

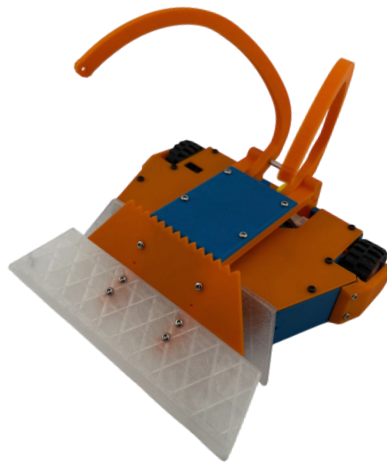
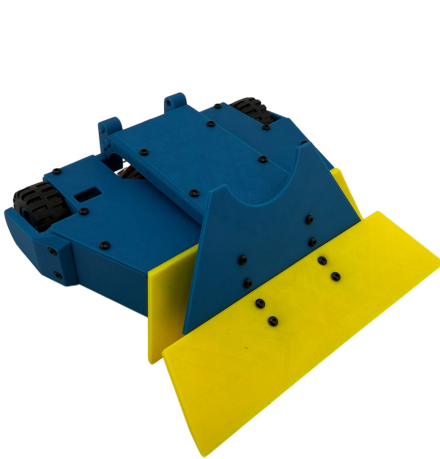
TURNABOT

create compete connect

Creatabots: FlipFrenzy & SuplexSlam Pre-soldered

Version: 2507

Assembly Instructions



Pro Tip: Read First, Build Later. Trust us—Step 12 will totally explain what Step 3 was talking about. It's like a plot twist... but with bolts.

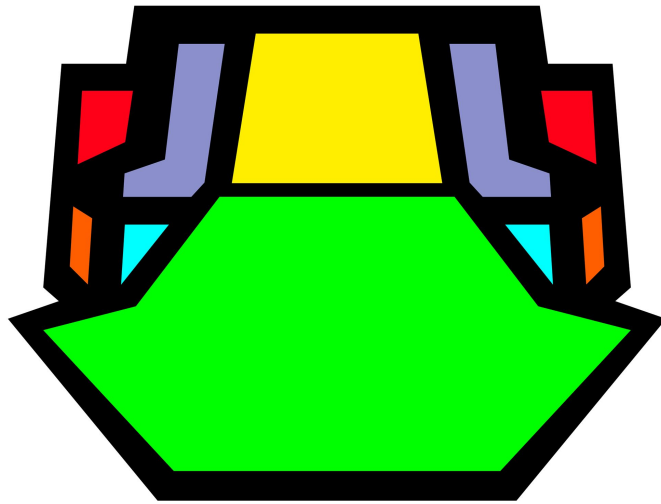
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Pro Tip: Read all the steps at least once before starting. Sometimes a later step will explain what the heck was going on earlier.

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1. Meet the Creatabots



Thank you for choosing **FlipFrenzy and SuplexSlam Creatabots**, non-destructive 8-ounce (225 g) combat robots designed to be **easy** to assemble, battle, maintain, and customize.

Creatabots strike the ideal balance: lightweight enough for small, portable arenas yet substantial enough to support exciting, dynamic designs—with **modular CAD files provided** to spark personalization and creativity—delivering the best of both worlds: creative freedom and a perfect fit inside a TurnaboX arena!

 **Put in the Work – Craft it like your robot’s counting on you (because it is)**

Don’t rush it. The little details — every screw, every spacer, every alignment — *matter*. A wobbly robot in battle usually means something skipped or rushed in the build process.

Take your time, build it right, and future-you (and your robot) will thank you.

Precision now = power later. Put in the work. You’ve got this.

 = The Goal

 = Pro Tip

 = Warnings or Safety Notes

 = Directional or Orientation Tips

 = Note

 = Success Indicators

2. Safety First!

Turnabots are among the safest combat robot kits available.

HOWEVER there are still several things to be aware of:

LiPo batteries can be **dangerous**. Charging should ONLY be done in a LiPo bag or FAR from anything flammable.

⚠ **Do NOT cut both wires of a battery at the same time.** If you need to change connectors, cut one wire, install it in the new connector, then cut the other wire.

If a LiPo has sustained any damage or has “puffed,” do NOT charge it. DISCARD it (safely and properly).

⚠ ***Over-discharging a LiPo can permanently damage it.**



⚠ Assume that **ALL** electronic joints and components have exposed **lead**.

Do not lick any electronics. Do not allow children or pets to lick any electronics.

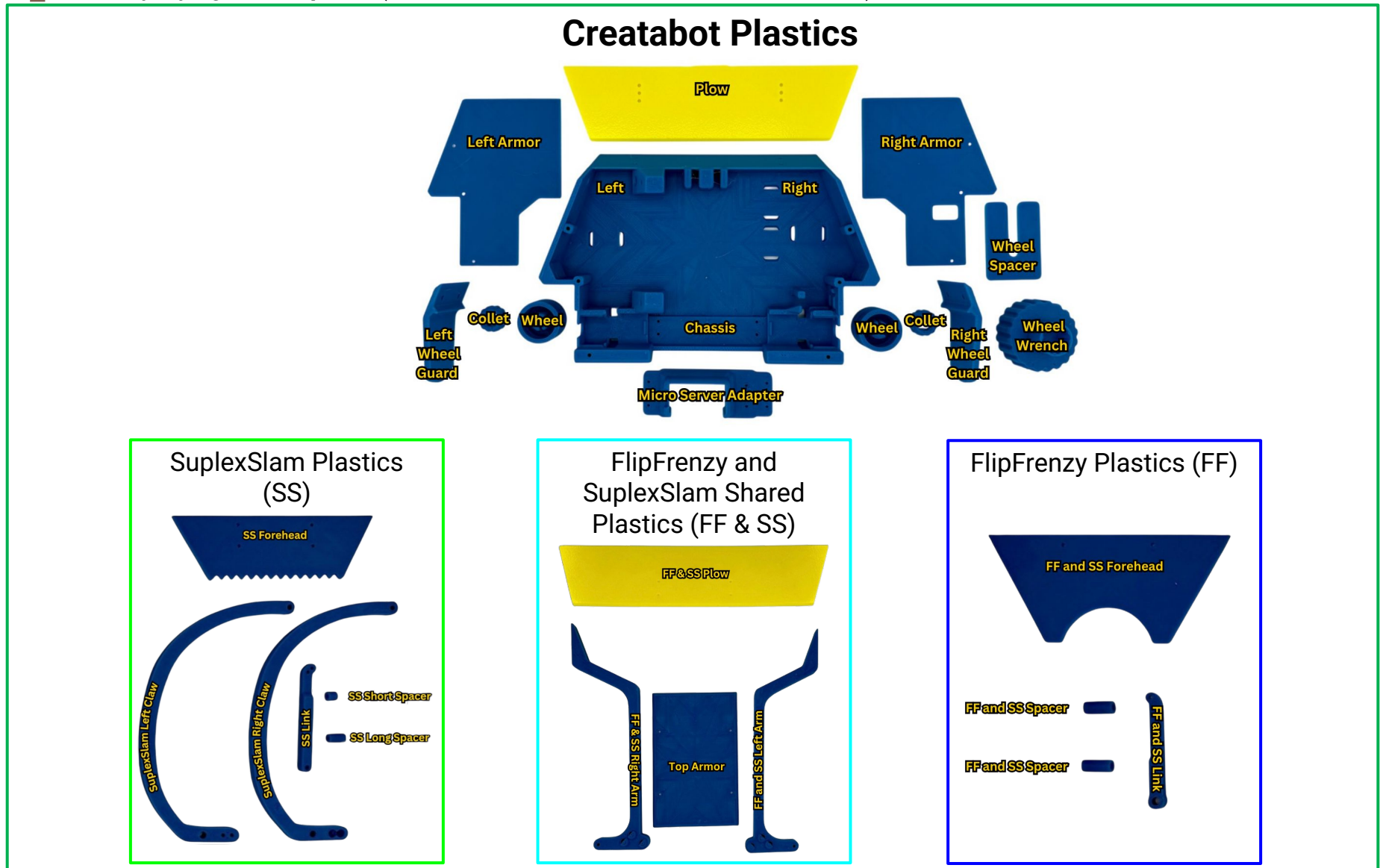
After anyone touches any electronics, faces must not be touched and hands must be washed with soap, and cold water, particularly before eating.

3. Parts, Tools, & Assembly Prep

This build is going to challenge you – but every step you take builds real engineering skills, and by the end, you'll have an awesome bot you built yourself and can be proud to compete with.



Start by laying out the parts. (Note the LEFT side and RIGHT side of the bot).



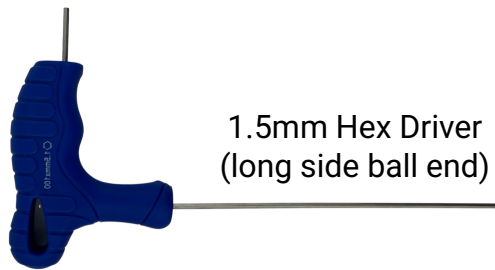
3. Parts, Tools, & Assembly Prep

 **Helpful Tip:** Before building, sort your screws.

* You have one M3 × 12mm, and four M3 × 14mm.

Four of the screws are slightly thicker M2.5 × 6mm and look almost identical to the 20 thinner M2 × 6mm screws. To avoid mixing them up, separate and set aside the four M2.5 × 6mm screws **before opening the bag of 20 M2 × 6mm screws. (If they're already in labeled bags, just leave them there.)

Included Tools



1.5mm Hex Driver
(long side ball end)



Phillips Driver



1.5mm Hex Driver



File

Component Bag



M2 x 6mm Self-Tapping (pointy)
1.5mm Hex Drive (20x)



M2 x 6mm Machine Screws (flat)
1.5mm hex drive (2x)



M2.5 x 6mm **
1.5mm Hex Drive (4x)
(**set aside at the start** - use only if
plastic is stripped)



M2 x 25mm Socket
Head Cap Screw
1.5mm hex drive

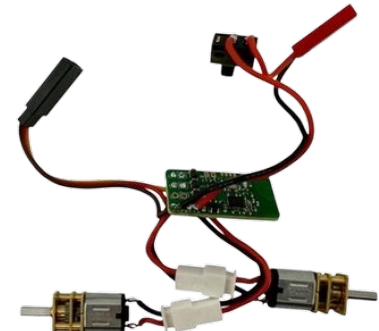
Battery



Servo



Servo Horn and
Screws



Harness with Motors



Zip Ties (4x)



Aluminum Rod



Paperclip



Tires (2x)

3. Parts, Tools, & Assembly Prep

 (available at turnabot.com)

Nice to have tools (not included)



High Quality Drivers 



SLOW Cordless,
Electric Screwdriver



Needle Nose Pliers (helpful
for placing servo screws,
among other uses) 

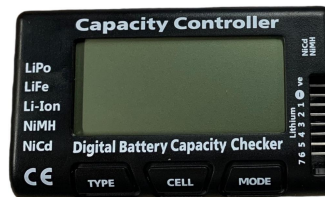


Flat Jaw Pliers (handy for
squeezing things without
marking them) 



Flush Cutters 

Super Glue / Cyanoacrylate
(using "accelerator /
activator" is recommended
for tires, wheels, repairs, etc.)



Battery Checker 

4. Malenki-Nano Intro & Harness Assembly

What does the Malenki-Nano do?

The **Malenki-Nano** is a tiny combo board that:

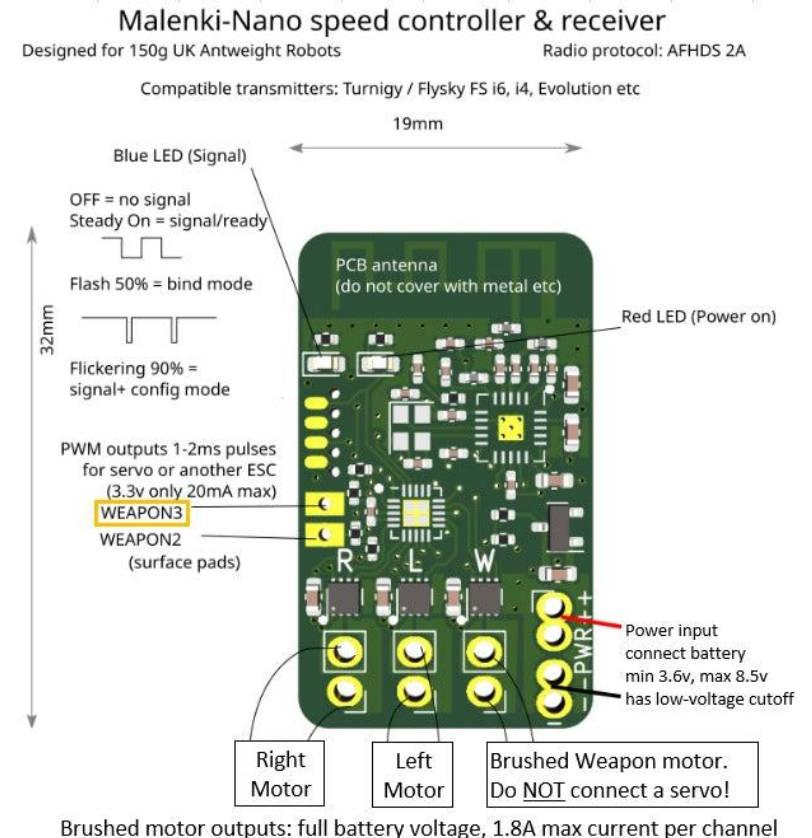
- **Receives signals** from your radio (like the FlySky FS-i6)
- **Drives two motors** — one for the left side, one for the right side (this is how your robot moves!)
- Can control a **third brushed motor** for a weapon
- Supports **Pulse Width Modulation (PWM) outputs** - PWM can be used to drive a servo or brushless motor Electronic Speed Controller (ESC)
- Accepts battery voltage between **3.6V and 8.5V**

 **What's PWM?** PWM stands for **Pulse Width Modulation** — a way of turning power on and off very fast to control speed or position.

- PWM tells the ESC how fast to go.
- It also tells servos where to turn.

Think of PWM like flicking a light switch really fast — longer “on” time = more power!

What's an ESC? An **ESC** (Electronic Speed Controller) tells a motor **how fast** and **which direction** to spin. It gets signals from the receiver chip on the Malenki and powers your motors — like a remote-controlled gas pedal!



Quick LED Reference

- **Red LED** = Power On
- **Blue LED**:
 - Off = no signal
 - Solid = ready
 - Flashing = bind mode

4. Malenki-Nano Intro & Harness Assembly

The Harness has:

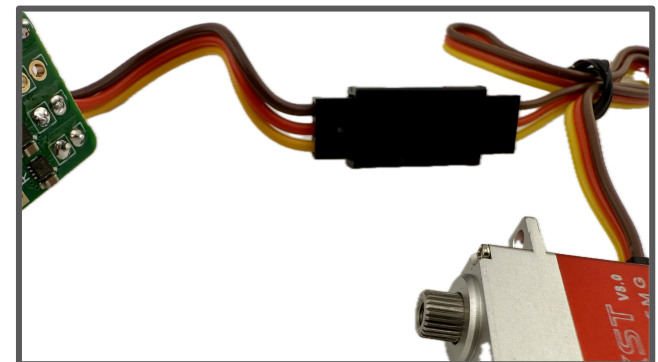
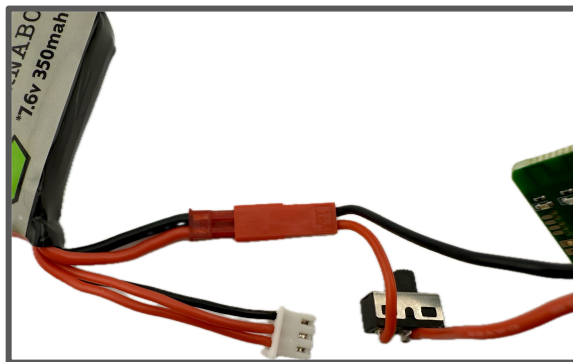
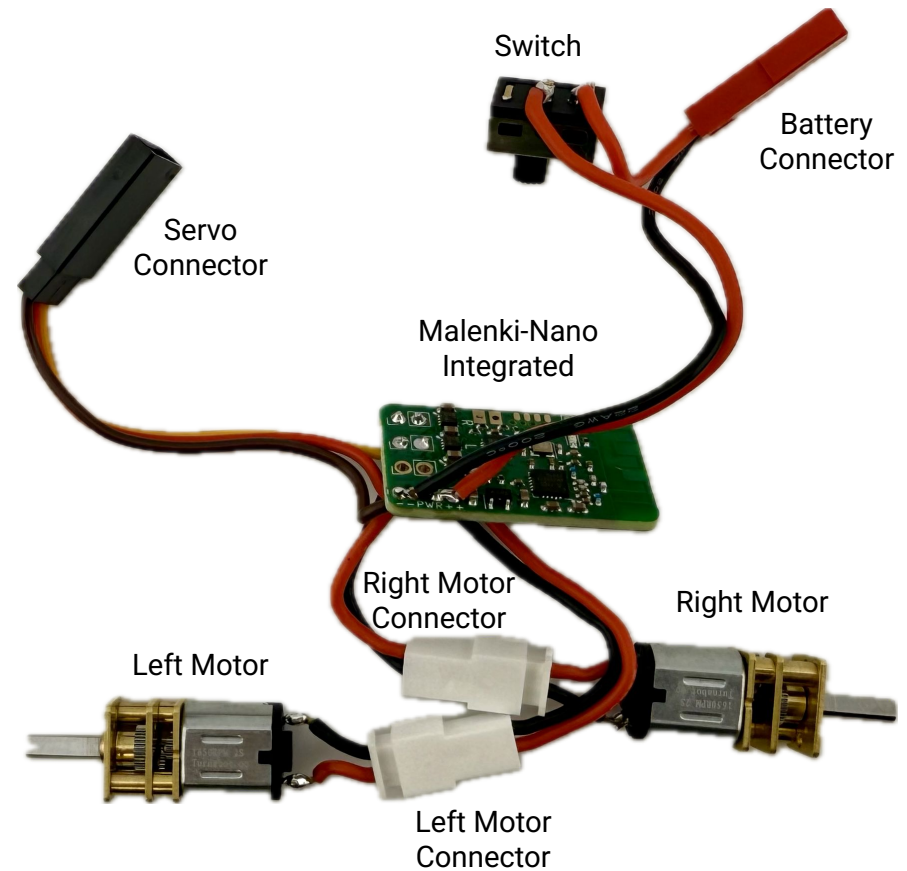
- Battery connector
- Switch
- Malenki
- Servo connector
- Right motor connector
- Left motor connector

Step 1: Connect the battery to the harness.

*Note the wire colors and keeping red-to-red and black-to-black.

Step 2: Connect the servo to the harness.

*Note the wire colors and keeping brown-to-brown and yellow-to-yellow.



5. Radio Binding

 **The Goal:** To make sure the Malenki-Nano is bound to *your* radio.

Binding is the process of getting the radio (transmitter) to talk to the receiver (Malenki / bot). If your kit was pre-soldered and shipped with a FlySky FS-i6 radio, it's probably already bound.

Switch on the harness with the radio off.

Check the LEDs: Is the Malenki bound to a radio?

- **Solid Red LED** with **Blue LED flashing** - It is ready to bind. Go to the “**Binding the Malenki...**” step.
- **Solid Red LED only** - The Malenki is already bound. (could be your radio or a different radio)

Is the Malenki bound to the radio you are holding? **Turn on your radio.** All top switches must be in the up position and the left stick pushed down. If not, the radio will alert you and prevent transmission until corrected.

- If the **Blue LED is now solid**, you're done. Go to the next page!
- **Still Solid Red LED only** - It is bound to another radio. As long as that radio isn't turned on, you can wait 90 seconds after powering on the Malenki and it will go into auto-bind mode.
- **Solid Red LED** with **Blue LED flashing** - It is ready to bind. Go to the “**Binding the Malenki...**” step.

 Having the Malenki/harness turned on with radio turned off for **90 seconds** will put the Malenki into auto-bind mode.

Binding the Malenki...

Only do this if the Blue LED is still flashing. Binding needs to be done one at a time and not at the same time as a friend!

1. Hold the **Bind** button while turning on the **FlySky FS-i6 Radio**.
2. The **Blue LED** on the Malenki should stop flashing and stay solid once it's bound.

 **Note:** The Malenki only works with radios using the **AFHDS 2A** protocol. Make sure your radio/transmitter supports this – the “**2A**” part is important!



Setting the Receiver (Rx) Battery Levels

 **The Goal:** To ensure accurate battery monitoring, the **Rx battery range** (the bot's battery) and **alarm settings** must be configured properly in the radio. By default, FlySky radios are set up for different battery types, and incorrect settings can lead to a failure to detect low battery levels. It is **CRITICAL** to monitor the battery in the bot to prevent permanent damage to the battery.

At **Turnabot**, we often configure these settings in pre-soldered kits before shipping, but you should verify and adjust them if necessary.

Steps to Check and Set the Battery Levels:

1. Ensure the radio screen's backlight is on. If not, press any of the 4 buttons at the bottom of the radio to make it respond.
2. Enter the Settings menu:
 - a. Hold the **OK** button to open **Settings**.
 - b. Press **OK** again to enter **System**.
3. Navigate to RX Battery Settings:
 - a. Press the **DOWN** button 5 times to highlight **RX Setup**, then press **OK**.
 - b. Press the **DOWN** button 2 more times to highlight **RX Battery**, then press **OK**.
4. Adjust the voltage settings (you must set High, then Alarm, then Low, in order):
 - a. Press **OK** three times to navigate to the **High** setting.
 - b. Hold the **UP** button until it reaches **8.5V**, then press **OK** three times to move to **Alarm**.
 - c. Hold the **UP** button until it reaches **7.4V**, then press **OK** three more times to move to **Low**.
 - d. Hold the **UP** button again until it reaches **6.8V**.
5. Save the settings – Hold the **Cancel** button to ensure the values are stored. (Yes, it's weird to use Cancel to Save, but that's what must be done.)

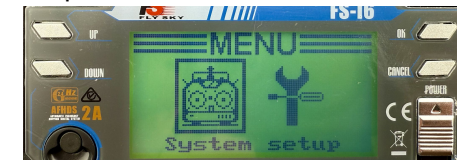
Final Check:

Once complete, your FlySky FS-i6 will now accurately monitor the bot battery and alert you when it reaches critical levels.

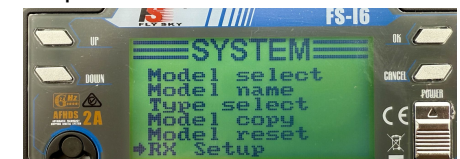
 **Again, running the battery too low can permanently damage it!**



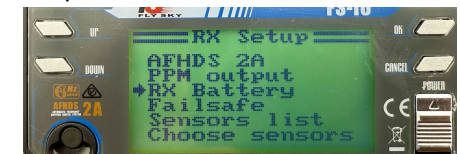
Step 2



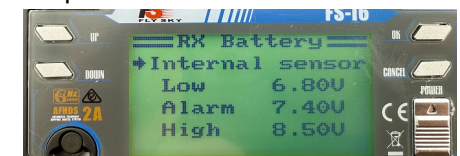
Step 3a



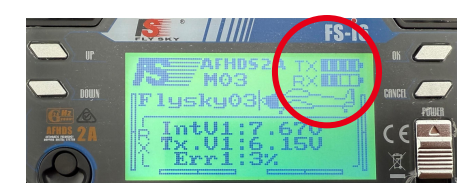
Step 3b



Step 4



Final Check

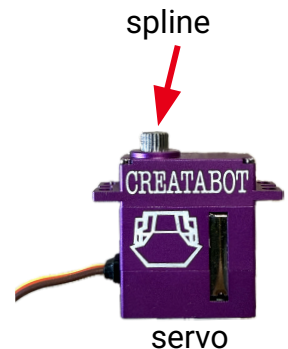


6. Servo Set Up

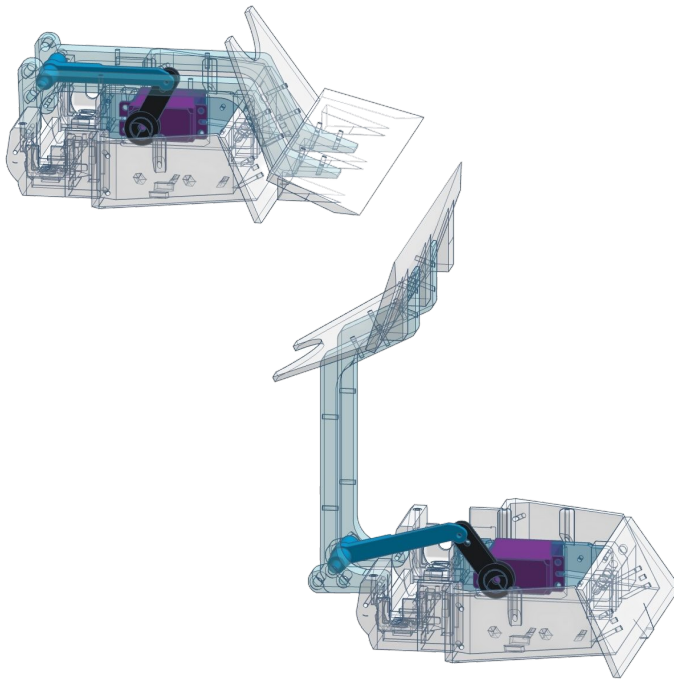
A **servo** (short for servo motor) is a small motor that can rotate the spline (the small gear shaft sticking out of the servo) to a specific position and hold it there. With the servo horn on the spline it becomes a mechanical arm that turns a set amount – not spinning all the way around like a regular motor.

In this step, you'll install the **servo horn**. In the images below, notice that the servo horn, the small black arm attached to the purple servo, will be positioned differently depending on which bot you're building.

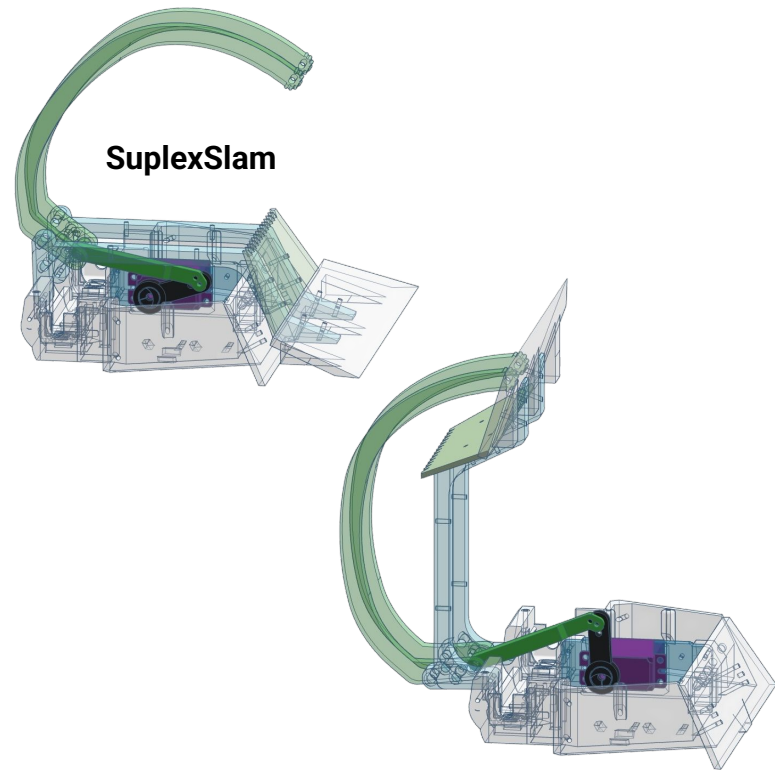
 Each bot's weapon works in its own way, so setting the servo horn at the correct angle ensures the linkage moves properly and your weapon performs as designed.



FlipFrenzy

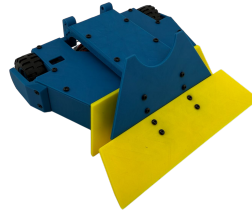


SuplexSlam

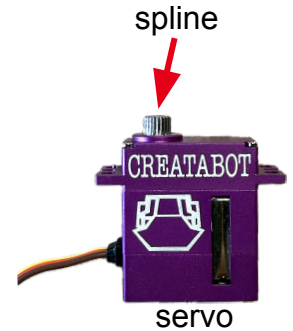


6. Servo Set Up

FlipFrenzy

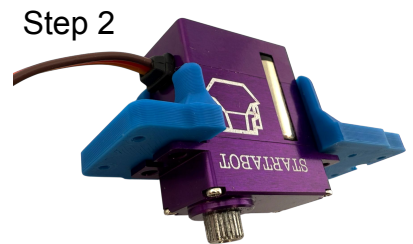


 **The Goal:** To get the servo horn installed in the right spot so that the weapon moves properly with the left stick. When the left stick is down, the flipper should be down, ready to flip your opponent. When the left stick is moved up, the flipper will go up, launching your opponent.



Step-by-Step:

1. With the harness and radio on, move the right stick to ensure that the Malenki is in Drive mode, then move the left stick up and down. Watch how the **servo spline** (the small gear shaft sticking out of the servo) moves.
2. Aligning the wire with the notch in the micro servo adapter, gently snap in the servo.
3. With the left stick all the way down (horn forward, weapon down), press the single-sided servo horn onto the spline so it points about **45° forward from vertical** (once installed, it will be toward the front of the robot, above the center of the servo).
4. Now test it. Move the left stick all the way up. The servo horn should move backward, ending up around **45° behind the spline**, sticking out in the opposite direction from the center of the servo.
5. Install the phillips-drive servo horn screw tightly into the center of the horn. Because it's a steel screw going into a steel part, you can make it nice and snug so the horn doesn't come off during a match.

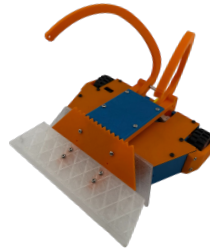


Final Check:

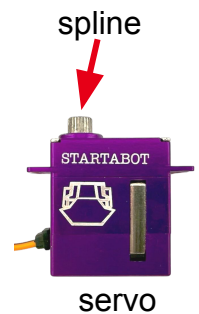
Left stick down → horn 45° forward (end closer to the center of the servo) → weapon down / ready
Left stick up → horn 45° back (end further from the center of the servo) → weapon up / launched

6. Servo Set Up

SuplexSlam

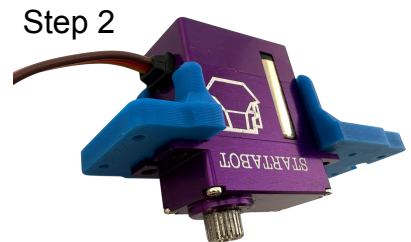


 **The Goal:** To get the servo horn installed in the right spot so that the weapon moves properly with the left stick. When the left stick is down, the plow should be down and the claws up, ready to grab your opponent. When the left stick is moved up, the claws will come down, then the plow will go up, suplexing your opponent.



Step-by-Step:

1. With the harness and radio on, move the right stick to ensure that the Malenki is in Drive mode, then move the left stick up and down. Watch how the **servo spline** (the small gear shaft sticking out of the servo) moves.
2. Aligning the wire with the notch in the micro servo adapter, gently snap in the servo.
3. With the left stick all the way down (horn forward, weapon down), press the single-sided servo horn onto the spline so it points about **30° above horizontal** (once installed, it will be toward the front of the robot, above the center of the servo).
4. Now test it. Move the left stick all the way up. The servo horn should move backward, ending up around **just past vertical**, sticking out in the opposite direction from the center of the servo.
5. Install the phillips-drive servo horn screw tightly into the center of the horn. Because it's a steel screw going into a steel part, you can make it nice and snug so the horn doesn't come off during a match.



Step 3



Step 4



Final Check:

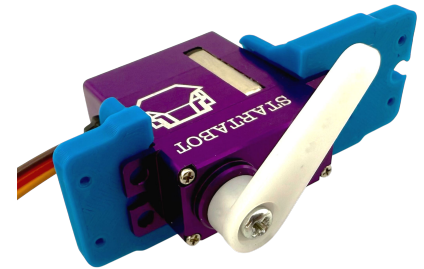
Left stick down → horn 30° above horizontal (forward, end closer to the center of the servo) → weapon open / ready
Left stick up → horn 95° back (end further from the center of the servo) → weapon up / suplexed

7. Servo Installation

 **The Goal:** To install the servo into the micro servo adapter.

1. Before you begin, **disconnect the battery by pulling on the connectors NOT the wires.** Anytime metal tools are near wiring, it's best to remove any power from the bot.
2. Also, go ahead and **unplug the servo from the harness, again pulling on the connectors not the wires** – it's much easier to install when it's free.
3. While holding the adaptor tight against the servo, install the **black self-tapping screws**, one on each side of the servo.

 *If you're using an electric screwdriver, go slowly - near 1 revolution per second. Turning the screw too fast can create heat that may **soften or melt the plastic**, even if the screw doesn't bottom out. The screws should be tight enough to hold the servo firmly, but not so tight that you risk stripping the plastic.*

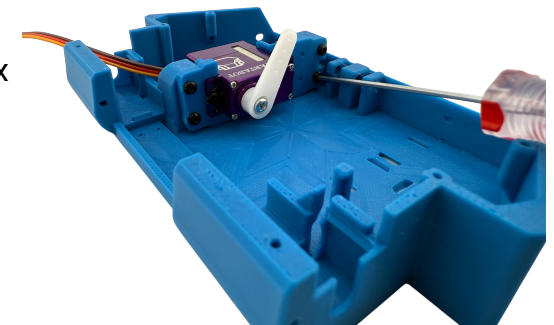


Mounting the Servo Assembly into the Chassis

Now that the servo is in the adapter, it's time to attach the whole unit to the bot's chassis.

1.  Place the servo+adapter into the chassis - with the **spline closer to the motors**.
2. Secure the adapter to the chassis using four of the **black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive). These screws hold all the power and torque that the weapon uses to throw itself and your opponents around, so it's important they are snug. Tighten them firmly, but be careful not to over-tighten and strip the plastic holes.

 If the holes become stripped, replace the screws with the M2.5 x 6mm screws.



8. Power Switch Installation

Your Creatabot uses a snap-in switch mount that securely holds the power switch in place. Reachable and secure switches are critical to all types and levels of combat robots. The Creatabot **switch mount** uses **retaining features** and a **flex post** to hold the switch firmly.

 **The Goal:** To get the switch securely installed so that it is hard for an opponent's bot to turn it on and off, while still easy for a human.

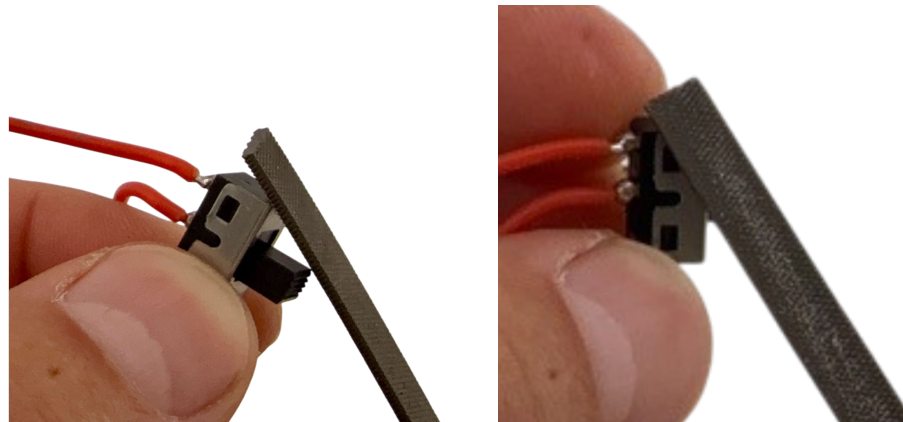
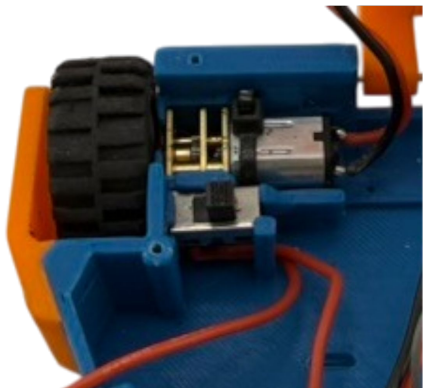
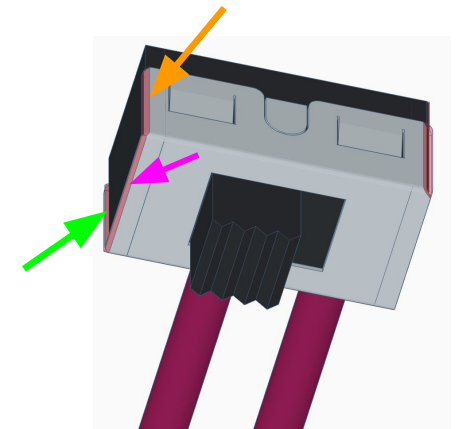
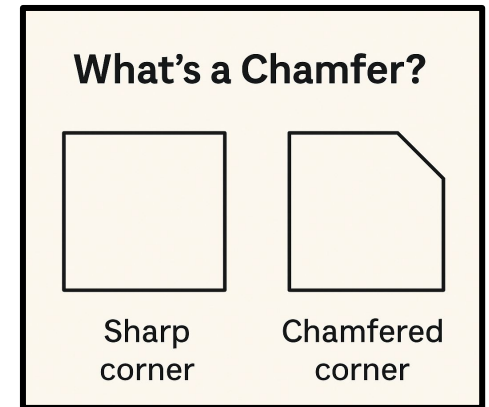
 **Step-by-Step:**

Step 1. File Chamfers Into the Metal Switch Edges

The **switch mount** is **intentionally tight** to keep the switch securely in place in battle.

File chamfers into the **indicated metal corner edges on the left side** of the switch to get them at least flush with the plastic. The chamfers allow the switch to press smoothly past the retaining features without the edges of the case digging into the plastic.

 Metal files are designed to work primarily in one direction; most work better when you push them rather than pull them.



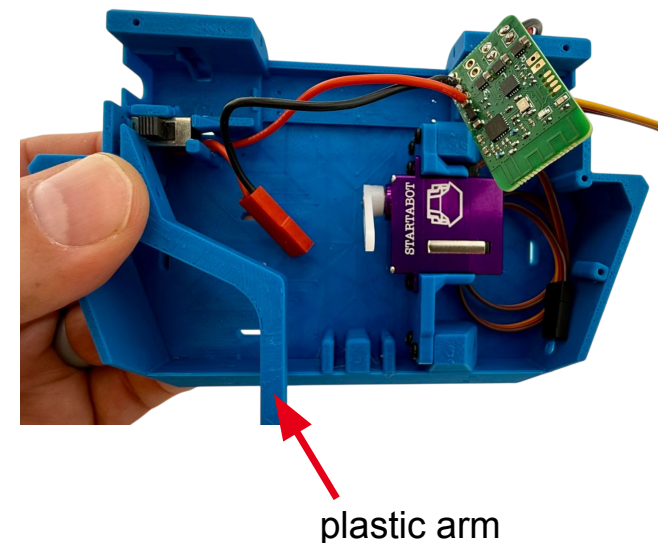
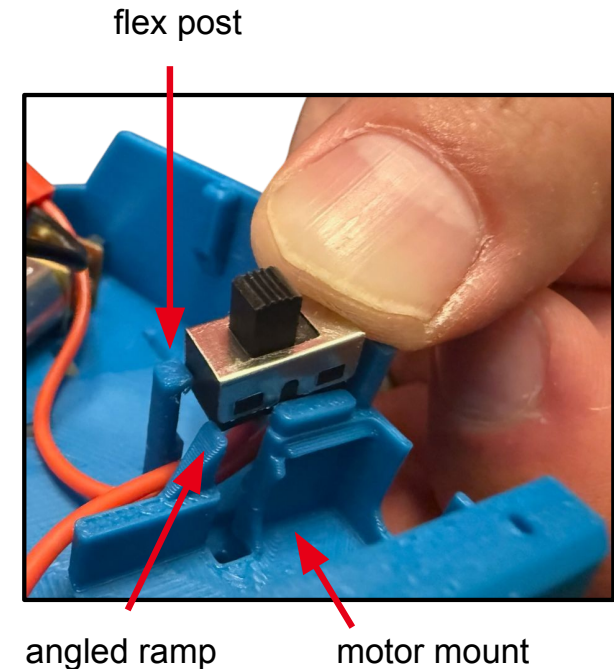
8. Power Switch Installation

Tips

- Using the right technique, patience, and small movements makes the switch installation fairly easy and reduces the risk of damaging the small retention features.
- If it starts going in crooked or too low in the front, **stop and gently pull it out** and try again from the start.

Step 2. Insert the Switch into the Mount

- a. Route the wires between the flex post and the motor mount.
- b. Angle the switch to get the short side of the switch against the flex post **and the angled ramp**.
- c. You will be **gently flexing the post** 1-2 millimeters from the corner. **It may help to gently flex the chassis** just a bit to help slide the switch down next to the angled ramp.
- d. Making small moves with your thumbs, ease the outer edge of the switch straight down to get it **square to the chassis**.
- e. Once it's square and past the retention features you may want to use the **tip of the plastic arm** to get it fully seated.

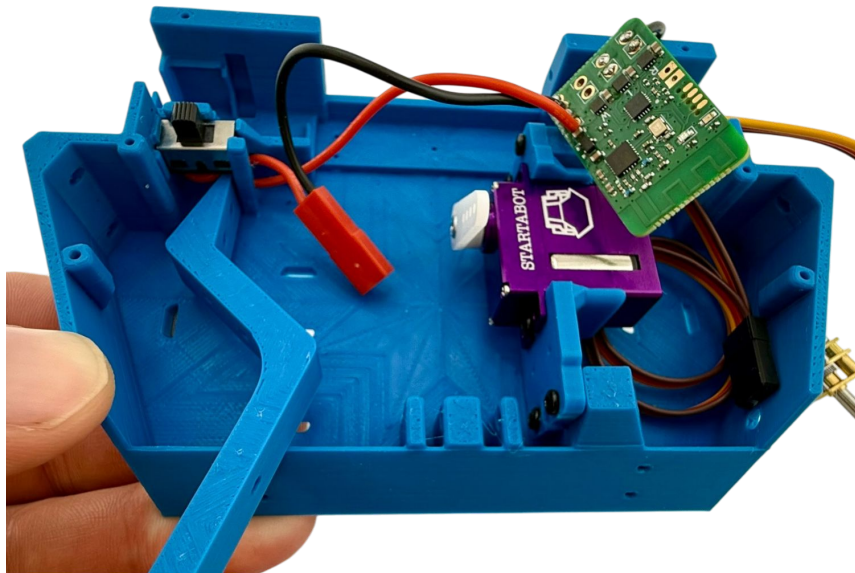


8. Power Switch Installation

Step 3. Fully Seat the Switch

- Once the switch is level and fully inserted, the flex post should pop back in against the side of the switch.
- If it's too deep, the post won't snap back. Gently pull the switch up, until it clicks into place. The tip of the plastic arm can help with this.
- Double-check that the flex post isn't overstretched and that the switch doesn't shift in any direction. If it does, pull the switch out and gently flex the post toward the front corner. As a last resort, glue the switch in place.

✓ **Final Check:** The switch should feel solid and secure.

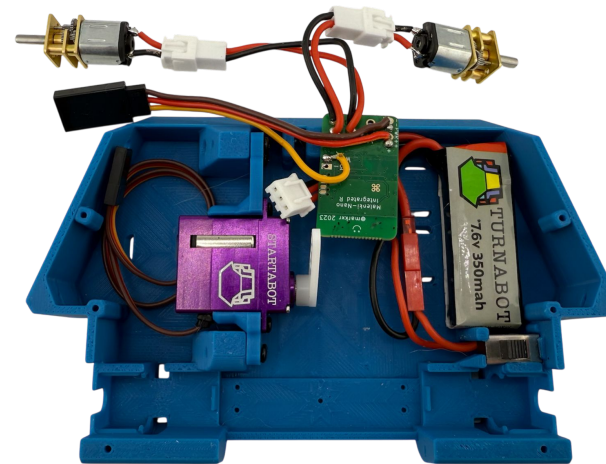
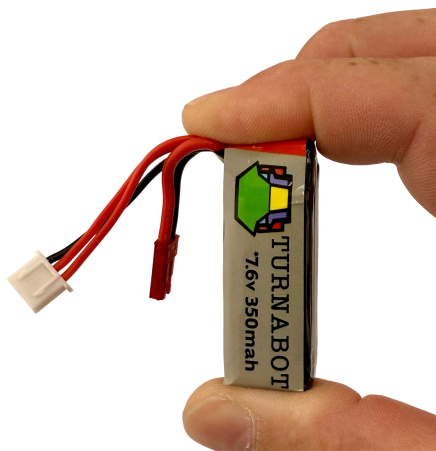


9. Harness & Motor Installation

 **The Goal:** To install the battery, harness, motors, and wiring cleanly into the chassis with the servo wires tucked next to the servo and the wiring all tidy.

Step 1: Install the Battery

- a. Make sure the **switch is already installed**.
- b. Tuck the **battery discharge cable** (2 wires) tightly against the battery.
- c. Carefully plug in the battery connector — ● red to red, ● black to black.
- d. Slide the battery into the **top right corner** of the bot:
 - No wires should be **underneath** the battery.
 - It should fit **snugly**, but not tight enough to bend the chassis.
 - If it feels too tight, you can **gently squeeze the cable bundle against the battery** to make room.



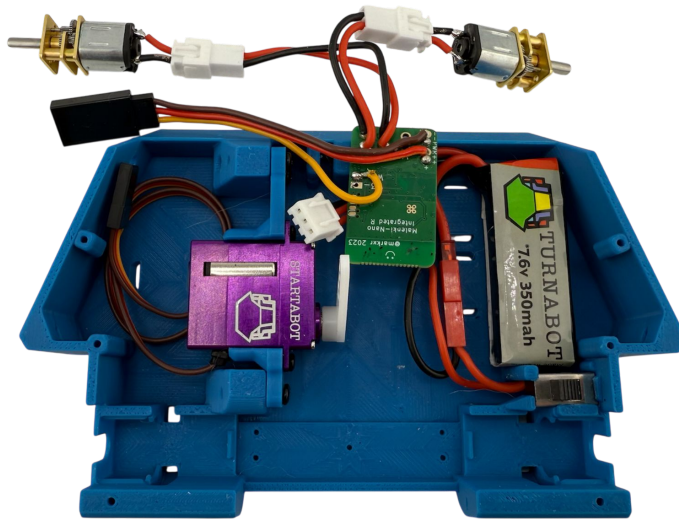
9. Harness & Motor Installation

Step 2: Arrange the Wires

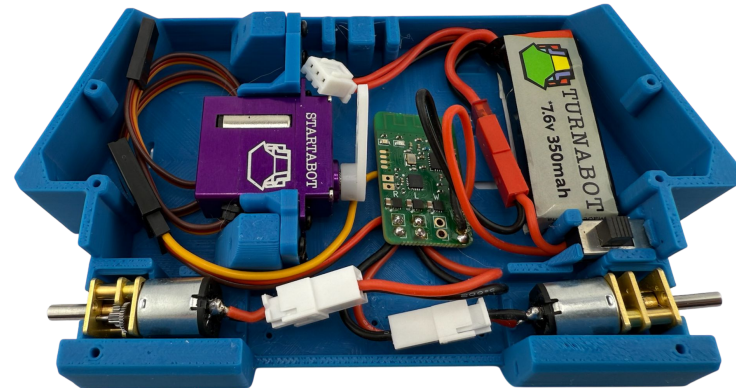
- Arrange the motors and wires with the right motor wires on top of the left motor wires.
-  Do not snap motors into place in this step. Wait for Step 3.

Flip the entire harness over from front to back so it matches the picture below on the right, with the motors resting on top of the slots. The right motor wires should now be positioned beneath the left motor wires.

Step 2a



Step 2b



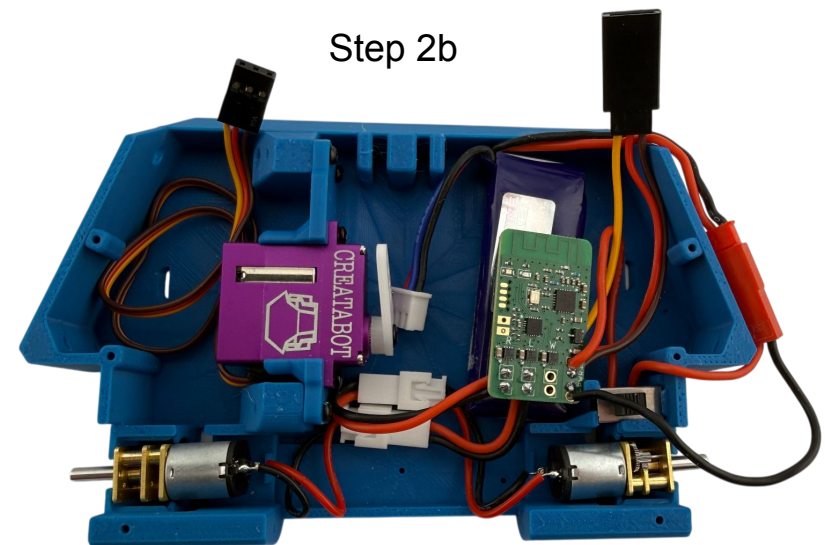
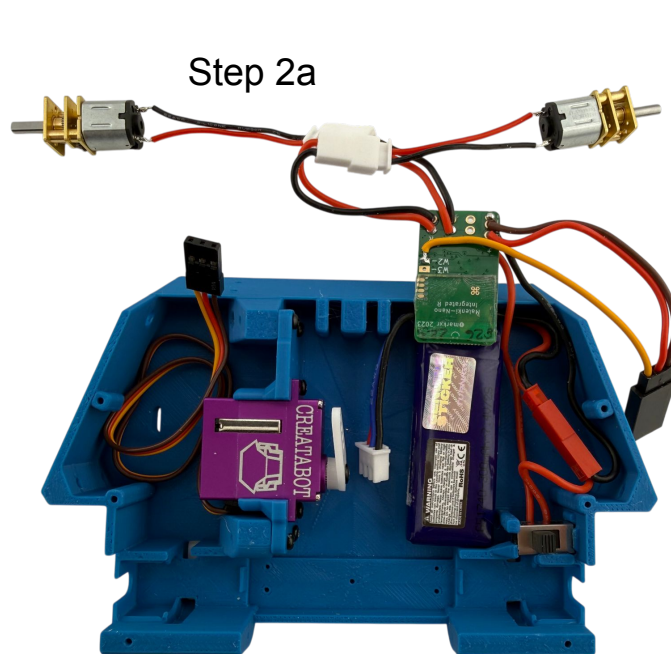
 Do not snap motors into place in this step. Wait for Step 3.

9. Harness & Motor Installation - alternate battery and motor connectors

Step 2: Arrange the Wires

- Arrange the motors and wires with the right motor wires on top of the left motor wires and the servo connector fully off to the right.
-  Do not snap motors into place in this step. Wait for Step 3.

Flip the entire harness over from front to back so it matches the picture below on the right, with the motors resting on top of the slots. The right motor wires should now be positioned beneath the left motor wires.



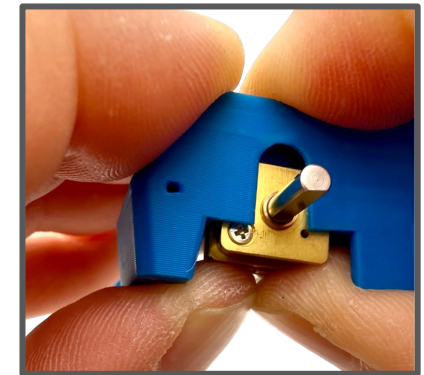
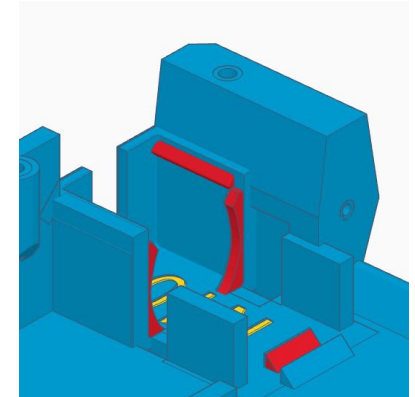
 Do not snap motors into place in this step. Wait for Step 3.

9. Harness & Motor Installation

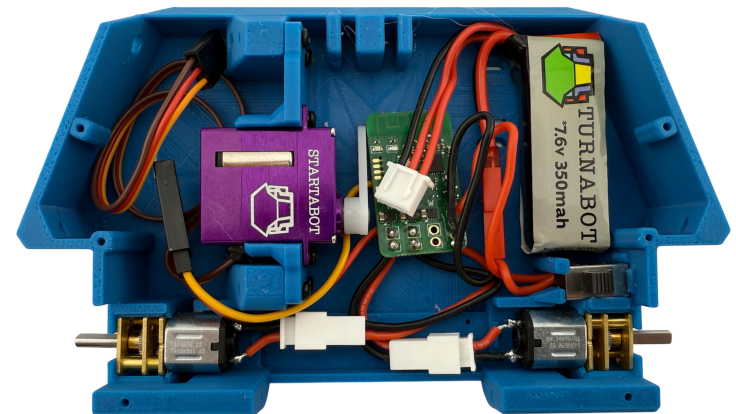
Step 3: Install the Motors

⚠ The chassis has **retention bars** that hold the motors tightly. Don't damage them! The laser-engraved RPM/speed numbers on the motors should be **facing up** so you can see them.

- Line up the motor square in its slot.
- DO NOT** push down while the chassis is sitting on the table.
- Hold the chassis in **your hands** and **gently flex the side open a little** while you press the motor in.
- Press straight in — don't twist or force it.
- When installed correctly:
 - The motor will **snap in** securely
 - There will be **no stress marks**
 - The retention clips will still be in good shape



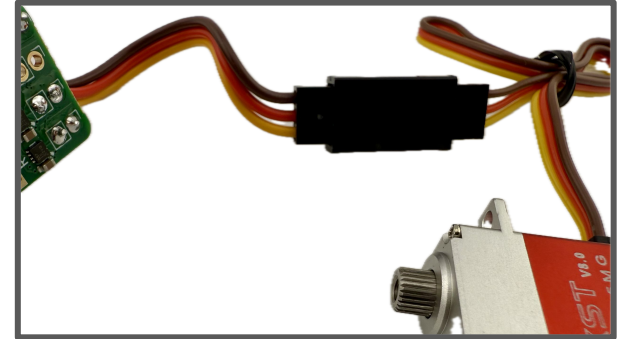
✏ Install one motor at a time, ensuring the wires are routed correctly before snapping the second motor into place.



9. Harness & Motor Installation

Step 4: Plug in the Servo

- a. Plug the servo wire into the servo connector on the Malenki:
 -  Brown to brown (ground to ground)
 -  Yellow to yellow (signal to signal)
- b. Coil the wire **next to and under the servo**.

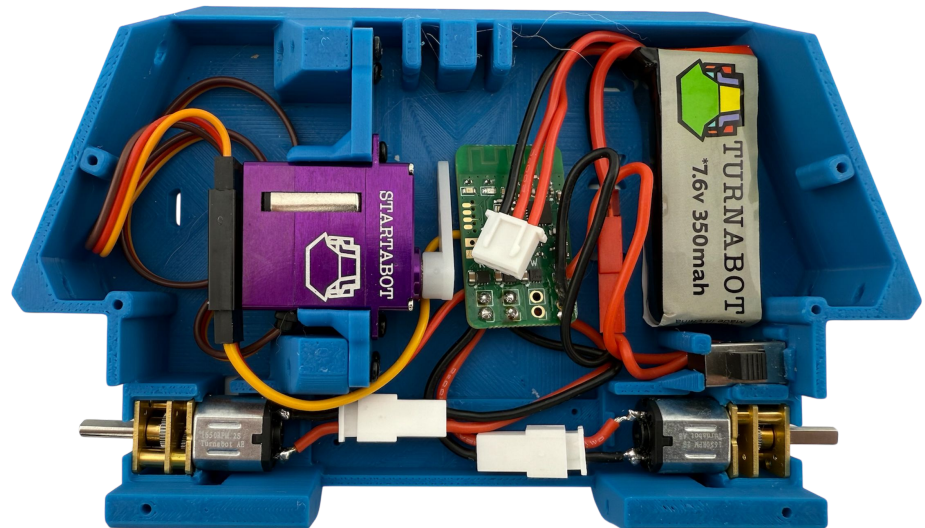


🏆 If you're trying to save weight, you can hard-wire the servo — but plugging it in makes repairs easier.

✅ **Final Check:** That's it — your harness is installed!

Take a final look:

- ☐ Battery snug, wires tidy
- ☐ Motors secure, RPM visible
- ☐ Servo wire connected and tucked
- ☐ Malenki LEDs visible



9. Harness & Motor Installation

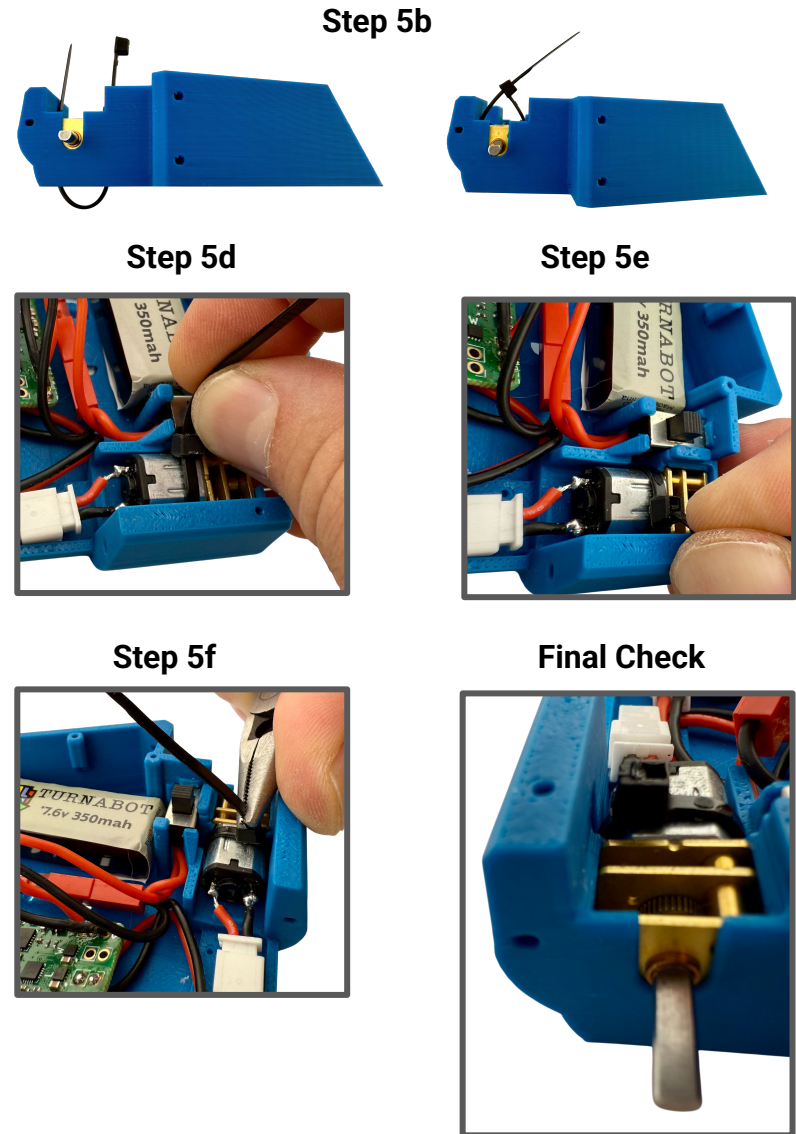
 **The Goal:** To install zip ties with maximum tension to secure the motors.

Step 5:

- Think about **where the zip tie tail needs to end** — we recommend it ending **toward the back** of the bot.
- The zip ties start by going down in front of the motors, through the floor, then back up behind the motors.
- Feed the tail through the head.
- To get maximum tension, start tightening the zip tie and then slide the head as far forward as possible. This positions the head so the zip tie naturally wants to stay anchored on that side of the motor.
- Then, pull the tail back across the motor. This stretches the zip tie tightly over the motor, increasing the tension.
- You can also **roll the zip tie head over** with pliers to pull the tail through the head as far as possible.
- Trim with flush cutters to leave a smooth edge.

 **Final Check:** Zip ties should be tight enough to be flat against the motors.

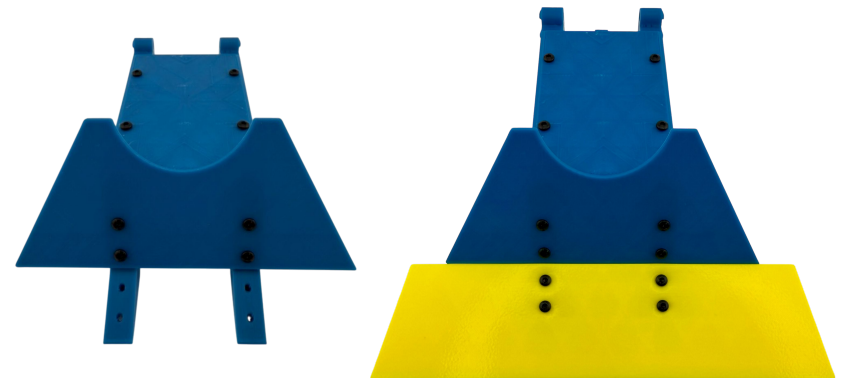
The **base chassis is complete!**



10. FlipFrenzy Weapon Assembly

 **The Goal:** To build the weapon stack on the aluminum rod.

1. Place the right arm on the table with the **R up**
2. Place the aluminum rod into the hole.
3. In order, add the **long spacer, link, short spacer, and left arm**.
4. Press the stack until the parts are flush.
5. If the caps pop off, you can remove the left arm, use pliers to slightly deform the end of the rod, then press the left arm back on. Then flip the stack over and repeat on the right side.
6. Install the top armor using 4 of the **black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive) which will hold it all together.
7. Install the FF Forehead with 4 of the **black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive).



Plow Installation

Install **4 black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive).

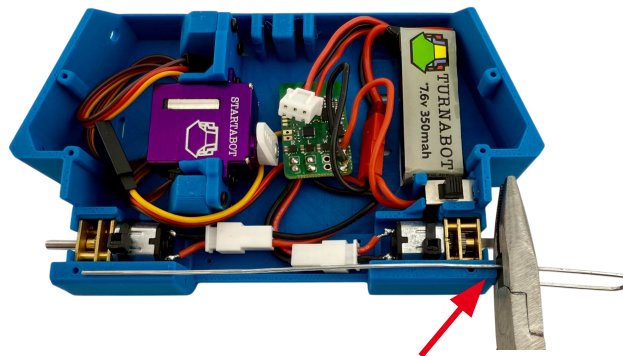
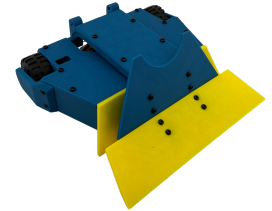
 Take care not to turn them in too fast so that you don't melt the plastic.

11. FlipFrenzy Weapon System Installation

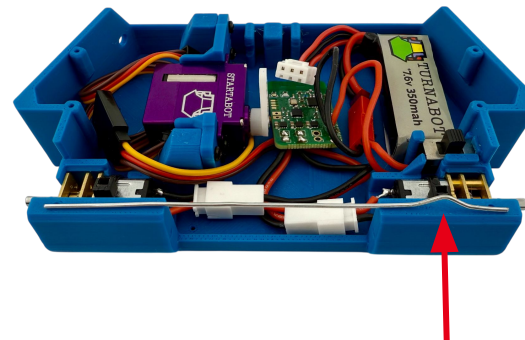
 **The Goal:** To create and insert the paper clip pin to hold the weapon in place.

Step-by-Step:

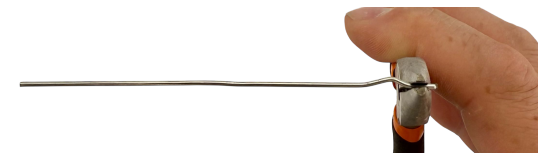
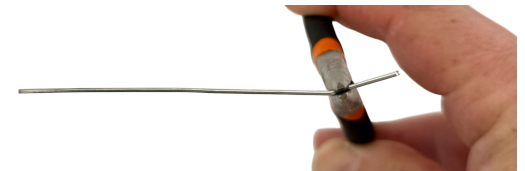
1. Straighten out **3 bends worth** of the paperclip.
2. Cut to length using the **inside edge of your pliers**.
 - Better to be a little short than too long.
 - These clips are tough — avoid using your nicest cutters!
3. Make a **V-bend** that will be entirely contained within the right upright of the chassis (about $\frac{1}{2}$ inch from one end). Kink up, kink down, then straighten.



Cut here with pliers
or strong cutters



V-bend here



11. FlipFrenzy Weapon System Installation

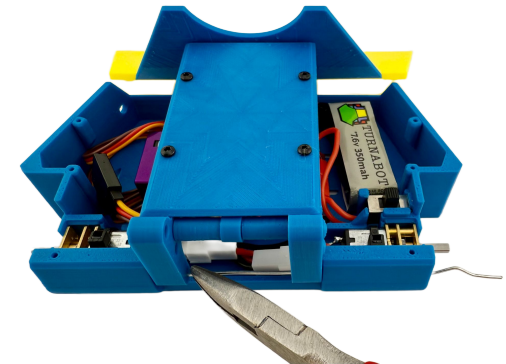
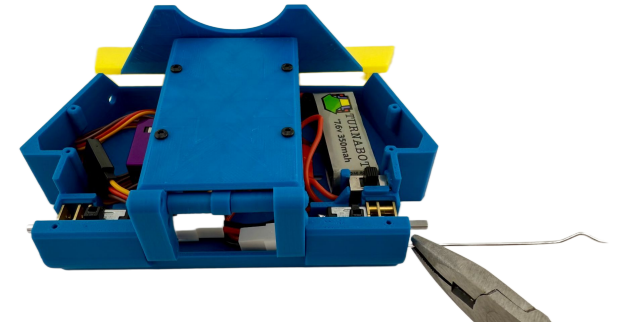
Step-by-Step (continued):

4. Insert the **non-V-bend side** through the chassis upright.
5. Holding the weapon in place, slide the paperclip through the closest arm.
6. You may need pliers to pull the paperclip to and then through the next arm.
7. There should be just enough room to see the paperclip between the arm and the chassis to align the paperclip into the last hole.
8. Push until the **V-bend seats inside the chassis**.

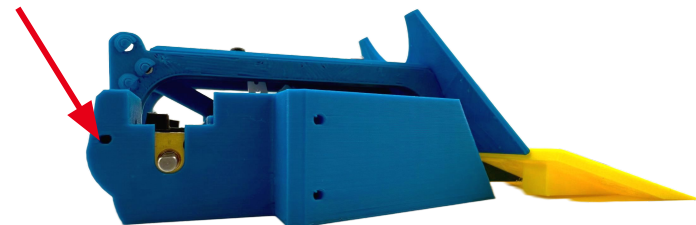
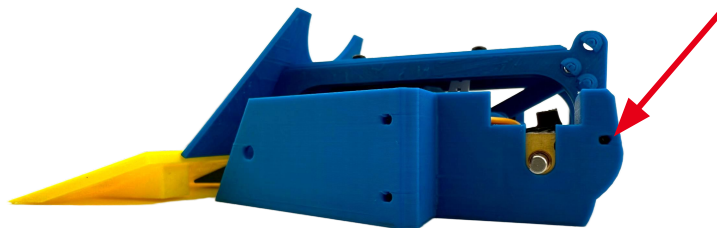
 Use small pushes near the leading edge so you don't bend the paperclip or jab yourself. If it's too hard to push in, your V angles might be too sharp.

Final Check:

The weapon should rotate smoothly, opening and closing with gravity. The paperclip should not move easily from side to side.



 Make sure the ends of the paperclip aren't sticking out from either side of the bot. They can be sharp enough to scratch you!



11. FlipFrenzy Weapon System Installation

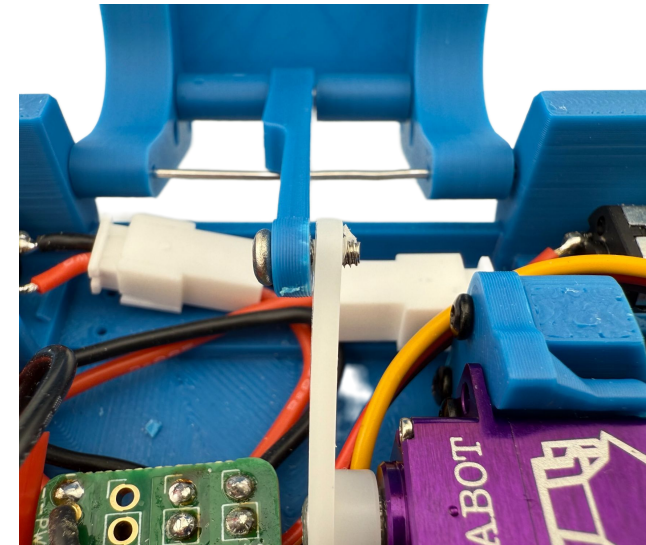
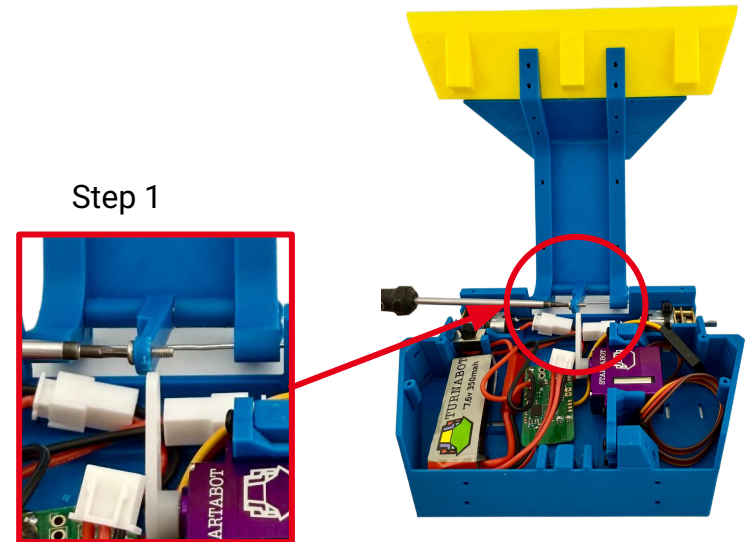
 **The Goal:** To connect the link to the servo horn.

Step-by-Step:

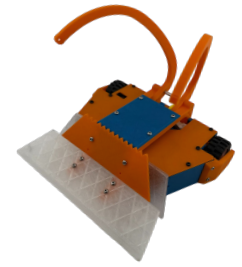
1. Insert one of the small silver machine screws through the link. If it doesn't press through, use a driver and keep spinning it to intentionally strip the hole out so the link can rotate on the screw.
2. Then screw it into the **furthest hole from the spline** on the white servo horn.
3.  If you do run the screw in until the link touches the horn, **back it off half a turn** so the link **pivots freely** on the screw.

Final Check:

The link should have a small gap and should not be pressed tightly against the horn.

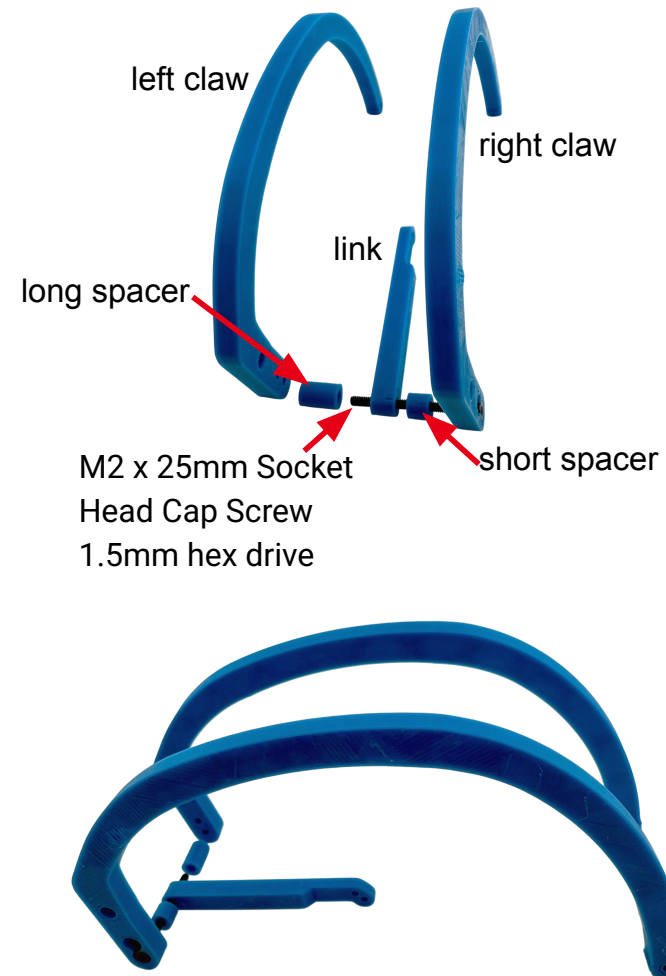


10. SuplexSlam Weapon Assembly



 **The Goal:** To build the claw portion of the weapon stack.

1. Insert the 1.5mm hex drive **M2 x 25mm Socket Head Cap Screw** fully into the lower hole of the right claw (the claw with recessed pockets for the screw head). You may need to use a driver to run the screw all the way in. It's okay if the screw spins freely in the right claw.
2. Slide on the parts in this order: **long spacer** → **link (thick side to the right)** → **short spacer**. Each should move freely on the screw. If anything feels tight, clear it by threading the screw through or lightly opening it up with a drill bit.
3. Install the **left claw** while keeping it parallel to the right claw.  **This claw is what actually holds the assembly together**, so carefully rotate it onto the screw **without** stripping the hole. It may help to hold the screw still with a driver while rotating the left claw.
4. Check that the link pivots smoothly on the screw and that no portion of the screw extends past the outer edge of either claw.



10. SuplexSlam Weapon Assembly

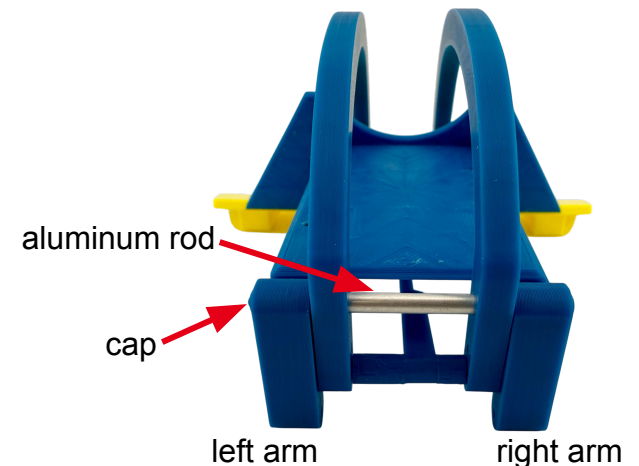
 **The Goal:** To complete the weapon stack on the aluminum rod.

1. Insert the aluminum rod into the top hole on the right arm, taking care not to knock the cap off.
2. Slide the claw assembly onto the aluminum rod.
3. Add the left arm to the assembly using the top hole.
4. Press the stack until the parts are flush. The aluminum rod should reach the outer edges of the arms without knocking off the caps.
5. If the caps pop off, you can remove each arm, one at a time, and use pliers to slightly deform the end of the rod, then press the arm back on.
6. Install the top armor using the front **two** of the **black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive) which will hold the assembly together.
7. Leave the rear two screw holes open for SuplexSlam.

Plow Installation

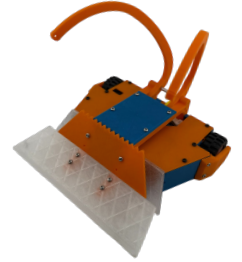
Install **4 black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive).

 Take care not to turn them in too fast so that you don't melt the plastic.



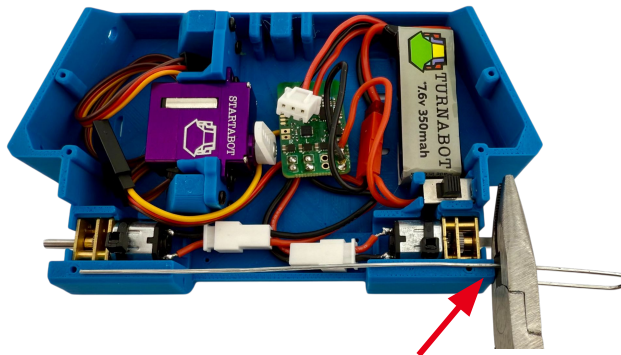
11. SuplexSlam Weapon System Installation

 **The Goal:** To create and insert the paper clip pin to hold the weapon in place.

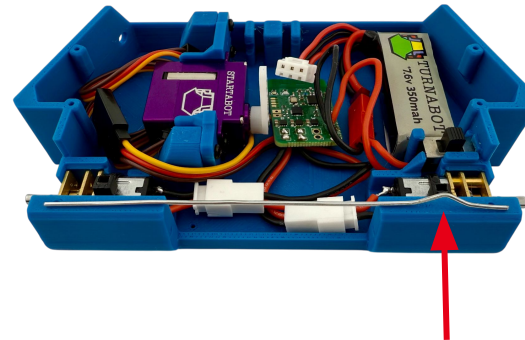


Step-by-Step:

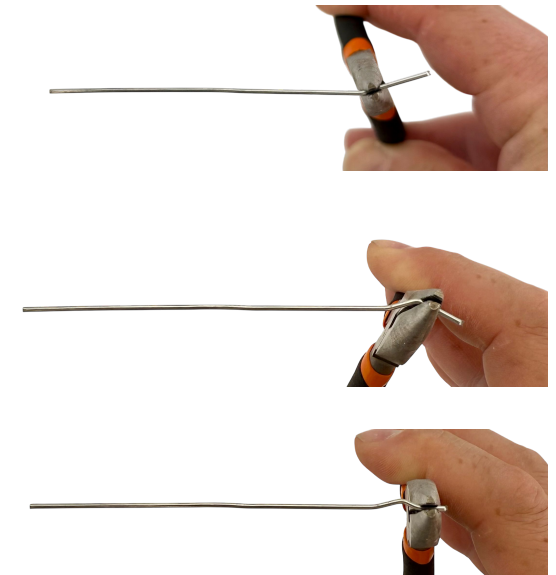
1. Straighten out **3 bends worth** of the paperclip.
2. Cut to length using the **inside edge of your pliers**.
 - Better to be a little short than too long.
 - These clips are tough — avoid using your nicest cutters!
3. Make a **V-bend** that will be entirely contained within the right upright of the chassis (about ½ inch from one end). Kink up, kink down, then straighten.



Cut here with pliers
or strong cutters



V-bend here



11. SuplexSlam Weapon System Installation

Step-by-Step (continued):

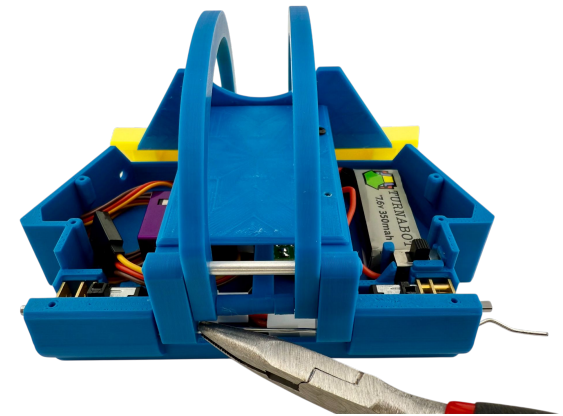
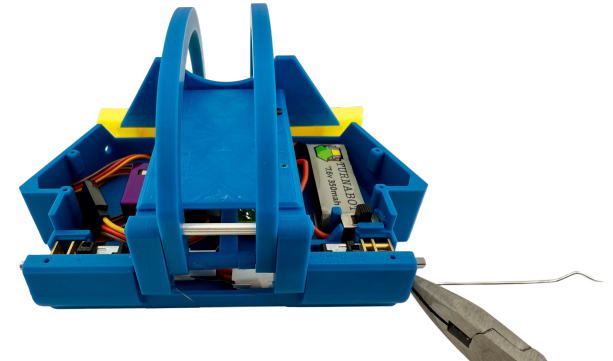
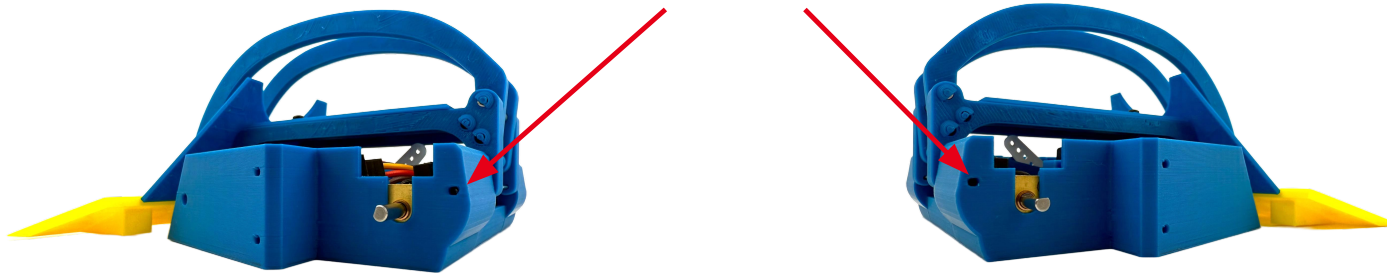
4. Insert the **non-V-bend side** through the chassis upright.
5. Holding the weapon in place, slide the paperclip through the closest arm.
6. You may need pliers to pull the paperclip to and then through the next arm.
7. There should be just enough room to see the paperclip between the arm and the chassis to align the paperclip into the last hole.
8. Push until the **V-bend seats inside the chassis**.

 Use small pushes near the leading edge so you don't bend the paperclip or jab yourself. If it's too hard to push in, your V angles might be too sharp.

Final Check:

The weapon should rotate smoothly, opening and closing with gravity. The paperclip should not move easily from side to side.

 Make sure the ends of the paperclip aren't sticking out from either side of the bot. They can be sharp enough to scratch you!



11. SuplexSlam Weapon System Installation

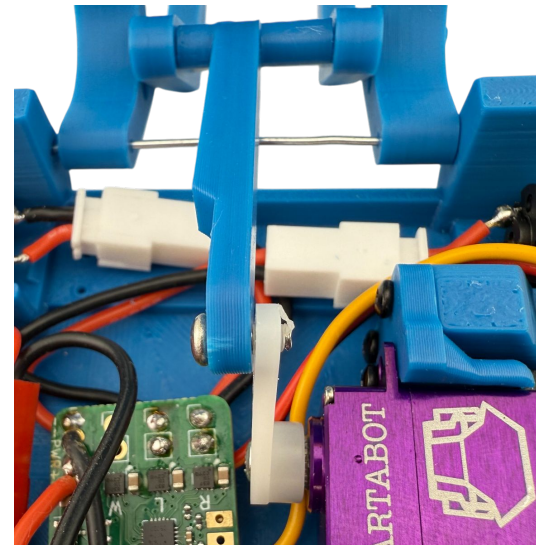
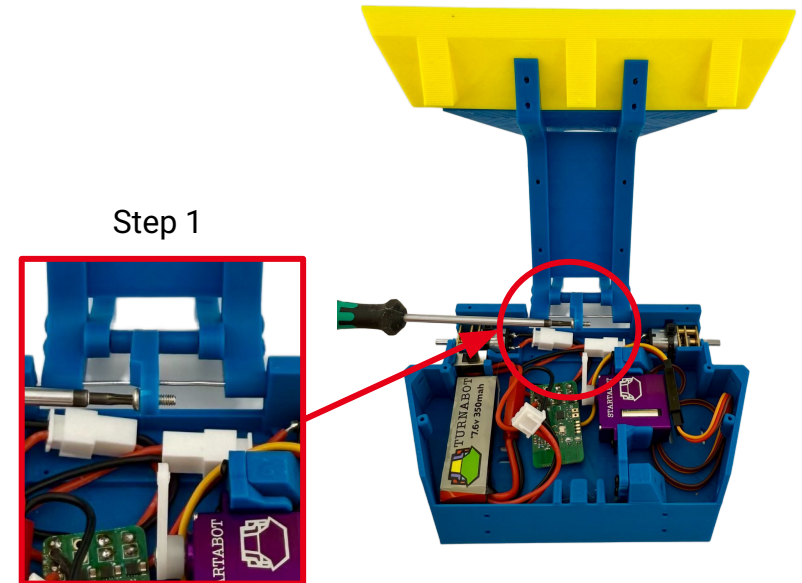
 **The Goal:** To connect the link to the servo horn.

Step-by-Step:

1. Insert one of the small silver machine screws through the link. If it doesn't press through, use a driver and keep spinning it to intentionally strip the hole out so the link can rotate on the screw.
2. Then screw it into the **furthest hole from the spline** on the white servo horn.
3.  If you do run the screw in until the link touches the horn, **back it off half a turn** so the link **pivots freely** on the screw.

Final Check:

The link should have a small gap and should not be pressed tightly against the horn.



12. Wheel Installation

 **The Goal:** To mount the wheels so they stay on tight and spin freely.

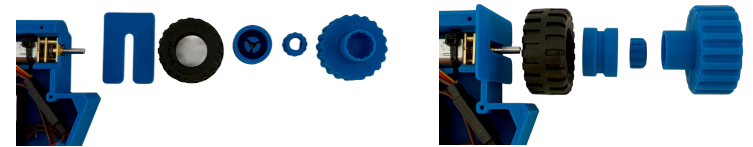
Step-by-Step:

1. Install the tires on the wheels.
2. Turn the D-shaft of the motor until the flat side faces up.
3. Place the spacer on the shaft touching the chassis.
4. Line up the **D-flat** on the wheel with the D-flat on the motor.
5. Push the wheel on until the tire just **touches** the spacer.
 - The tire should touch the spacer gently
 - The wheel should still turn fairly easily.
6. Place the collet, tapered side first, into the wrench.
7. Hold the wheel still and **tighten the collet** using the wrench.
8. Remove the spacer, hold the wheel and tighten the wrench nearly as hard as you can.

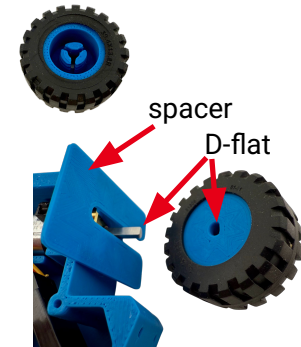
 The tighter the collet, the harder it is for the wheel to come off.

Final Check:

Held up to a light, you should just barely see a gap between the tire and the chassis. The collet should be on far enough that there is a full thread visible.



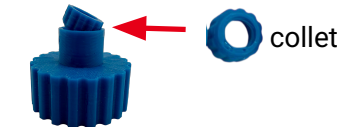
Step 1



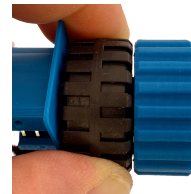
Steps 2, 3, and 4



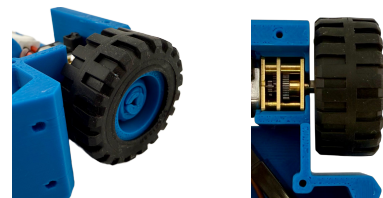
Step 5



Step 6



Step 7



Step 8

13. Armor & Wheel Guard Installation

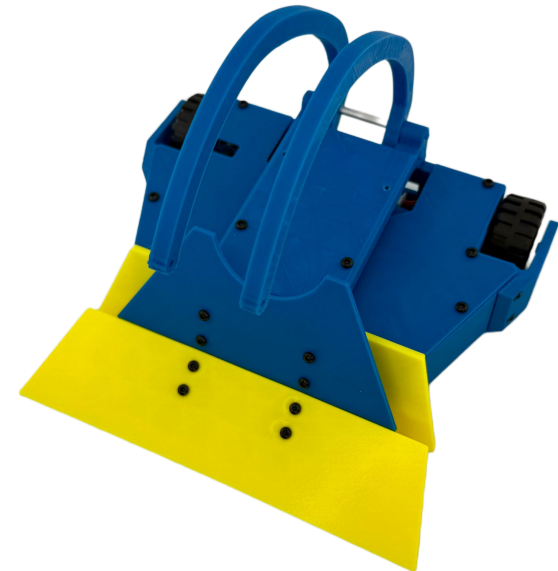
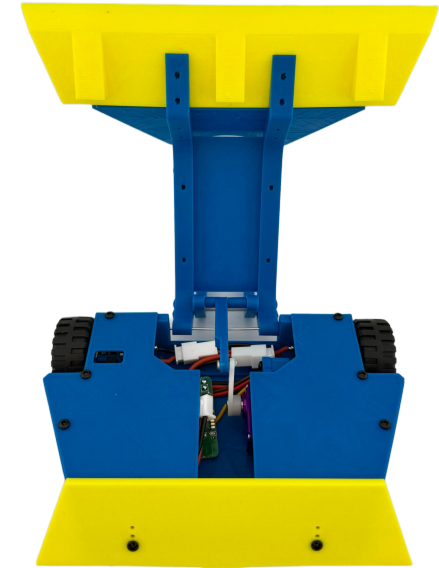
 **The Goal:** To secure the armor and wheel guards.

Steps:

1. The front armor attaches to the chassis with two black self-tapping screws (M2 × 6 mm, pointy, 1.5 mm hex drive) using the lowest holes in both.

 Go slow — 1 rotation per second max. Too fast can melt plastic!
2. To make it easier to put the screws in, open and close the flipper gently by hand with the bot turned off.
3. Position the **right top armor** in place, note the opening for the switch.
4. Use a hand driver or slow electric screwdriver to install **3 black self-tapping screws** (M2 x 6mm self-tapping (pointy) 1.5 mm hex drive screws) per side.
5. Repeat for the **left top armor**.
6. To install the wheel guards, start by preparing the top holes. Use your driver to run one of the black self-tapping screws (M2 × 6mm, pointy tip, 1.5 mm hex drive) into each top hole of the wheel guard. Keep turning until the screw spins freely, this intentionally strips the hole.
7. Align the wheel guard against the chassis, using the tip of the top screw as a guide. While holding the guard flush to the chassis, drive the screws in fully to secure it.

 **Final Check:** Armor and wheel guards should be snug but not overly tight.



14. Radio Set Up

 **The Goal:** To set flipper end points on FS-i6 radio (channel 3)

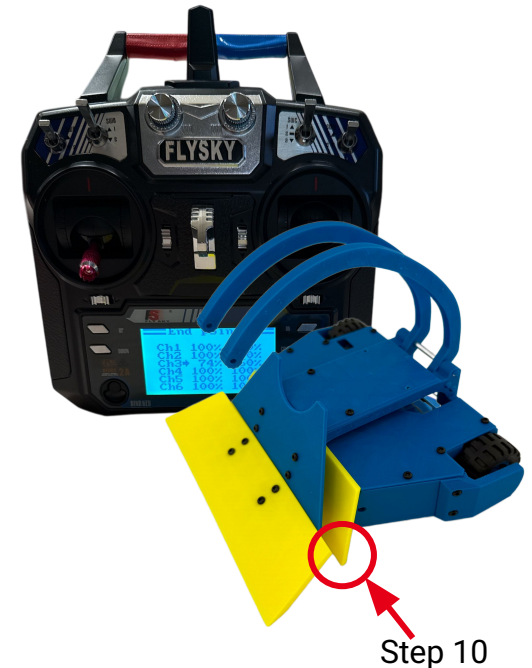
Setting the end points tells the servo **how far to move** when you push the stick up or down — so your flipper moves *just enough*, without stalling the servo, or bending the paperclip.

Step-by-Step:

1. **Turn on the radio.**
2. **Before you turn on the bot**, set the left stick (weapon / flipper / channel 3) about halfway up so the servo doesn't slam too far in either direction when you turn on the bot. (The servo will “jump” to its position when it turns on.)
3. Turn on the bot.
4. On the radio, as long as the backlight is on, **hold [OK]** to open the menu.
5. Use the arrow buttons to move over to → **“FUNCTION SETUP”** Press **[OK]** to enter.
6. Arrow down to → **“END POINTS”** → Press **[OK]** again.
7. Press **[OK]** 3 more times to move the arrow down to **CH3** (the flipper channel).

Set the Bottom (Flipper Down)

8. Slowly move the left stick down until the plow lifts the front armor or the servo starts audibly whining.
9. The arrow should be on the **left number** (this is the “low” endpoint).
10. Use the **UP** and **DOWN** buttons to adjust the value **as you continue to lower the stick** (you will slightly raise and lower the stick a number of times):
 - With the stick all the way down, the flipper should go down far enough to just barely lift the front armor — not more.
 - Watch for the front corner of the front armor to move up relative to the plow.



14. Radio Set Up

▲ Set the Top (Flipper Up)

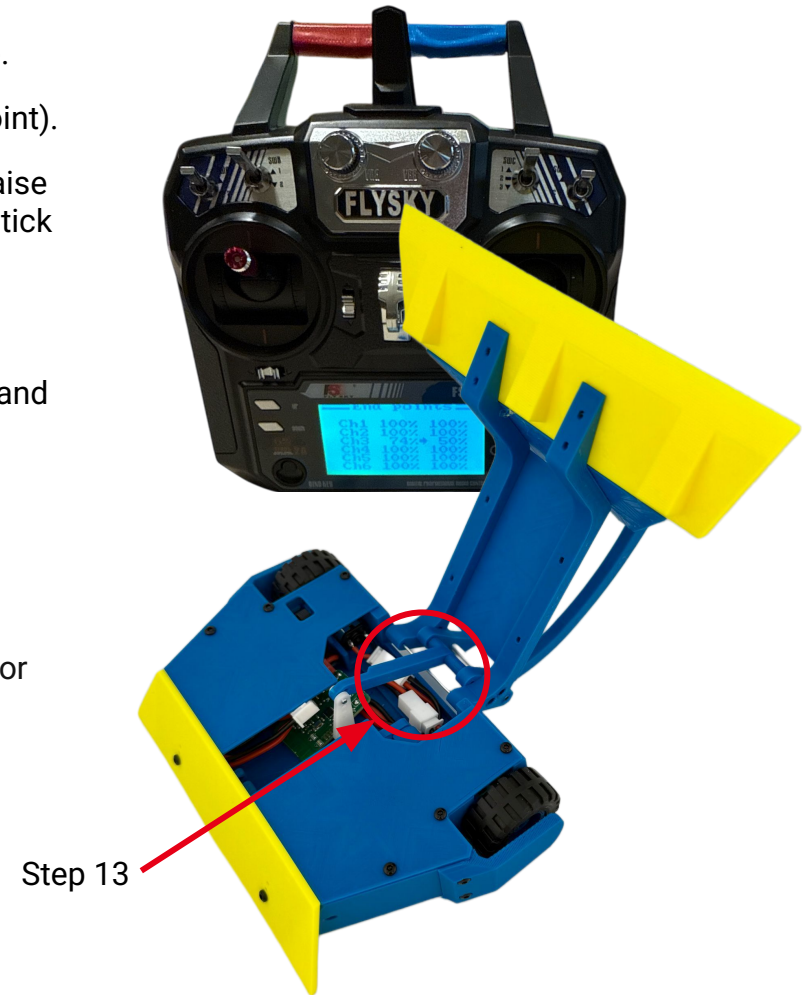
11. Move the left stick up until the link almost touches the paperclip.
12. The arrow will move to the right number (this is the “high” endpoint).
13. Use the down button to lower the top value as you continue to raise the stick, keeping the link from bending the paperclip. With the stick all the way up, the **servo link should almost touch the paperclip**.

Save Your Settings

14. When you're happy with both endpoints, **hold [CANCEL]** to save and exit.

🏆 Generally the end points will be between 30–90.

✅ **Final Check:** If you flip the bot over on a hard surface, it should self-right when the left stick is quickly moved up and down. Get ready for your first **laughsplosion!**



14. Radio Set Up

 **The Goal:** To set up the radio so that the bot drives and actuates the weapon properly.

Check Driving Direction

1. Move the **right stick up** — the bot should go **forward**.
2. If it goes backward, go to the “**Reverse a Channel...**” section and reverse Ch2.
3. If it **turns**, go to the “**Invert a Drive Side...**” section to invert only one side.
4. If it goes forward, push the **right stick to the right** — the bot should turn **right**.
5. If it goes left, go to the “**Reverse a Channel...**” section and reverse Ch1.



14. Radio Set Up

 **The Goal:** To reverse a channel... on the FS-i6 radio

Use this when your robot **turns the wrong way**, or when the **flipper opens instead of closes**.

 **Step-by-Step:**

1. Turn on the radio → Hold the **[OK]** button to open the menu.
2. Use the arrow buttons to move over to → **"FUNCTION SETUP"**
3. Press **[OK]** to enter.
4. The first item on the list is **"REVERSE"**
Press **[OK]** again.
5. You'll now see a list of channels (1–6).
6. Press **[OK]** to highlight the channel you want to reverse:
 - **CH1** = Steering (left/right)
 - **CH2** = Throttle (forward/backward)
 - **CH3** = Weapon / Flipper
7. Press the **up or down arrow** to reverse it.
You'll see it switch from **"NOR"** (normal) to **"REV"** (reverse).
8. Hold **[CANCEL]** to save and exit.

 **Final Check:** Test that your bot now moves and flips properly.



14. Radio Set Up

 **The Goal:** To invert a drive side... use configuration mode

Configuration mode lets you change the Malenki's internal settings — like motor direction, drive mixing, and braking. These settings are saved even when the bot is turned off. Use this when your robot **turns when moving the stick forward or backward**.

Step-by-Step:

1. Note which side of the bot moves **backward** when you pushed the stick forward.
2. Turn off the radio and the bot.
3. Turn the bot back on, **wait 5 seconds**, then turn the radio on.
You are now in **configuration mode** (**blue LED flickers**).
4. On the radio, as long as the backlight is on, hold **[OK]** to open the menu.
5. Use the **DOWN** button to move over to → **"FUNCTION SETUP"** Press **[OK]** to enter.
6. Press the **DOWN** button 3 times → **Aux Channels**. Press **[OK]**.
7. Press the **UP** button until **Channel 5 = Switch D (SWD)**.
8. Hold **[CANCEL]** to save and exit.
9. Back out and go to **Display** to verify that Ch5 is **Low**.
10. Flip **Switch D up and down to send the correct number of High-Low pulses**:
 - a. If the **Left** side of the bot moves backward then invert the Left drive side by sending **2** pulses.
 - b. If the **Right** side of the bot moves backward then invert the Right drive side by sending **3** pulses.
11. The blue LED on the Malenki will **flicker back the same number** to confirm.

 **Final Check:** Test it again — forward should now be forward. If **left/right** is still reversed go back to the **"Reverse a Channel..."** section and reverse Ch1.



15. Test Drive & Self-Righting

 **The Goal:** Time to make sure everything works!

Steps:

1. Turn on the **radio** and the **bot**.
2. Check motor response:
 - Push stick forward/back → bot moves as expected
 - Push stick left/right → bot turns as expected
3. Check the **flipper**:
 - With the stick down, it should BARELY lift the chassis.
 - With the stick up, the link should almost touch the paperclip.
 - Flip the bot over on a surface and test the **self-righting** by moving the left stick up and down quickly.



If anything is reversed, go to the **Reverse a Channel** section in the radio settings. (Chapter 13)



16. Optional - Advanced Tuning / Set Up

Adjust the Radio's Dual-Rates for more Control

Make your bot easier to drive precisely. This can also help make it easier to drive for new drivers.

1. On the radio, go to **Function Setup** → **Dual Rates**.
2. Select **Channel 1** (steering).
3. Adjust the **Rate** down to slow the overall steering speed ~80-90% often works well
4. You may notice that the right stick has to move fairly far to make the bot move.
5. Adjusting the **Expo** up to +20 or +25 will get the bot to start moving with less stick motion.
6. Flipping **Switch A** (Top Left) toggles between **Normal mode** and **Sport mode**.
7. You can set the **Rate** even lower in **Normal mode** for newer drivers, and keep the **Rate** higher in **Sport mode** for more experienced drivers!

Rubber Band/Switch Trick

You can use long rubber bands to hold all of the switches up on the radio to reduce the chances for confusion.

Ground Game

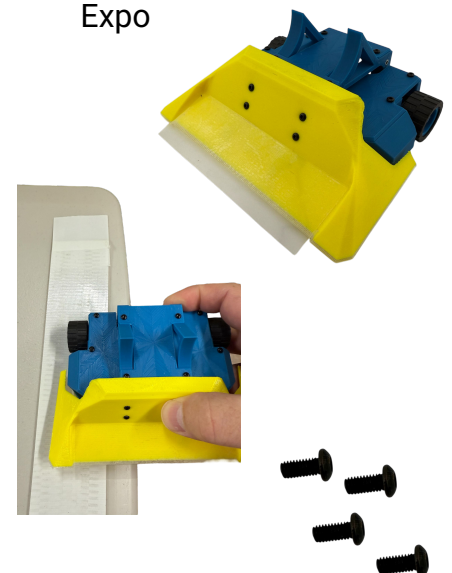
Acetate is very thin and flexible plastic. Gluing or double-sided taping acetate so that it sticks off the front edge of the plow by 2-4cm can massively improve your ability to get under your opponents.

Tire Cleaning

Cleaning the tires with duct tape is VERY helpful in competition. We generally tape down a long piece of duct tape, so that we can SLOWLY roll the tires on it between rounds.

Stripped Holes

Remember that you can use the bigger M2.5 screws if holes get stripped. They are in a separate bag of 4.



16. Optional - Advanced Tuning / Set Up

Widen Claws Using a Heat Gun

Use a heat gun or hot hair dryer to gently warm the claw areas just above the aluminum rod (shown by the red circles below). Once the plastic softens, push the claws outward until they line up with the edges of the flat part of the plow. Hold them in this position for about 10 seconds.

