



Stinger Robot Kit Assembly Guide



Figure 1 - Assembled Stinger Robot Kit



Below is a summary of the bolt packs included in the Stinger Robot Kit. Please familiarize yourself with them, and refer back to them during assembly.

Bolt Pack # 1

- Two Aluminum Drive Hubs
- Two 10-32 Set screws
- Eight 4-40 x ½ Stainless Steel Phillips Head Cap Screws
- Four M3 x .5 x 6mm Stainless Steel Pan Head Phillips Screws
- Four #4 Stainless Washers



Figure 2 - Bolt Pack #1

**Bolt Pack #2**

- One Stainless Steel Caster Shaft
- One Caster Wheel
- One Aluminum Caster Pivot Hub
- Four 3/32" Collars & Set Screws



Figure 3 - Bolt Pack #2

Bolt Pack #3

- Four 1" Plastic Hex Male/Female Standoffs
- Four $\frac{1}{4}$ " Plastic Hex Male/Female Standoffs
- Eight 4-40 Stainless Steel Nuts
- Four 4-40 x 3/8" Stainless Flat Head Phillips Screws
- Four 4-40 x $\frac{1}{4}$ " Stainless Flat Head Phillips Screws



Figure 4 - Bolt Pack #3

**Bolt Pack #4:**

- Six 4-40 x 3/8" Stainless Pan Head Phillips Screws
- Six 4-40 Stainless Nyloc Nuts

**Figure 5 - Bolt Pack #4****Bolt Pack #5**

- Two 1/4" plastic Hex Male/Female Standoffs
- Two 4-40 x 1/4" Stainless Pan Head Phillips screws
- Two 4-40 Stainless nuts

**Figure 6 - Bolt Pack #5**

**Bolt Pack #6**

- Two Velcro Tie Straps
- Three $\frac{1}{4}$ " x 4" Tie Wraps
- Two Tie Wrap Squares with adhesive

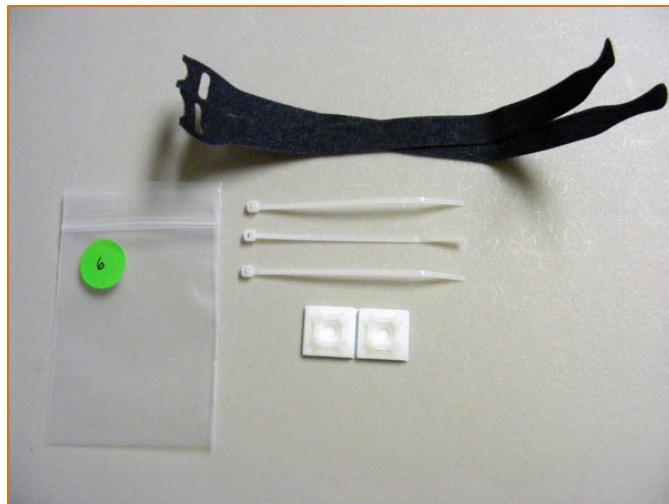


Figure 7 - Bolt Pack #6

Bolt Pack #7

- One 0.050" Hex Wrench
- One 3/32" Hex Wrench



Figure 8 - Bolt Pack #7



Assembly Start

- 1.) Using a Phillips head screw driver, bolt each motor to the gray sub-frame using two M3x.5x6mm screws and #4 washers as shown.



Figure 9 - Securing Motors with M3x.5x6mm Screws and washers

- 2.) This is how the sub-frame should look with both motors bolted in.

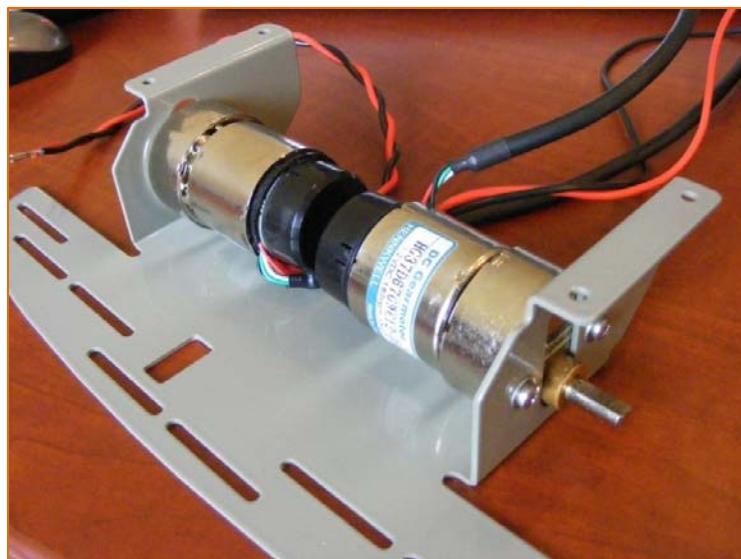


Figure 10 - Sub-Frame with DC Gearhead Motors



- 3.) Start the set screw into each drive hub as shown using the included 3/32" hex wrench. Screw it down until you see the tip protrude into the inner shaft hole, and stop. Repeat for other hub.



Figure 11 - Inserting 10-32 Set Screw into Hubs

- 4.) Slide each hub onto the motor shaft, making sure that the set screw is lined up with the flat on the motor shaft. Tighten the set screw to secure the hub to the shaft. Repeat for other hub.

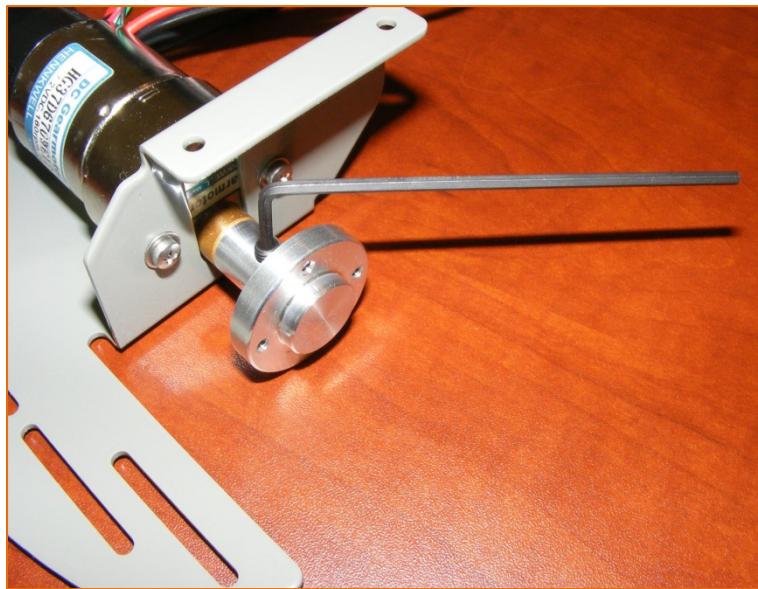


Figure 12 - Attaching and securing drive hubs to motor shafts



- 5.) This is how the sub-frame should look at this point, with both motors, and both hubs bolted on.

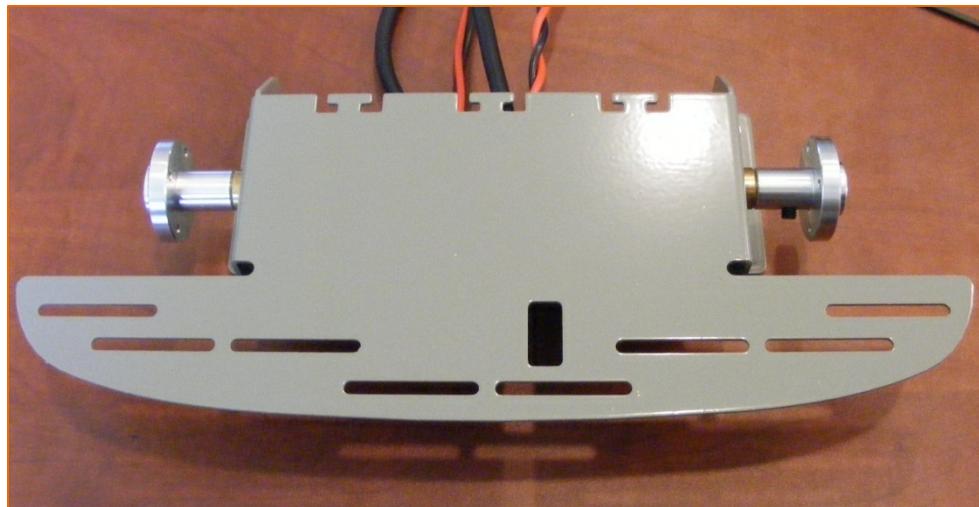


Figure 13 - Fully Assembled Sub-Frame

- 6.) Using the included 0.050" hex wrench, insert the small set screws into the collars until the set screw protrudes through the inner collar hole. Repeat for all four collars/set screws.



Figure 14 - Inserting set screw into caster collar



- 7.) Slide one collar over the rear caster shaft, then slide the caster pivot on. Next, slide another collar over the caster shaft as shown. Secure the second collar so that it's flush with the end/tip of the caster shaft, and secure using the 0.050" hex wrench. Next slide the first collar up, sandwiching the caster pivot between the two collars, and secure using the hex wrench. You will want to ensure the caster pivot can spin freely about the caster shaft before moving to the next step.



Figure 15 - Sandwiching caster pivot hub between two collars

- 8.) On the opposite end of the caster shaft, slide on one collar, the caster wheel, and the last collar. Secure the set screws for both collars so that the wheel is centered with the vertical portion of the caster shaft as shown below. Set the caster assembly aside.



Figure 16 - Attaching caster wheel and collars to caster shaft

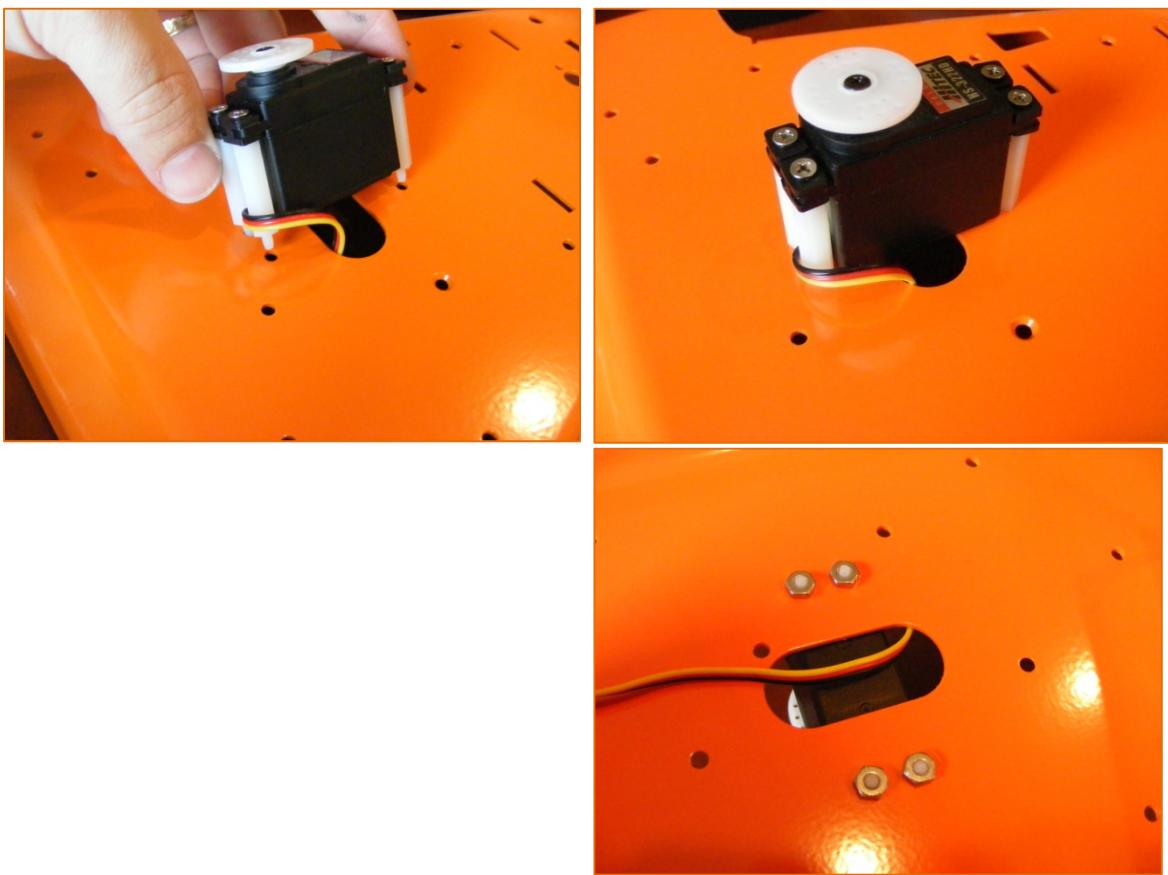


- 9.) Optional Step: If you are planning on attaching a servo to the top of the Stinger, then insert the four rubber mounting grommets into the servo mounting holes. Then, attach the four 1" hex standoffs to the servos using the included 4-40 x 3/8 flat head Phillips screws as shown.



Figure 17 - Insert rubber servo mounting grommets into servos, followed by 1" hex standoffs

- 10.) Optional Step: Mount the servo to the top of the Stinger as shown, making sure that you place the servo cable through the oval hole in the top of the chassis. Secure the servo using four 4-40 nuts on underside of chassis.





- 11.) Optional Step: If you are mounting a Serializer Robot controller to the Stinger, start by attaching four $\frac{1}{4}$ " hex standoffs to the Serializer board as shown below.



Figure 18 - Attaching 1/4" Hex Standoffs to Serializer

- 12.) Orient the Serializer into the underside of the Stinger chassis as shown. Secure using four 4-40 x $\frac{1}{4}$ Flat Head Phillips screws as shown below.

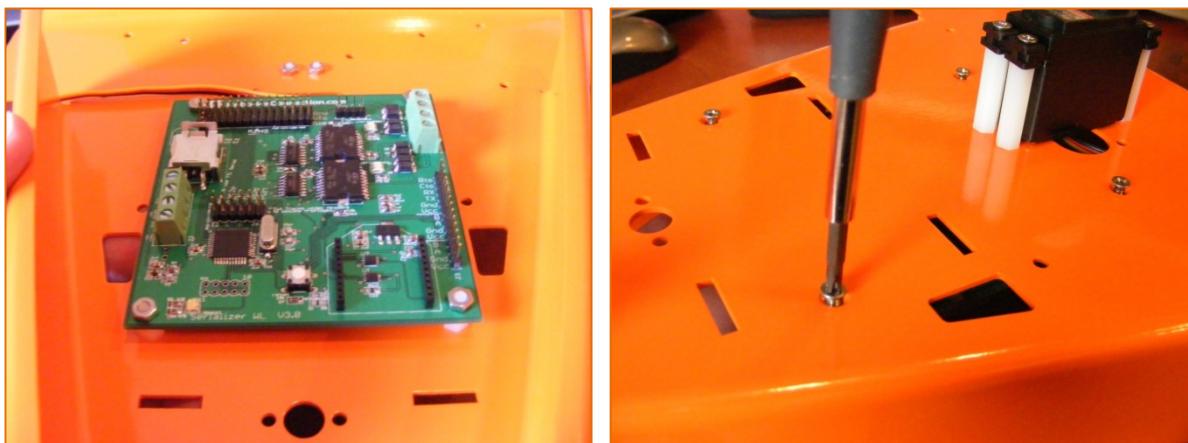


Figure 19 – Installing Serializer with 4-40 x 1/4 Flat Head Phillips screws



- 13.) Bolt the sub-frame to the underside of the Stinger chassis using four 4-40 x 3/8 Pan Head Phillips screws and four 4-40 nylock nuts as shown below. The 4-40 x 3/8 Pan Head Phillips screws are inserted down through the top of the chassis, and the nylock nuts attach from underneath.

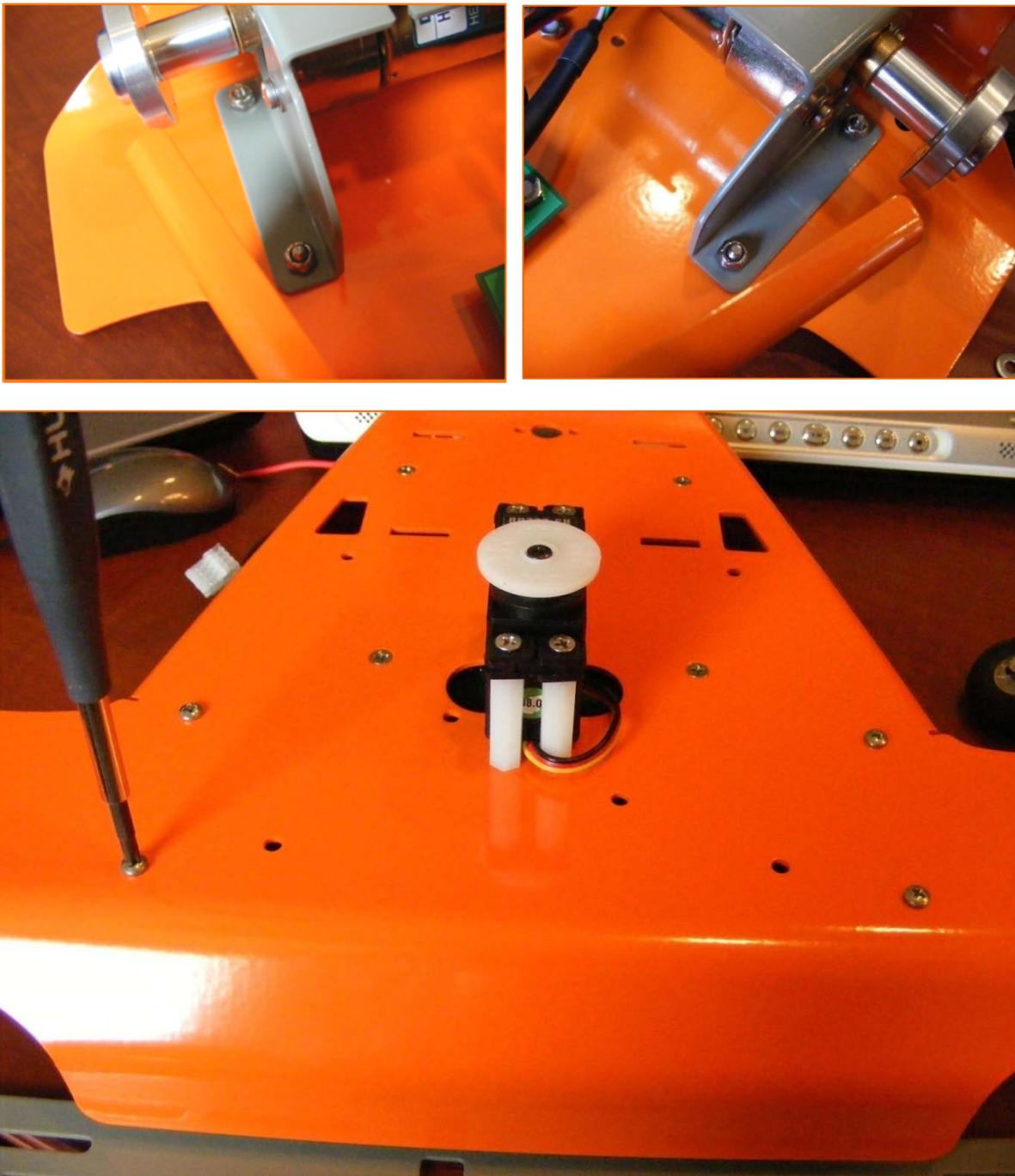
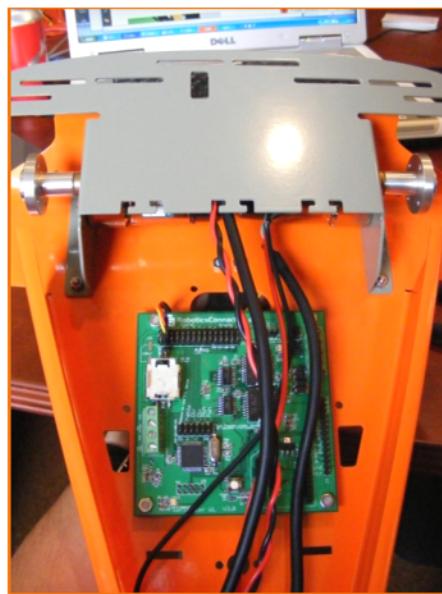


Figure 20 - Attaching Sub-Frame to Chassis using 4-40 x 1/2 Pan Head Phillips screws and Nylock Nuts



14.) This is how the Stinger should look at this point (w/ optional Serializer).



15.) Insert two 4-40 x ½ Pan Head Phillips screws through the chassis as shown below, and place two #4 washers over each screw. Place the caster assembly over the screws, and secure using two 4-40 nylock nuts as shown. Your caster wheel is now properly mounted.

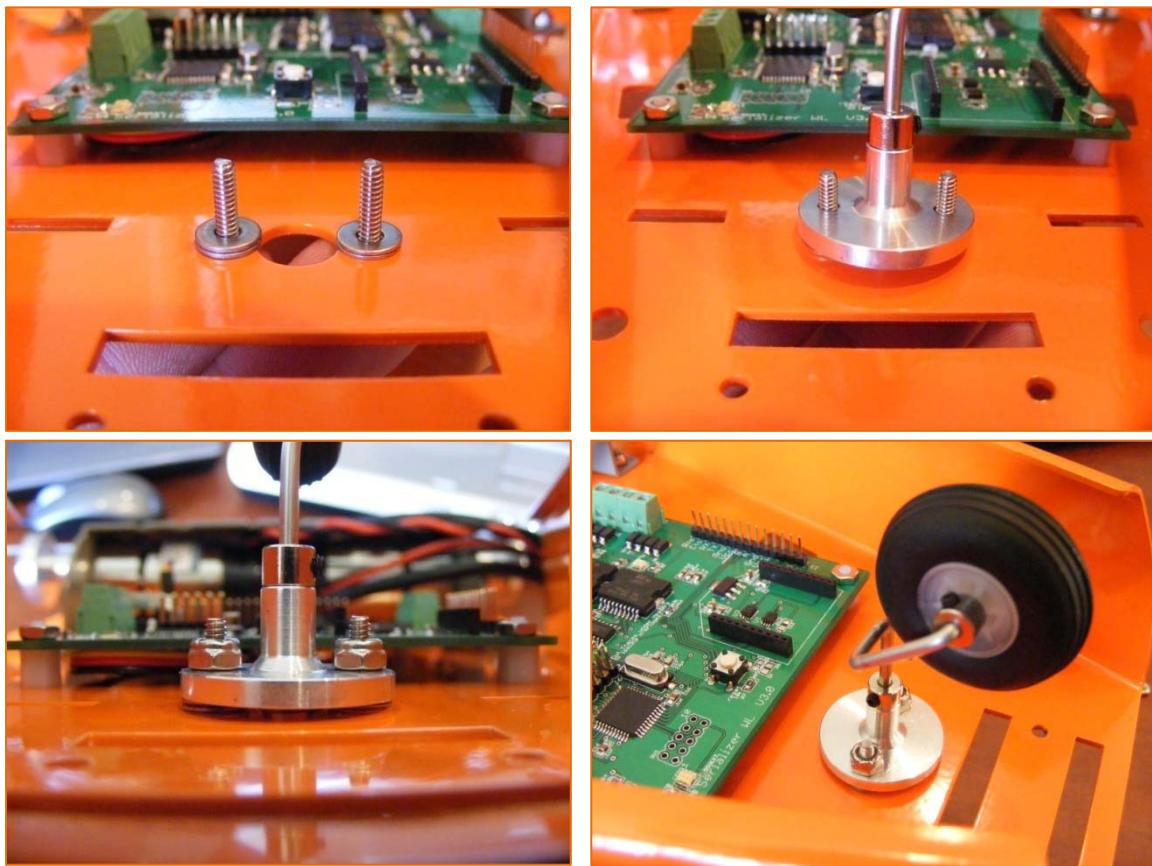


Figure 21 - Attaching the rear caster assembly



16.) Attach the drive wheels to the drive hubs using four 4-40 x ½ Pan Head Phillips screws per wheel as shown below. The screw heads are a tight fit in the wheel bolt holes, but rest assured they will seat properly. Tighten the bolts down until the wheel is firmly seated against the drive hub. Repeat for other wheel.



Figure 22 - Attaching the drive wheels



17.) The wheels fit close to the chassis, and should have plenty of clearance to rotate properly. If however, the wheel is touching the chassis sides as shown below, simply loosen the four screws that bolt the sub-frame to the chassis, and slide the sub-frame forward. Hold that location securely, and re-tighten the bolts. You will now have enough wheel clearance.



Figure 23 - Checking for proper wheel clearance

18.) Optional Step: If you are using a Push Button I/O Board, attach two $\frac{1}{4}$ " hex standoffs to it, and secure using two 4-40 nuts as shown below.

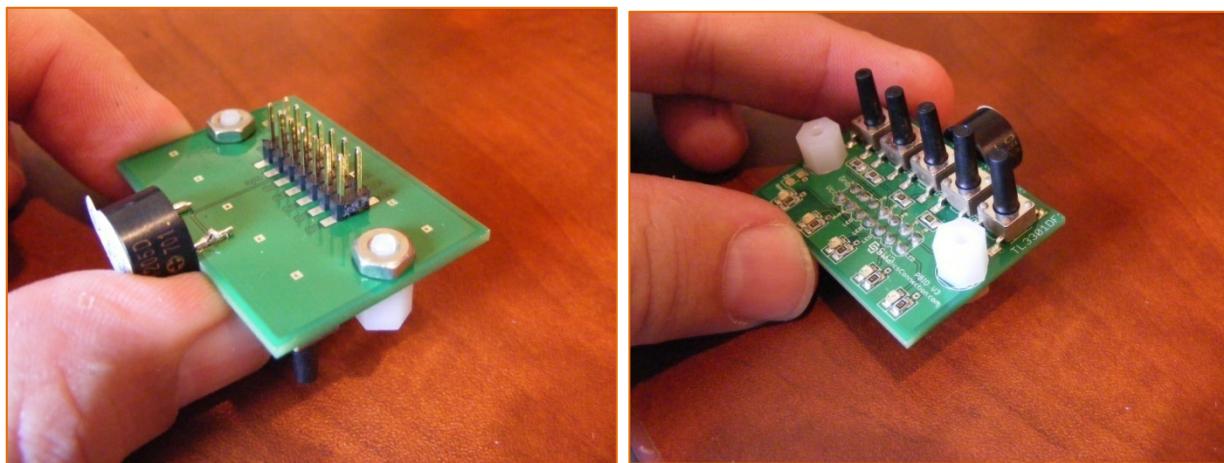


Figure 24 - Installing hex standoff hardware on Push Button I/O Board



19.) Attach the Push Button I/O board to the bottom of the chassis using two 4-40 x ¼ Pan Head Phillips screws as shown. Make sure the push buttons protrude through the square hole closest to the caster pivot.

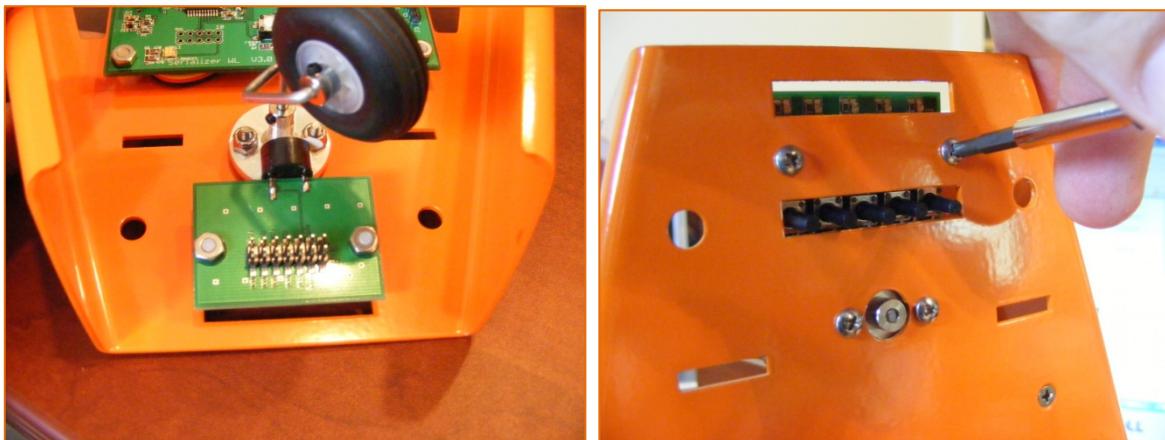


Figure 25 - Installing a Push Button I/O Board

20.) This is how the finished Stinger should look. We did place the 'RoboticsConnection.com' sticker on the front, and inserted an XBee antenna. ☺



Figure 26 - Assembled Stinger Robot Kit

21.) Please proceed to the Serializer Wiring Guide to complete electrical assembly if you are using a Serializer Robot Controller.



Serializer Wiring Guide

- 1.) Plug encoder connectors from motors into the encoder ports on the Serializer. **Make sure you watch the polarity of the plugs!** The red lead wire should connect to the Vcc pin on each port.



Figure 1.0 – Plugging Encoders into the Serializer Encoder Ports

- 2.) Bolt the Wiring Harness/Switch assembly into the shell as shown. You will need to remove the nut and washer from the switch to begin with, then insert the switch through the hole, and secure with the washer and nut.

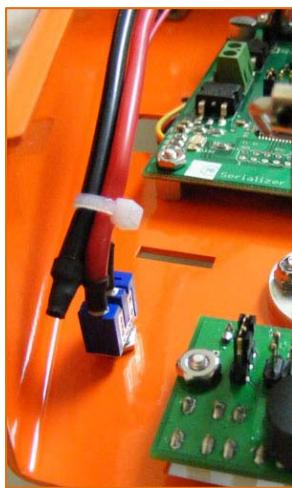


Figure 2.0 – Switch inserted from bottom

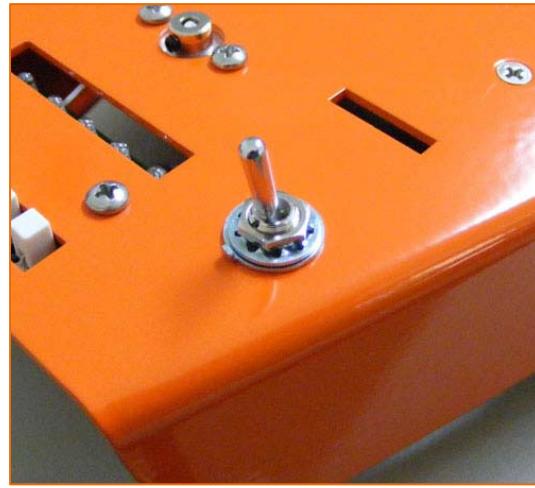


Figure 3.0 – Switch bolted into shell



- 3.) Strip about $\frac{1}{4}$ ", or 5mm, worth of insulation from the ends of the thin power wires on the wiring harness as shown.

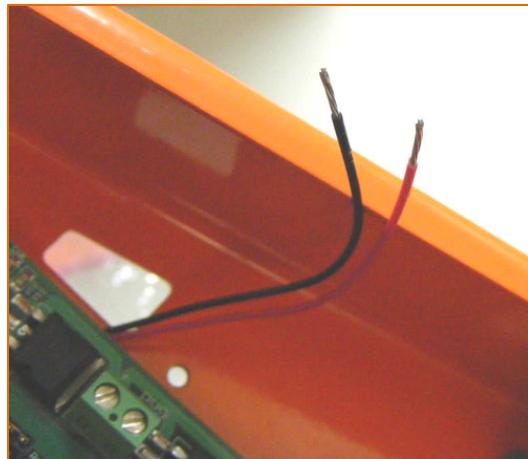


Figure 4.0 – Wiring Harness power lead ends stripped

- 4.) Connect power leads to Serializer power screw terminal port. **MAKE SURE YOU WATCH POLARITY, OTHERWISE DAMAGE WILL OCCUR, AND WE ARE NOT RESPONSIBLE!!!** The **red** wire should connect to the '+' screw terminal, and the **black** wire should connect to the '-' screw terminal, as shown below. Note, the keep the power wires tidy, you can route them underneath the Serializer as shown below.

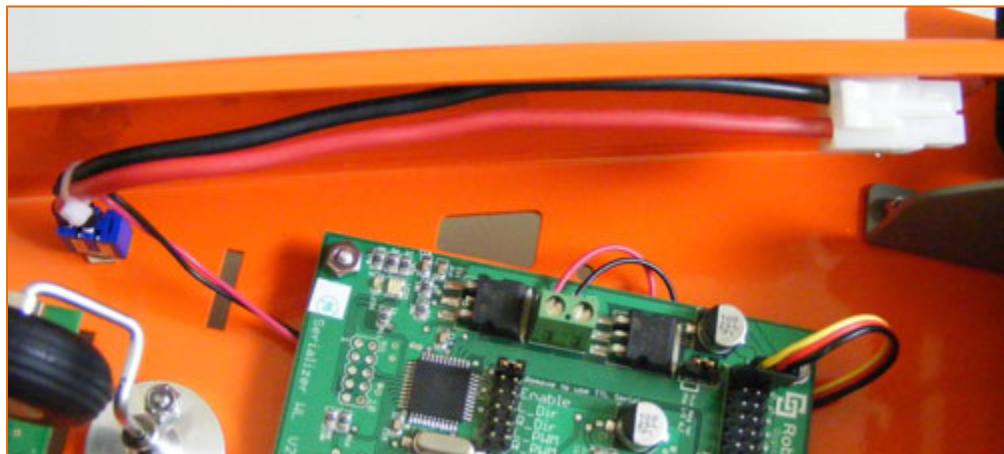


Figure 5.0 – Wiring Harness power leads properly connected to Serializer



- 5.) Run the motor wires over to the green motor terminals (see Figure 7), keeping the wiring close to the chassis. Cut the excess wire from the ends of the motor leads if you wish. **Make sure that you don't cut them too short!!!** You can actually leave them the stock length if you wish. Then, strip $\frac{1}{4}$ ", or 5mm, of insulation from the ends, as shown below.

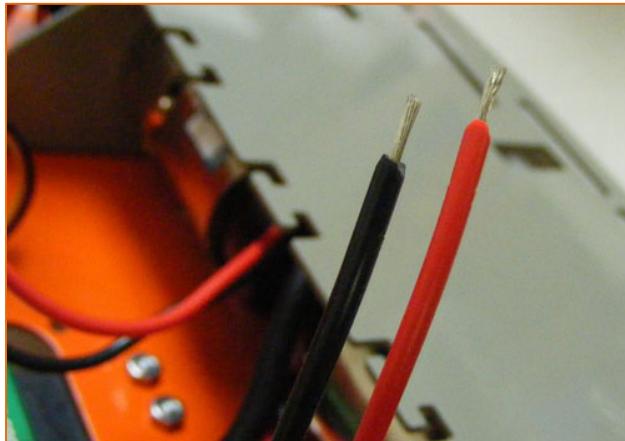


Figure 6 – Stripping insulation from motor wires

- 6.) Connect each motor lead pair to each of the motor screw terminal ports on Serializer. Both red wires should be placed on the two inner screw terminals, and the black wires should be placed on the two outer screw terminals as shown below.

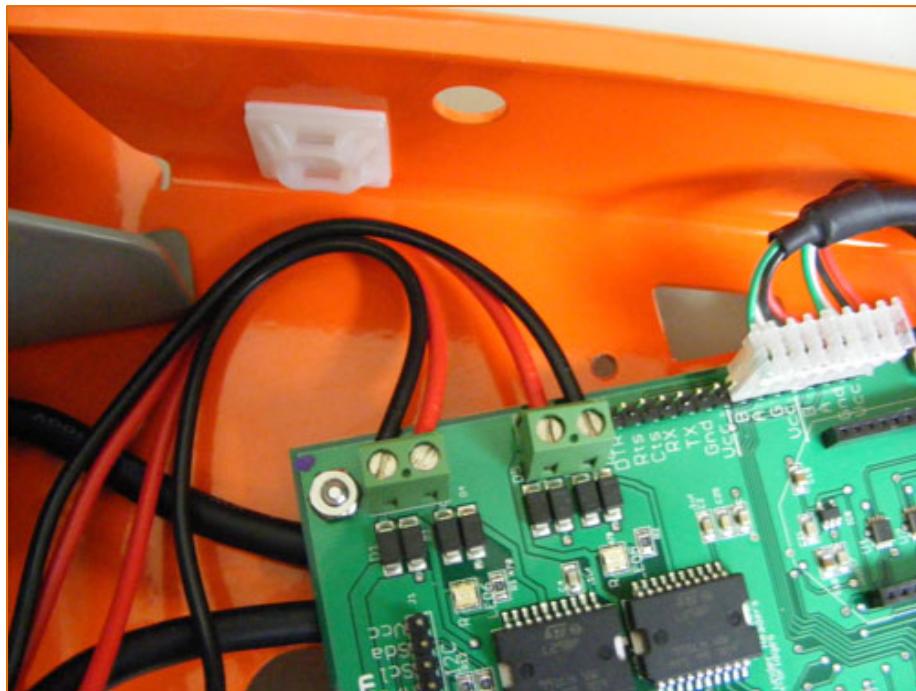


Figure 7 – Connecting motor wires to Serializer Port



- 7.) Attach one of the wire tie squares, with adhesive, to the inside of the Stinger as shown. Then, use a tie wrap to secure the motor wires.

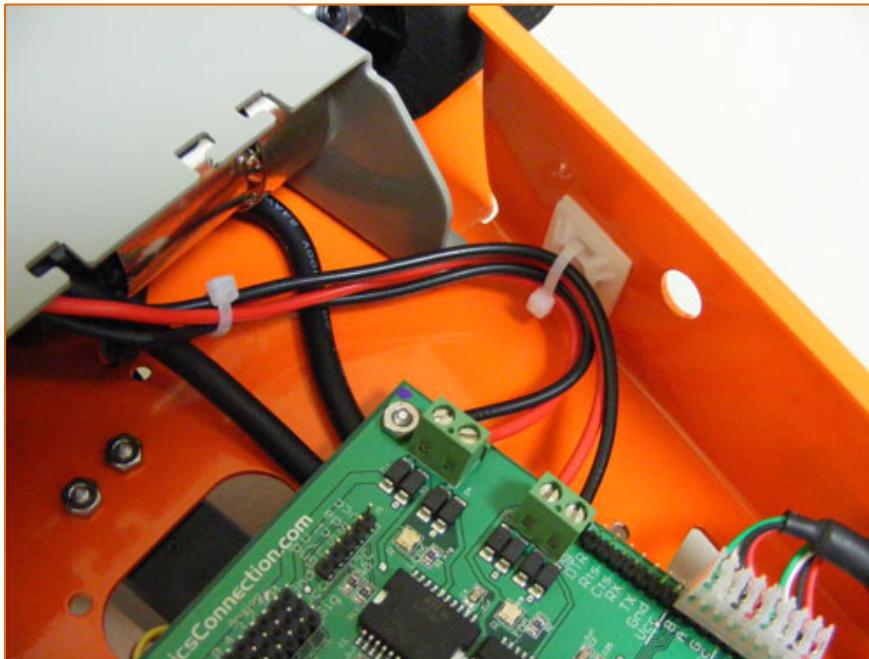


Figure 8 – Attaching wire tie square to secure motor wires

- 8.) Your wiring should now match the diagram below:

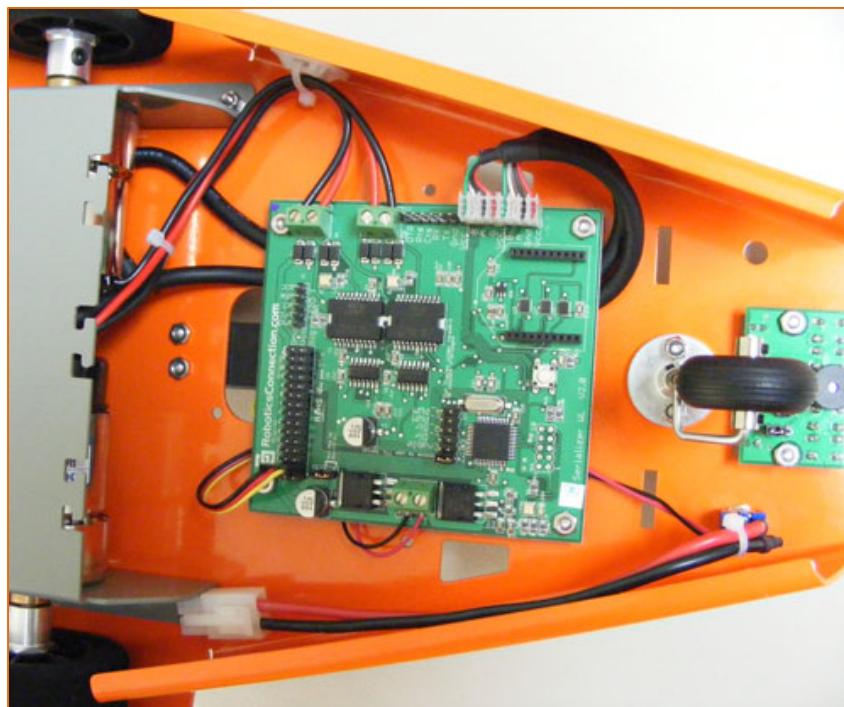


Figure 9 – Overall Wiring Diagram



- 9.) Insert the U.FL antenna into the hole in the side of the Stinger shell. The antenna cable will end up being located inside the chassis, as shown below.

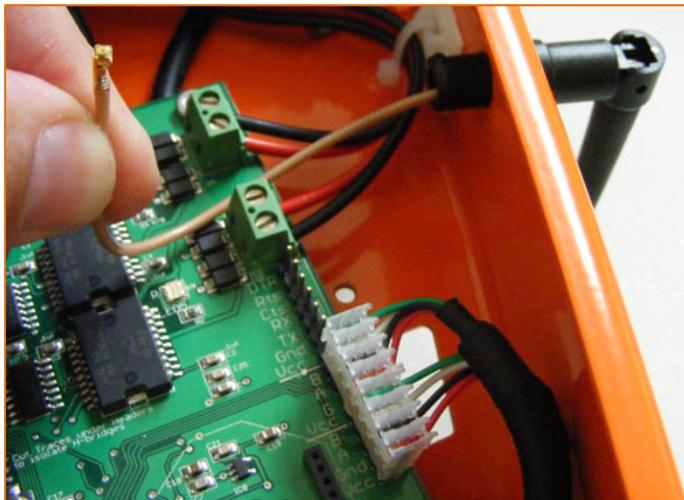


Figure 10 – Bottom View of Antenna inserted into Shell

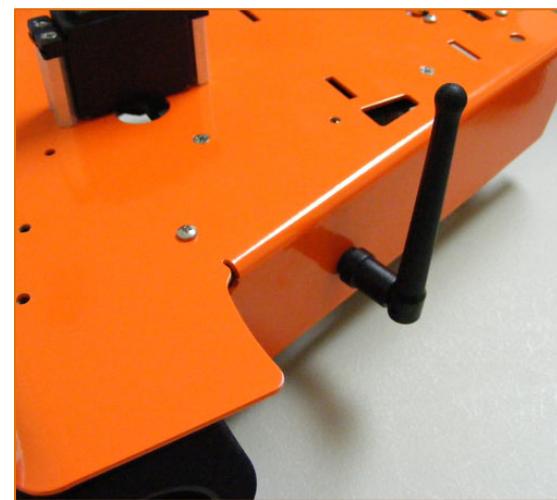


Figure 11 – Outside view of Antenna

- 10.) Now, plug an XBee module into the Serializer as shown, noting the orientation. If you plug it in backwards, we are not responsible for damage, so please ensure proper orientation!

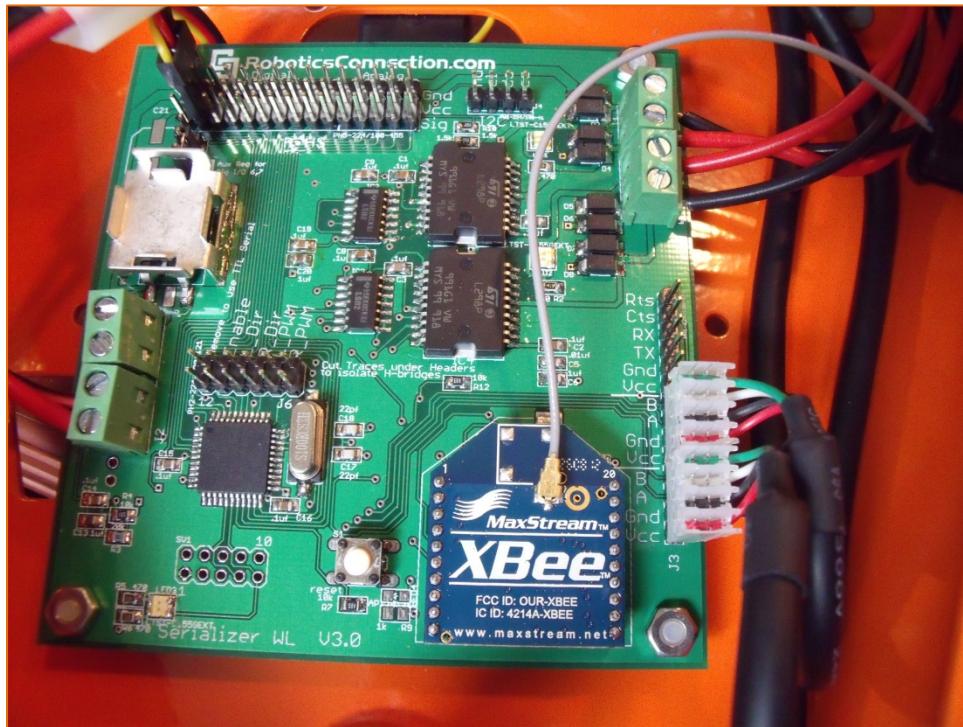


Figure 12 – Antenna wire secured to Xbee module



11.) Connect the U.FL Antenna wire to the U.FL connector on the XBee module as shown.

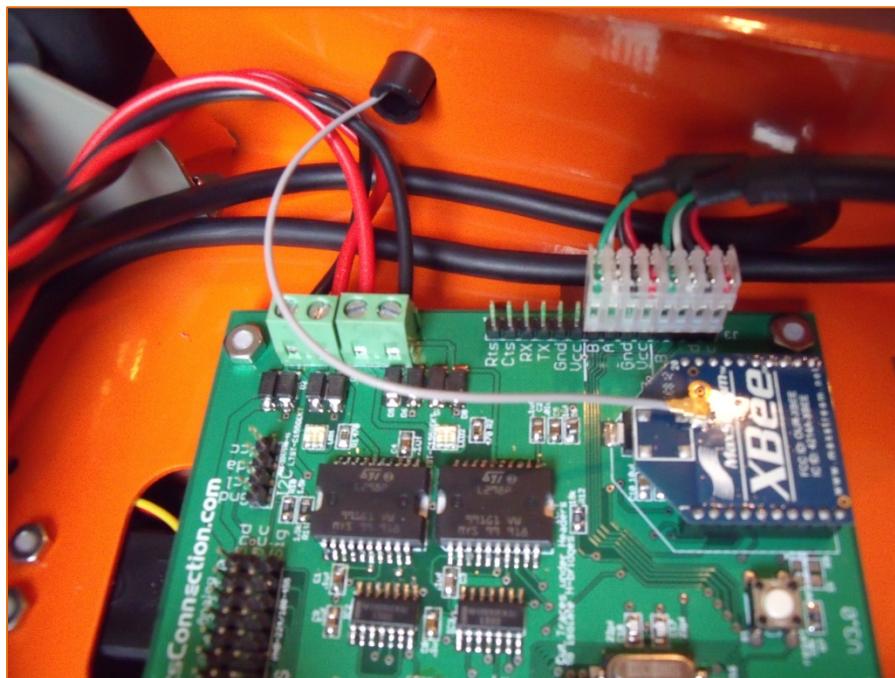


Figure 13 – Inserting XBee module into Serializer

12.) Finally, insert the velcro battery straps, used to secure the batteries. This will require some threading of the strap between the Stinger chassis, and the Serializer.



Figure 14 – Inserting the Velcro Straps

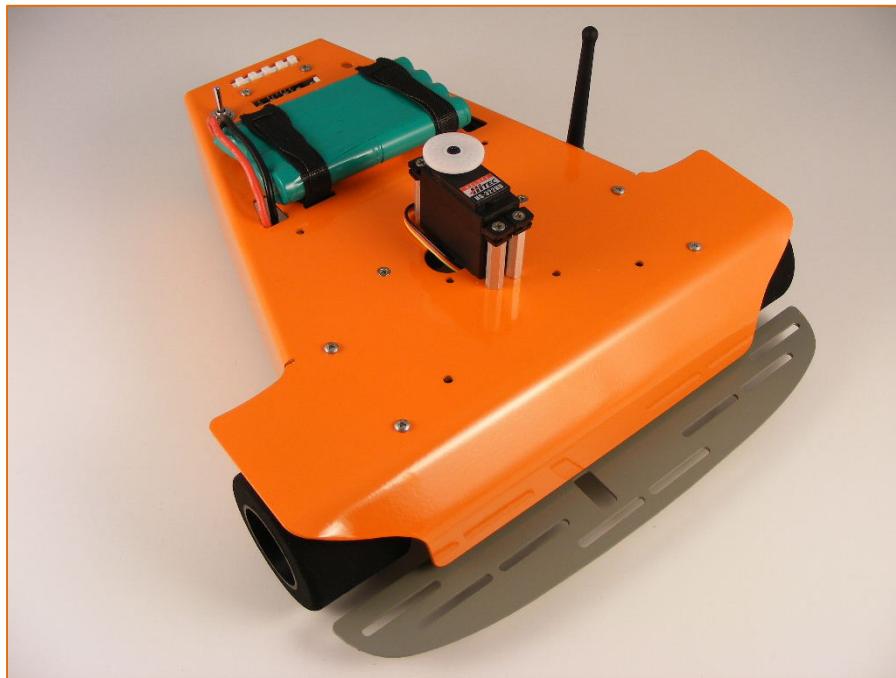


Figure 15 –Assembled Stinger with pan servo, Push Button I/O Board, and batteries.