soldered Motherboard + FS2A
- Soldered WEKA Dual brushed ESC or 2X Brushless ESCs
- Soldered DartBox Drive motors + Motor Breakout PCBs, or Blitz Lite motors
- Servo
- 3/32" Hex Key/Power on Key (Blue T-Handle)

Instructions:

1. Plug a battery into the Motherboard and tighten the screw switch to turn it on. If the Motherboard power LED lights up green, this is a good sign! If the FS2A blue LED starts slowly blinking, this means the hardest soldering work for the kit is completed.
 - a. If either of these do not happen, look over all your solder joints again, reflow or remove any messy looking ones or balled-up blobs. A solder sucker or solder wick works well here.
2. Loosen to Turn off the screw switch.
3. Plug the ESC XT30U connectors into any open PWR ports on the Motherboard
4. Connect drive motors to ESCs (if not hard-wired or connected already)
5. Connect the Servo to Motherboard CH3 (3 pins), black/ground wire to the outer edge of the board.
6. Connect the ESC signal wires to the Motherboard CH1 and CH2 pins (center pin is missing here). Which signal wire goes to CH1 or CH2 isn't important yet. See the photo below for reference.
7. Power on the Motherboard again. If you have a WEKA connected it should have a stable on **RED** power LED and alternating flashing **BLUE** indicator LEDs.
 - a. Note the AM32 brushless ESCs LEDs do not always light up when powered, so if you have a brushless kit there isn't much to see here!
 - b. If you see smoke or hear a loud pop, unplug the battery immediately and email team@justcuzrobotics.com with some information about what happened, where the smoke came from, and send clear images of all your soldering and wiring.
8. (Optional) Bind your radio transmitter to the FS2A as shown in the Motherboard soldering video, and jiggle the sticks to make sure the motors and servo respond properly.
9. Once satisfied, unplug everything and move on!



4: Install Motherboard & Bind Radio

Parts and Tools Needed:

- SSP UHMW Billet Chassis
- Fully soldered electronics (as created above)
- 3X Plastite Button Head #6 x 1/4" screws (silver)
- T15 Torx Screwdriver/Bit
- LiPo Battery
- Radio transmitter
- Servo

Instructions: Video timestamp [Motherboard and Connections](#)

1. Position the Motherboard with screw switch toward the outside of the bot, such that the screw holes align with the little bosses in the chassis
2. Insert and tighten three #6 button heads to hold the Motherboard in place
3. Connect the battery to the Motherboard..

4. Get your ratio transmitter ready and bind it to the FS2. This [video will guide you through the binding process](#), or you can follow the instructions below.
 - a. First, turn off the main power switch motherboard to remove power to the receiver.
 - b. Put the transmitter in bind mode. For FS-i6 you must hold the bind button with the radio off, then power it on while holding it and then you may let go and should see a rapidly flashing LED.
 - c. For OpenTX/EdgeTX radios like the MT12 and Zorro, hit the **MDL 'model' button**, then **Next Page** to get to page 2, **SETUP**. Scroll down until you see **Internal RF**. Switch the **Internal RF Mode to MULTI**. Then set the **Type to "Flysky2A"** (NOT just "FlySky", I know, it's dumb.
 - d. Scroll down further until you see **Receiver 00 [Bnd] [Rng]**. **[Bnd] is BIND**, select this option by scrolling over it and pressing down on the scroll wheel.
 - e. Put the FS2A in bind mode. To do this you must hold the black button on the FS2A and while holding it, power on the Motherboard. You may see the blue light flash rapidly and then turn solid or flash slowly. If this rapid flashing stops your receiver is bound correctly.
 - f. Test! Turn off the radio and Motherboard, then turn them both on like normal. Connect the servo to channel 3 on the Motherboard (black wire facing the edge of the Motherboard). You should be able to use the throttle channel 3 (left stick up/down) on your transmitter to control the servo! Now power everything off.
5. If you are using the Radiomaster MT12 pistol grip, [watch this section of the assembly video](#) to learn how to assign the lifting arm control to a switch or dial.
6. Once you have the arm position control set up and working, set the arm to control to the lowest position.

5A: Assemble Servo Lifter Assembly (Standard Arm)

Parts and Tools Needed:

- Fully soldered electronics (as created above)
- Steel Servo Horn
- TPU Standard/Wide Arm
- 3X 4mm x 35mm Shoulder Bolt
- 3X M3 PEM/Flush Mount Nut
- 1X M3 x 12mm Flat Head Screw
- 2X AR600 (5mm or 3/16") Arm Fork
- 2mm Hex Wrench
- Radio transmitter

Instructions: Video Timestamp [Servo Arm + Support Assembly](#)

1. This part is confusing without the aid of the video as it will differ for different transmitters, and you will be setting up endpoints for the servo before installation

2. Follow the video carefully, and be sure to set your endpoints with your radio when installing the servo arm assembly. Failure to do this can result in killing your servo by having it stall in the full up or down position, or not having the full range of travel!

5B: Assemble Servo Lifter Assembly (Anti-Horizontal Arm) (Skip this if you don't have a 3rd arm fork)

Pro tip: If you buy an extra servo, steel servo horn, and arm fork pair, you can build up the other lifter arm assembly for a super quick swappable spare. All the extra hardware needed is included with your kit!

Parts and Tools Needed:

- Fully soldered electronics (as created above)
- 6X Plastite Pan Head #6 x 1/2" screws (black)
- Steel Servo Horn
- TPU Anti-HS Arm
- 3X M3 PEM/Flush Mount Nut
- 4X M3 x 12mm Flat Head Screw
- 1X AR600 (5mm or 3/16") Arm Fork
- 2mm Hex Wrench
- Radio transmitter

Instructions: Video timestamp [Anti-Horizontal Arm Assembly](#)

1. This part is confusing without the aid of the video as it will differ for different transmitters, and you will be setting up endpoints for the servo before installation
2. Follow the video carefully, and be sure to set your endpoints with your radio when installing the servo arm assembly. Failure to do this can result in killing your servo by having it stall in the full up or down position, or not having the full range of travel!

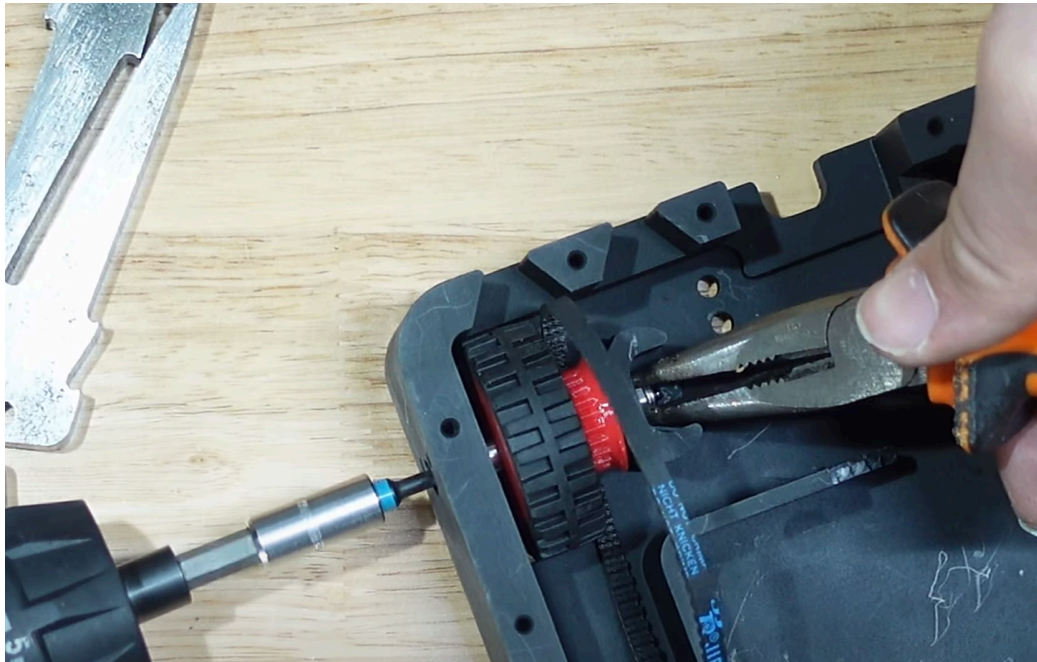
6: Assemble & Install Front Wheels and Drive Belts

Parts and Tools Needed:

- 2X Aluminum Wheel Bushings
- 2X Front Wheels (Urethane or LEGO tire, front wheels have a small circular hole through the center)
- 2X 4mm x 35mm Shoulder Bolts
- 2X M3 Nylock Nuts (not the thinner PEM nuts)
- 2X 74T Timing Belts
- SSP Chassis
- Needle Nose Pliers
- 3mm Hex or T15 Torx Bit/Driver

Instructions:

1. The bushings have a thicker shoulder at one end. Insert the bushings into the wheels so the bushing is on the tire side, not the pulley side.
2. Loop a timing belt around one of the wheels, we'll start on the right side.
3. Grab a shoulder bolt, these will work as the front axles
4. Position the wheel so it lines up with the recessed hole on the outside of the chassis in the front. Insert the shoulder bolt through the chassis outer wall, through the bushing, and through the hole on the inner raised section of the chassis. Make sure the threads stick out.
5. Using your fingers, carefully start threading the Nylock nut a couple turns. Then grab the nut firmly with pliers and tighten the bolt and nut together with your wrench or driver.
6. Once the Nylon ring is past the end of the thread this is tight enough. Ensure the wheel can spin freely.
7. Repeat for the left side.



7A: Standard: Install DartBox Drive Motors & Rear Wheels

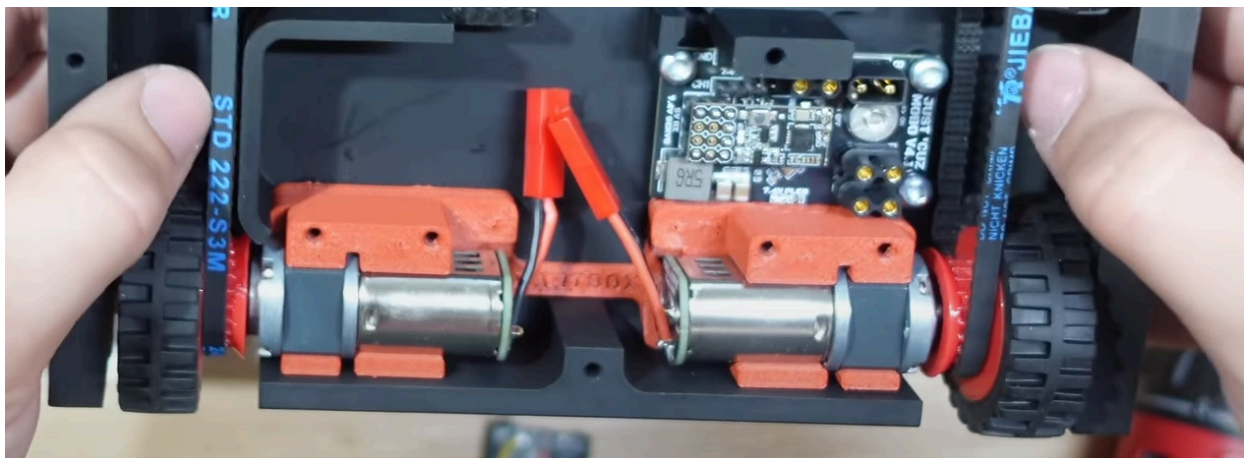
Parts and Tools Needed:

- Fully soldered electronics + Motherboard (as created above)
- Both drive motors
- 4X Plastite Pan Head #6 x 1/2" screws (black)
- 3D Printed DartBox Motor Insert
- 3D Printed Motor Clamps L and R
- 2X Rear Wheels

- 2X 4mm bore Hex Hubs
- T15 Torx Screwdriver/Bit
- 2mm Hex Key
- Blue Loctite 242 or similar medium strength threadlocker

Instructions: [Video timestamp](#)

1. Prep a small puddle of threadlocker on a non-absorbent surface like a plastic bag.
2. Remove the four set screws from the hex hubs to apply threadlocker, then reinstall them just below flush with the flat hex sides of the hubs. Two screws per hub on the flatted sides only.
3. Slide the DartBox motors into the 3D printed insert, such that the wires face toward the front (the thicker side with 4 holes)
4. Push the hex hubs into the rear wheels so the set screws line up with holes in the pulley part of the TPU wheels
5. Loosen the set screws until they no longer are visible through the hub bore to allow the motor shaft to easily pass through.
6. Slide the rear wheels onto the motors, leaving about a 1mm gap (1/16") between the pulley face and motor face, and the pulley side facing in toward the motor.
7. Line up one set screw with the motor shaft flat and tighten it securely. Then tighten the opposite set screw.
8. Loop the right timing belt over the right wheel; then the left timing belt over the left wheel, and line them up so the belts grab on both of the pulleys.
9. Now you can sit the motor insert in the chassis, hold it firmly against the back of the chassis and turn it over to expose the bottom. Insert the 4X #6 plastite screws through the chassis bottom and secure the motor mount in place. Careful not to over tighten these!
10. Ensure that the belt is tight enough that when you spin the back wheel by hand the front turns with it while holding the bot in the air. If it's too loose, you may loosen the bottom screws and pull back again and retighten. If it is still a bit loose it will likely be fine once the lid is in place.
11. Remember that before you install the lid you need the Right (R) motor clamp over the right motor, and Left (L) over the left motor. The holes should line up and arrows point to the wheels. Leave them off for now as they can fall out easily when jostling the kit around for the following steps.



7B: Brushless: Install Blitz Lite Drive Motors & Rear Wheels

Parts and Tools Needed:

- Fully soldered electronics + Motherboard (as created above)
- Both drive motors
- 3D Printed Blitz Lite Inserts (L and R)
- 2X 3D Printed Dovetail Wire Guards
- 4X Plastite Pan Head #6 x ½" screws (black)
- 2X Rear Wheels
- 2X 6mm bore Hex Hubs
- T15 Torx Screwdriver/Bit
- 2mm Hex Key
- Blue Loctite 242 or similar medium strength threadlocker

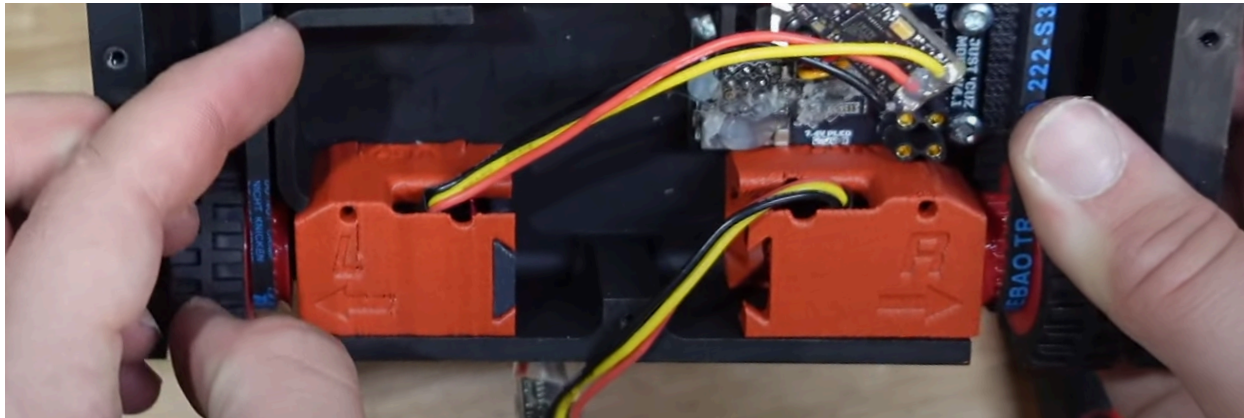
Instructions: [Video timestamp](#)

1. Prep a small puddle of threadlocker on a non-absorbent surface like a plastic bag.
2. Remove the four set screws from the hex hubs to apply threadlocker, then reinstall them just below flush with the flat hex sides of the hubs. Two screws per hub on the flatted sides only.
3. Slide the Blitz Lite motor into the 3D printed inserts, aligning the wires with the narrow slot and ensure that the 3 lobe faceplate fits nicely into the matching section of the mount. Repeat for both motors and both L and R inserts.
4. Apply some loctite to the 3X M3 x 8mm flat head screws and install them into the face of the gearbox locking it into the insert. Repeat for the second motor.
5. Push the hex hubs into the rear wheels so the set screws line up with holes in the pulley part of the TPU wheels
6. Loosen the set screws until they no longer are visible through the hub bore to allow the motor shaft to easily pass through.
7. Slide the rear wheels onto the motors, leaving about a 1mm gap (1/16") between the pulley face and motor face, and the pulley side facing in toward the motor.
8. Line up one set screw with the motor shaft flat and tighten it securely. Then tighten the opposite set screw.
9. Grab the right drive side (looking at the chassis from the rear) timing belt and stick the right motor and wheel assembly through it. Then pull the belt tight to both pulleys.
10. Repeat on the left side.
11. Now you can sit the motor inserts in the chassis, hold them firmly against the back of the chassis and turn it over to expose the bottom. Insert the 4X #6 plastite screws through the chassis bottom and secure the motor mounts in place. Careful not to over tighten these!
12. Ensure that the belt is tight enough that when you spin the back wheel by hand the front turns with it while holding the bot in the air. If it's too loose, you may loosen the bottom

screws and pull back again and retighten. If it is still a bit loose it will likely be fine once the lid is in place.

13. Slot the dovetail wire guard into place from the top, ensure it sits flush with the Lite mount or just below.
14. After installing the motors and testing, if you have any drive issues, these are often related to ESC firmware/settings. The most reliable setup found in testing has been AM32 V1.28 (or newer) with PWM by RPM enabled, and 150% startup, 25 or auto timing. These should be set up for you out of the box on JCR-Rc ESCs. For more info on adjusting ESC settings and flashing updated firmware:

▶ [AM32 ESCs and You! Combat Robot ESC Wiring, Usage, Programming and More](#)



8: Install Servo Lifting Arm Subassembly

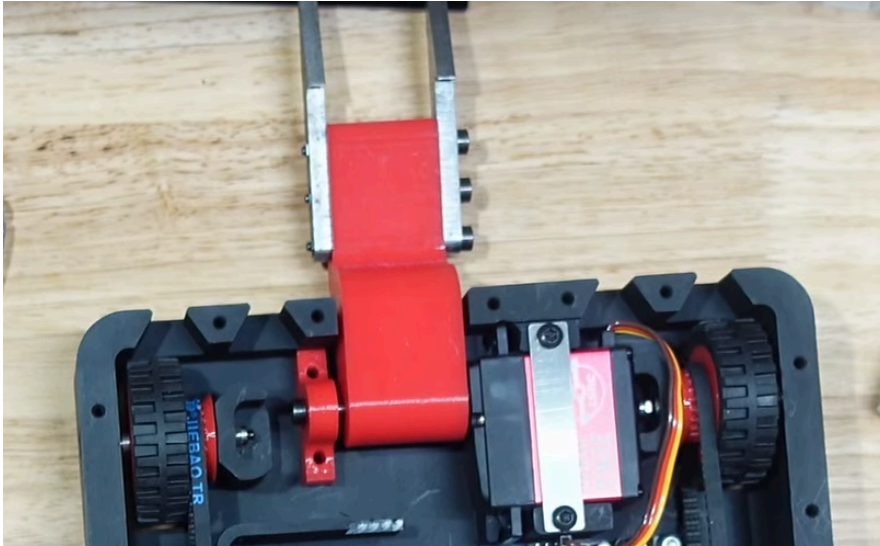
Parts and Tools Needed:

- Assembled lifter arm (standard 2 fork or anti-hs angle fork) with servo and pivot support
- 6X Plastite Pan Head #6 x 1/2" screws (black)
- Aluminum servo retainer plate
- Torx T15 Driver/Bit
- Radio transmitter

Instructions: [Video timestamp](#)

1. Slot the servo into place, ensuring the tabs that stick out on the sides but up against the nubs in the chassis. The standard servo has no wiggle room, but the brushless servo is smaller and should be shifted as far toward the "arm" side as it will go.
2. Ensure the pivot support flat side is down and lines up roughly with the 4 holes in the chassis bottom.

3. Install the servo retainer plate across the 2 holes on top and secure with 2X #6 x 1/2" plastite screws.



4. Secure the pivot support with 4X plastite screws
5. Done! Super easy.

9: Complete All Wiring/Connections

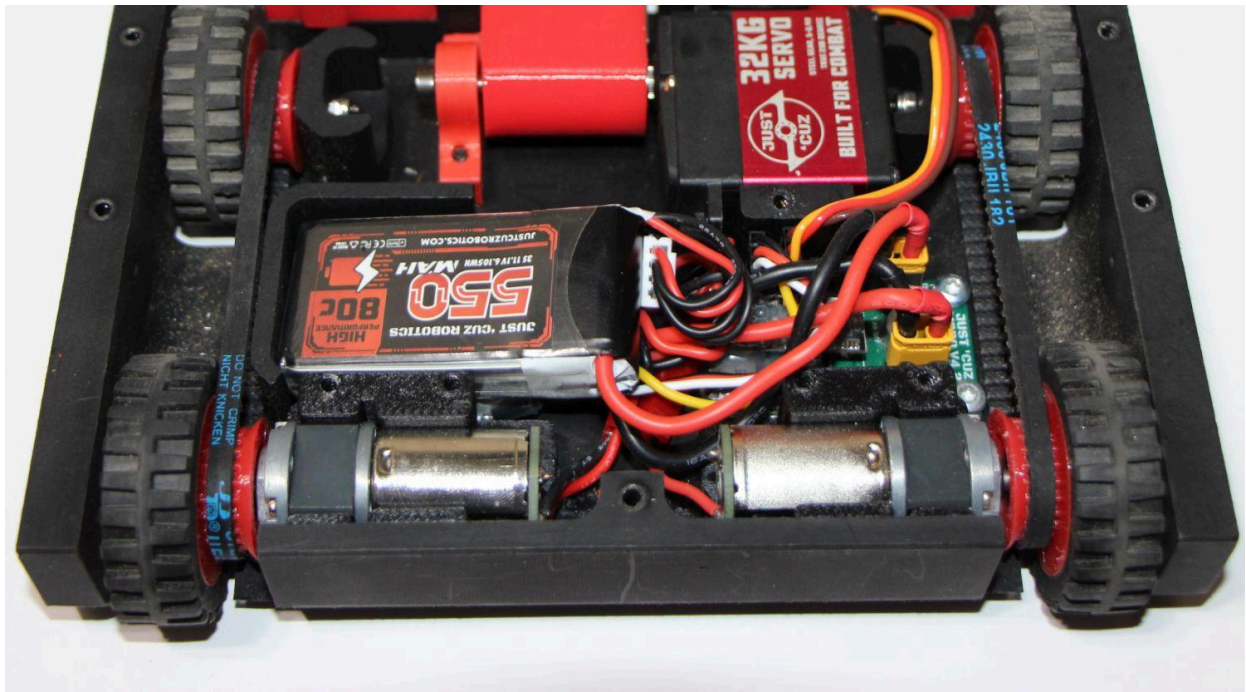
Parts and Tools Needed:

- 80% Assembled bot (which you have after the above steps)
- Soldered ESCs (WEKA or brushless)
- LiPo Battery
- Power on 3/32" T handle

Video Timestamps: **Standard:** [WEKA Dual ESC install](#). **Brushless:** [Brushless ESC Connections](#).

Instructions:

1. Connect the ESC signal wires as shown in the video
 - a. **WEKA: Yellow signal wire to CH2, white signal to CH1. Tuck the WEKA into the battery compartment.**
 - b. **Brushless: single ESCs: Left ESC to CH1, Right to CH2. Tuck the ESCs and excess wire into the back between the motors.**
2. Connect your motors to your ESCs if not done already.
3. Connect ESC XT30 power to the Motherboard PWR ports, any will do.
4. Plug in the battery, switch on the Motherboard, and ensure everything works. Now is a great time to put the kit onto the floor and run through the WEKA calibration or brushless drive mixing process as shown in [this radio setup video](#).
 - a. For both brushed and brushless setups there is a lot more you can do with OpenTX/EdgeTX radios as well. Once you finish your build, you may want to watch this video for additional tips and tricks.
[▶ EdgeTX Mixing for Combat Robotics \[Tutorial\]](#)
5. Congrats, you have a fully functional combat robot! Now we just need to add the forks or wedge.



10A: Assemble Forks

Parts and Tools Needed:

- 4x M5 x 40mm Bolt (or just 2 for Claw)
- 4x M5 Hex Nut (2 for Claw)
- 2X $\frac{3}{8}$ " thick AR600 Fork (your choice of barbed, or claw)
- 2X TPU Fork Mounts
- 4mm Hex Bit/Wrench (or T25 Torx Bit in a pinch)

Instructions: Video timestamp for [Claw/Hinged Forks Assembly](#)

1. Ensure wider 2 fork standard arm assembly is installed in the bot, not the single fork Anti-HS arm.
2. Pretty easy and simple stuff here! The fork mounts have dovetails on top that slot into the chassis.
3. Insert the M5 hex nuts into the fork mounts (top hole only for claw forks)
4. For claw forks, apply loctite to the end of an M5 x 40mm bolt.
5. Sandwich a fork between the halves of the fork mount, then insert the M5 x 40mm bolt through the hole and by hand start threading it into the nut.
6. Repeat for the second bolt and fork mount.
7. For barb forks, ensure both bolts are in place and tighten until about $\frac{1}{8}$ " of thread sticks out. For claw forks, leave the screw loose enough for the fork to hinge freely.

10B: Assemble Wedge

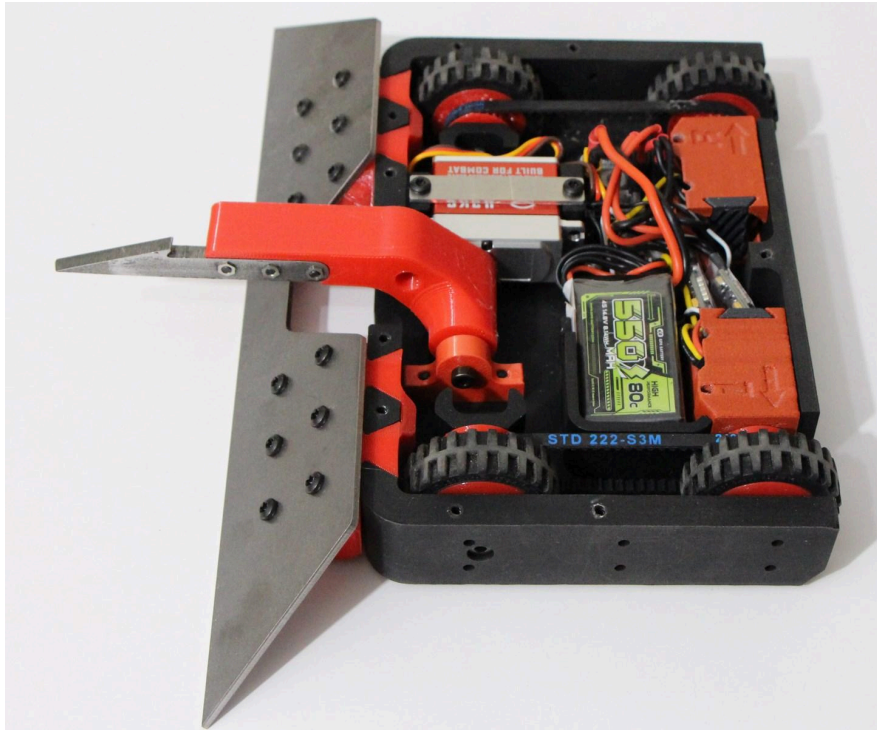
Parts and Tools Needed:

- 12X Plastite Pan Head #6 x $\frac{1}{2}$ " screws (black)

- 1X AR500 Wedge (2mm or 3mm thick)
- 2X TPU Wedge Mounts
- T15 Torx Bit/Driver

Instructions: [Video timestamp for Wedge](#)

1. Ensure the anti-HS arm assembly is installed in the bot, not the wide standard arm.
2. Line up wedge mount with the 6 holes on the wedge.
3. Install the 6 screws
4. Repeat for the other side
5. Slot into the chassis dovetails



11: Install Battery and Lid

Parts and Tools Needed:

- LiPo Battery (3S for Standard, 4S for Brushless)
- 10X Plastite Pan Head #6 x 1/2" screws (black)
- 4X* Long Plastite Pan Head #6 x 3/4" screws (silver)
 - For the brushless kits, you may want to just use the two outermost holes through the drive motor inserts and, not the two inner ones. This will avoid stabbing a screw through the motor phase wires.
- 1X Lid
- T15 Torx Bit/Driver
- **Standard only:** L and R motor clamps

Instructions: [Video timestamp for Lid Install](#)

1. Get the motor clamps into place over the motors if this is a standard kit.
2. Slap the lid on and align the holes

3. Install two black 1/2" plastites in the rearmost center hole and any of the front holes
4. With the lid now lined up, install the long 3/4" silver plastites through the lid middle 4 holes that thread into the 3D printed motor inserts
 - a. For the brushless kits, just the outside two will do
5. Install all remaining black plastites.

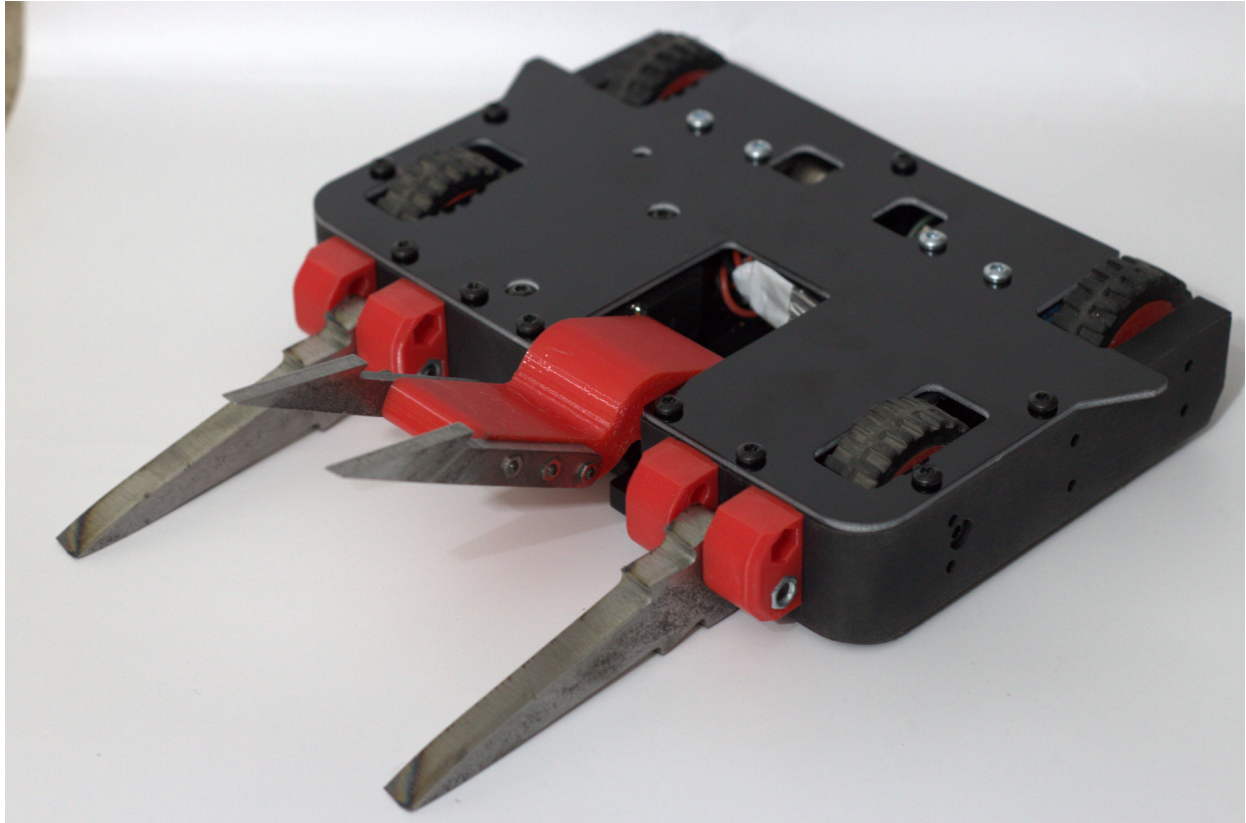
12: Celebrate and Test Drive!

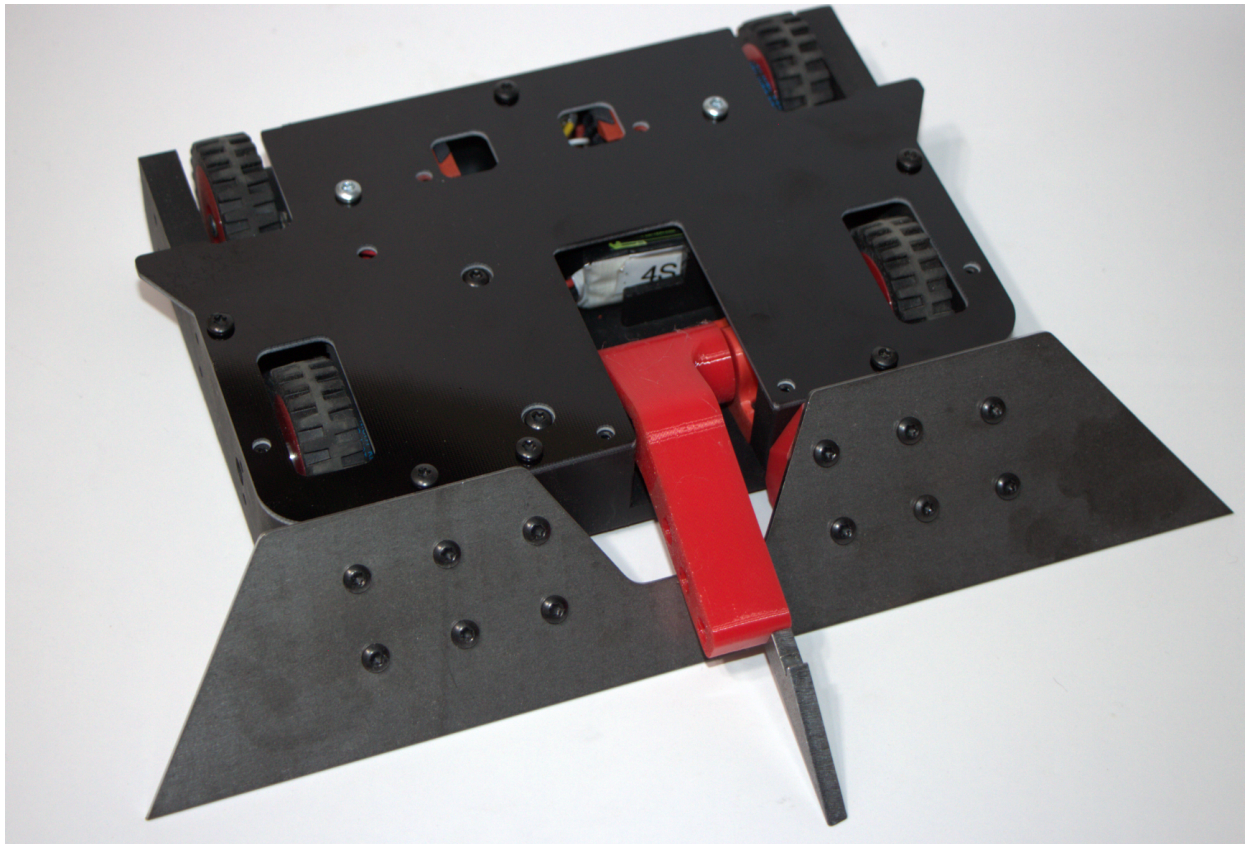
Parts and Tools Needed:

- Radio Transmitter
- 3/32" Blue Hex power on T handle
- A Cookie or Ice Cream

Have some fun with your new SSP Kit!

You may now want to spend some time tuning your radio settings for the best driving experience.





Vertical Spinner Module (Optional addon)

Parts and Tools Needed:

- 8X M4 Hubmotor Mount Bolts, some kits will include M4 x 15mm button head, others M4 x 14mm Socket Heads
- 4X M3 x 12mm Socket Head blade mount screws
- 1X RDY-5022 Hubmotor
- 1X 1/4" AR600 Promo Blade
- 2.5mm or 3mm Hex Bit/Driver (if button head M4 screws, use 2.5mm, if socket head use 3mm)
- Left and Right TPU Vertical Spinner mounts
- 2X AR600 forks (Barbed or Claw)
- 2X or 4X M5 x 40mm bolts
- Loctite Blue
- 35A AM32 ESC
- Wire lock pin (Weapon lock)

Instructions: Video coming soon

1. Start by placing the promo blade onto the hubmotor so that the four slots for screws line up with the four threaded M3 holes. The blade must be oriented so that the tooth will face forward with the motor wires on the right side
2. Install 4X M3 x 12mm socket heads with blue loctite, make sure not to mix them up with M3 x 10mm if included (the hubmotors may come with the shorter M3 x 10mm installed)

3. Again using loctite on the M4 screws, secure the right side of the motor to the longer motor mount part, with wires fitting into the notch in the TPU part
 - a. **VERY IMPORTANT: DO NOT OVERTIGHTEN THESE OR YOU WILL DAMAGE THE HUBMOTOR!** You may not find these tighten up completely as the TPU can squish, but just be sure to use Loctite and only thread into the motor about 4mm.
4. Repeat for the left side
5. Lastly, install forks of choice using the M5 x 40mm bolts. You will be threading into TPU, so do not overtighten these. Loctite isn't needed.
6. Solder the motor phase wires to the ESC phase pads, and solder and XT30U connector to the ESC power wires just like the Blitz Lite drive motor assembly steps.
7. Install the locking pin through the ears and blade to prevent weapon movement before making the spinner power and signal connections
8. You should be ready to rock with your new spinner module!

Tips and Tricks/FAQ

Q: The SSP 2.0 kit has so many configuration options! How do I pick the best one?

A: There are a lot of things to consider depending on the opponent you will be facing and the type and condition of arena.

- For fighting a horizontal spinner be it undercutter, mid cutter/tomb-clone, meltybrain, or otherwise, the wedge and Anti-HS arm is always the best choice. Forks are never a good idea against horizontal spinners as they get torn off very easily. The wedge attachment is usually bad against almost every other type of opponent however since it isn't ground scraping.
- If the floor is bad or torn up and many bots are getting forks wedged and stuck under wall seams and in floor gouges, you usually want to avoid using the hinged Claw Forks unless fighting a drum or beater bar
- The Barbed Forks are my first pick when I don't know exactly what to use. They are excellent against other control bots or opponents without really strong ground game, and provide better maneuverability than the claw forks on uneven floors. When you really need as much mobility as possible they are usually best on wood floors.
- The Claw Forks are great in a specific set of situations. 1- the opponent is running a low wedge and you want to guarantee you can get under that. 2- you are fighting a drum or beater bar, as the claw fork barbs can get hit by a wide drum tooth and then hinge up and kick the opponent back. 3- You are fighting a vertical spinner that is likely to flip your SSP over a bunch. Since the claw forks work upside down you won't need to self right before reengaging, and trying to self right can leave you open to a devastating shot to the lid or bottom of the chassis. 4- on steel floors that don't really develop tons of deep gouges, these can work pretty well and still allow good mobility.

- Fighting a hammersaw or HUGE or other overhead attack bot - you should buy a titanium lid, or maybe design a pocketed AR500 lid to be lasercut.

Q: What are the differences between the SSP 1.0 and 2.0? Maybe I have an SSP 1.0 kit and want to upgrade. What do I need?

A: The SSP 2.0 kit has a redesigned UHMW billet chassis and G10 lid. The major ramifications of the redesign are as follows:

1. The biggest reason for the change is to allow the use of 3D printed motor mount inserts so that both DartBox brushed and Blitz Lite brushless drive motors can be used. Having a brushless drive option has been a very common request for years. Plus, now you can design and print your own inserts to expand your drive motor options even further.
2. The vertical spinner addon can much more elegantly attach to the 2.0 chassis as there is a cutout for the blade in the chassis base. The chassis height was also reduced to 1.20 from 1.25", and the 2.0 lid doesn't extend all the way back which allows for the bot to drive inverted at an angle with the vertical spinner attached.
3. The 2.0 chassis accommodates both the original 1.75 x 0.5 inch urethane wheels and LEGO tires which are 43.2 x 14mm, or about 1.70 x 0.55 inch. LEGO tires are beneficial for you since you can buy spares online from other retailers. The custom cast urethane wheels are quite expensive and labor intensive to make, so keeping extra stock on hand to sell spares was a real challenge. We plan to still cast batches of urethane wheels to sell as an upgrade option and to support all 1.0 kit owners.
4. Despite the overall chassis dimensions changing, if you do 3D print the needed motor inserts you can reuse all of your drive motors, ESCs, servos, wheels, belts, Motherboard.... Basically everything from 1.0 works on 2.0. The 2.0 3D printed fork and wedge mounts as well as chassis dovetails were changed slightly to make them harder to 'pop out' during a fight, but you should be able to place TPU 1.0 mounts in both chassis if you wish.
5. Once we receive our second batch of 2.0 chassis we will sell them as spares and to provide an upgrade path for SSP 1.0 owners. Same for the 2.0 lids.

Q: I bought an SSP 2.0 Standard kit, but want to upgrade to the Pro Brushless version. What do I need to buy?

A: If you have a 3D printer to print the needed Blitz Lite drive motor inserts (preferably in PETG-CF, PA-CF, PA-GF, or other high temp impact resistant plastics) then you only need a few things!

1. 2X Blitz Lite 2850kV drive motors
2. 2X JCR-RC 35A AM32 ESCs (or our larger 6S rated 35A ESCs)
3. 6mm bore Hex Hubs, since the Blitz Lites have a 6mm shaft instead of 4mm like the DartBox motors use. If you have access to a lathe or drill press you may be able to drill out the 4mm hex hubs, but with a hand cordless drill it's difficult to drill them straight through.
4. Extra XT30U connectors

5. Recommended but optional: The 2850kv Blitz Lite motors work best with a 4S LiPo. We recommend either the 4S lipo we'll be including with the Brushless kits, or a Tattu 4S 450mAh. The 3S lipo included with 1.0 kits will work fine, but the kit will drive at 75% speed vs 4S. You also may be able to use the 3800kV Blitz Lite motors, but they are less popular and may not be stocked regularly.
6. Optional: You can buy a 42kg Brushless servo to get the same power and speed boost as the Pro kits. The standard 32kg servo works fine though!

Q: I really want the [vertical spinner addon](#)! Will this work with my kit?

A: The Vertical Spinner addon works with both standard and brushless SSP 2.0 kits. The 1700kV RDY-5022 hubmotor is a great weapon platform for many SSP spinner modifications. Keep in mind that if you run it with a 3S lipo the tip speed will be 25% lower than with 4S, but it should still be fairly effective. The addon will not fit on the SSP 1.0 kit with the stock 3D printed motor mounts, but you absolutely can design your own or find my original [SSP 1.0 vertical spinner mounts on GrabCAD](#) to make it work. Just keep in mind that without the design changes from the 2.0 kits, the 1.0 kit really struggles to drive inverted in this configuration. A number of people have found ways to modify their SSP 1.0 kits and make it work.