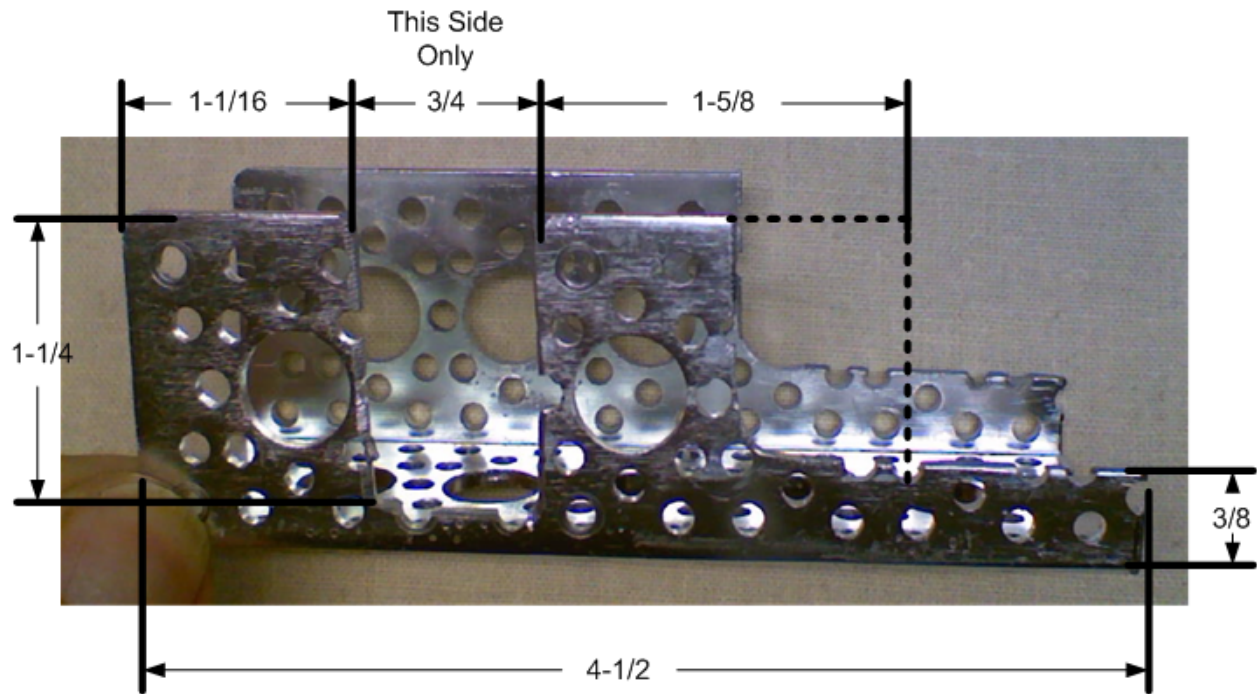
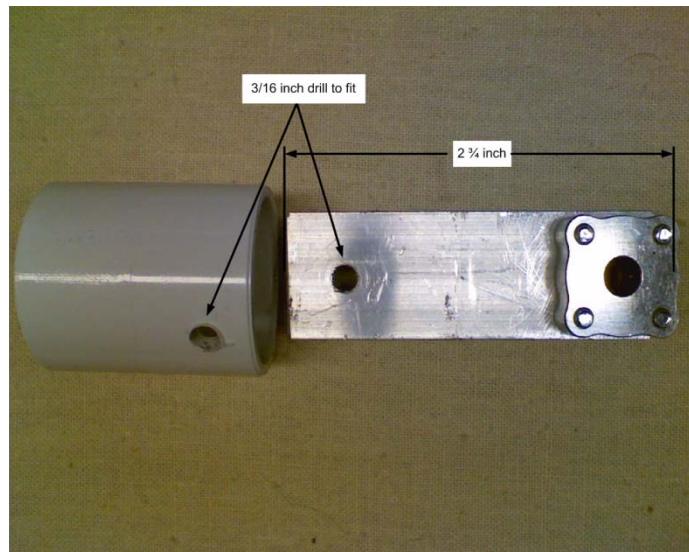


WRAPS Rotor Construction Guide.

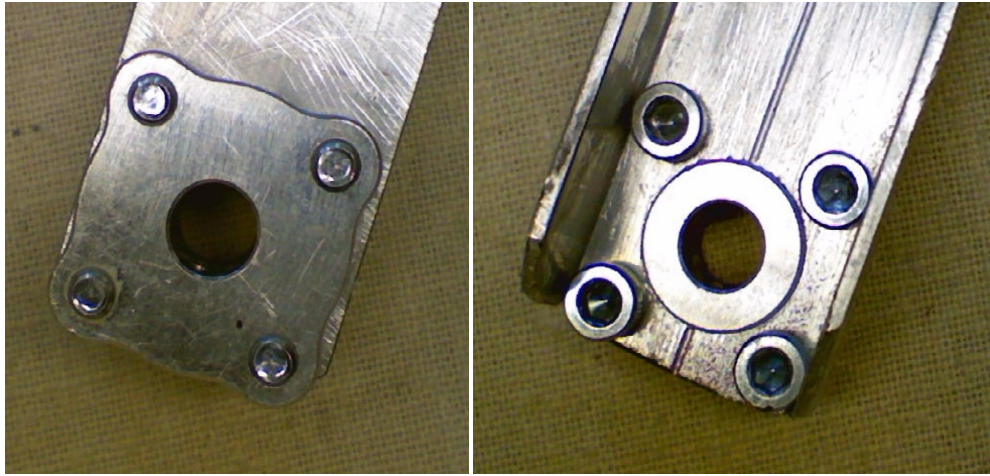
This is a suggested construction sequence, your end sequence may vary depending on your mechanical abilities and your talent. You in all likelihood will come up with a better way of constructing your WRAPS rotor, this sequence worked for me.



Cut the aluminum channel chassis as shown. Use the channel cutout template (PDF) as a guide. The dotted line should be the cut line, this picture is of the prototype and is not the final configuration. File edges to remove spurs.



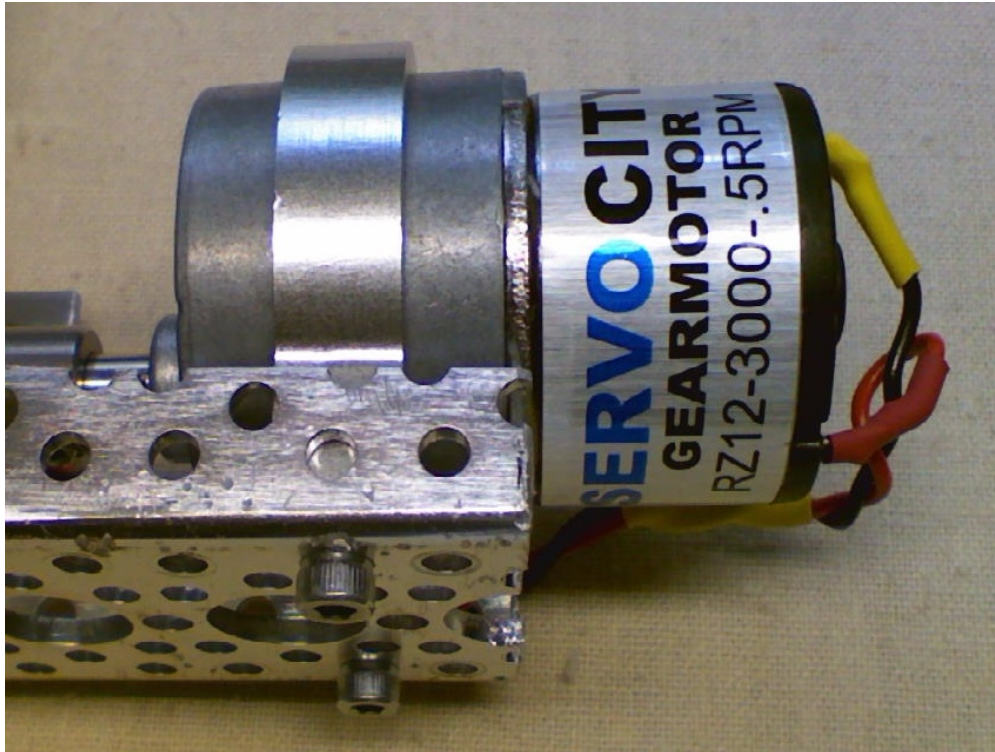
Cut the $\frac{3}{4}$ inch aluminum channel to length. Drill holes to accept hub fitting on one end. Drill hole to accept PVC coupler mounting screw on the other end, snug the PVC coupling to edge of channel length when drilling the pilot hole.



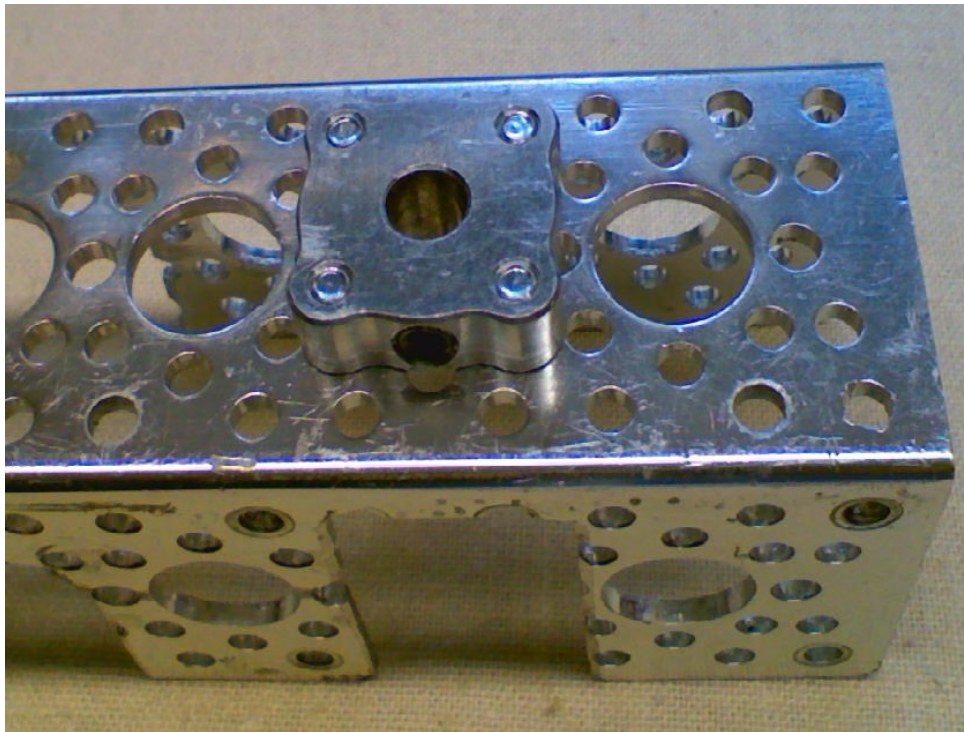
Install hub fitting.



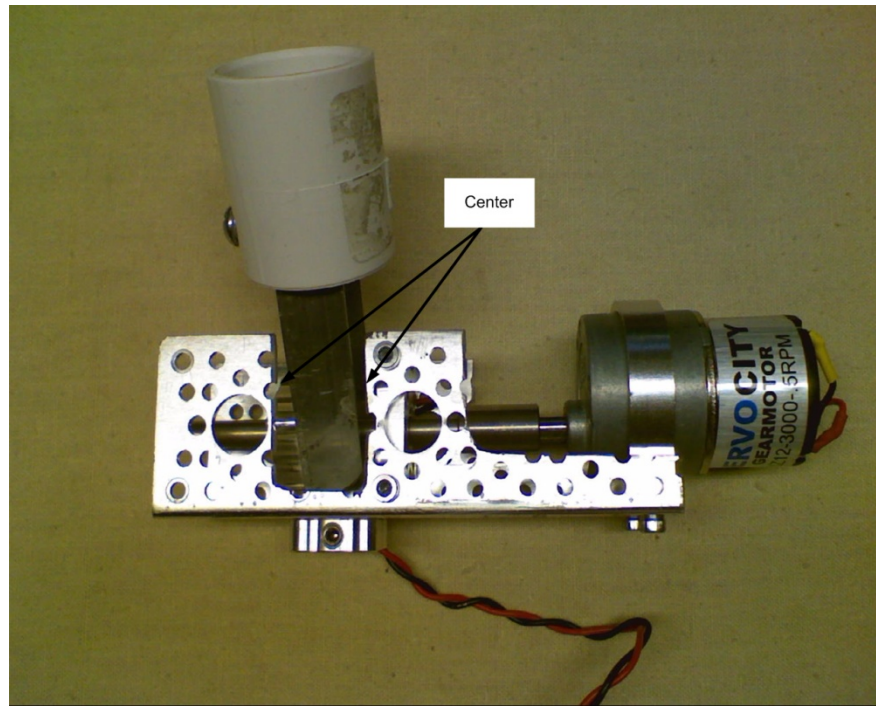
Round off and bevel the end of the extension arm to clear AZ mounting hub attachment screws later.



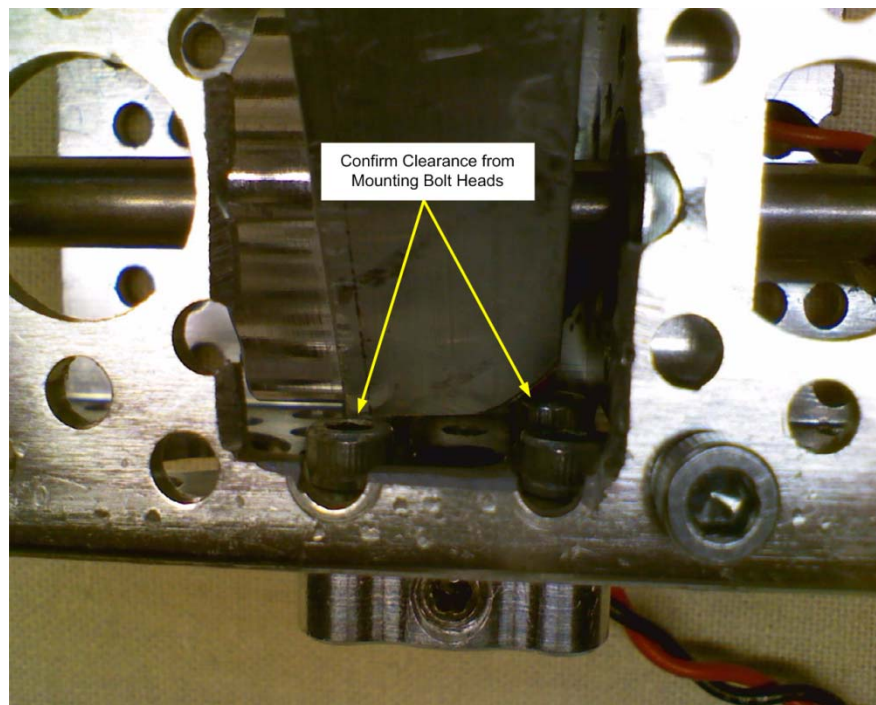
Prepare and install .5 RPM EL motor on the channel chassis. Use the 6mm to $\frac{1}{4}$ inch coupler on the end of the motor shaft to mate with the $\frac{1}{4}$ inch D shaft extension.



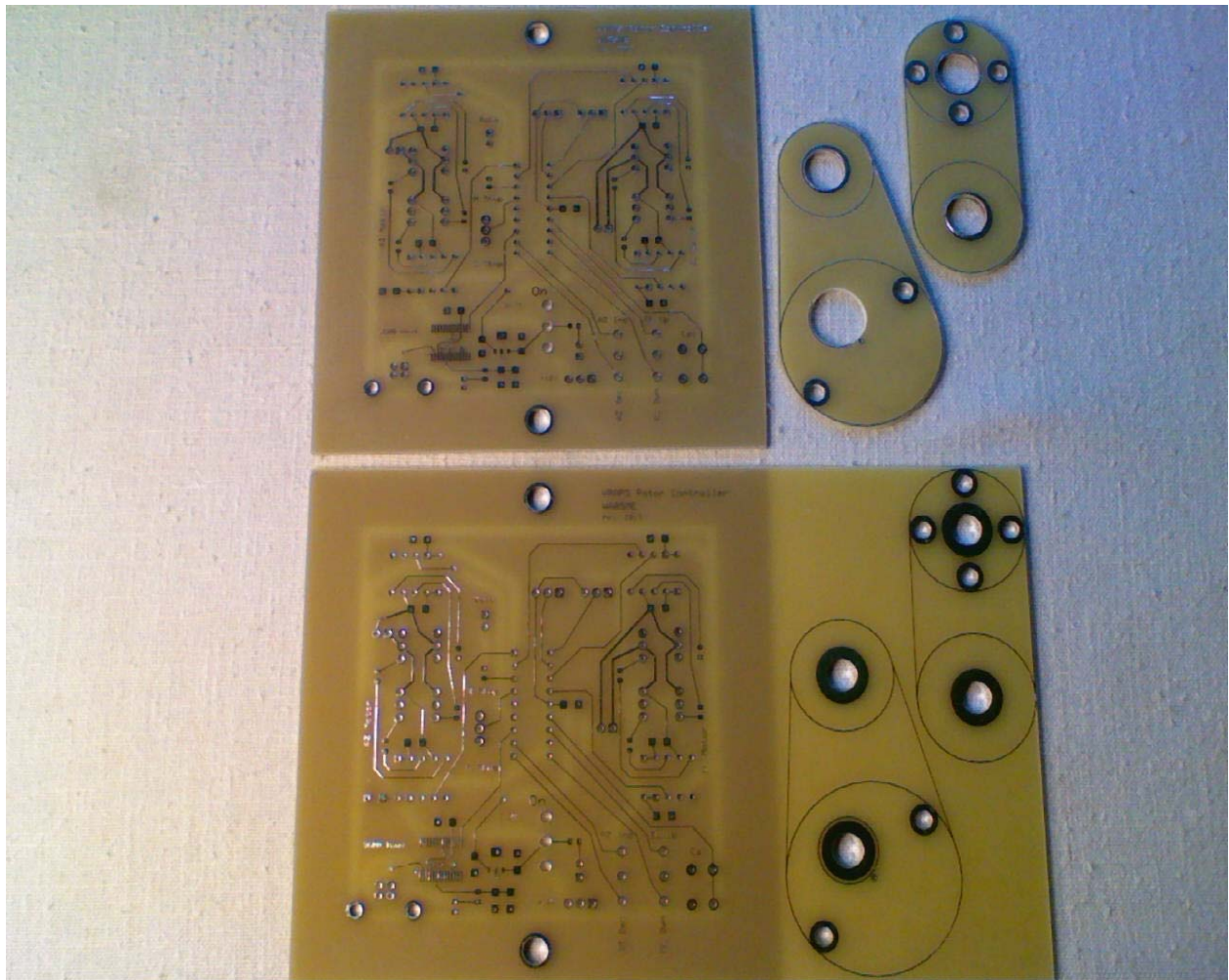
Install AZ hub fitting on the bottom of the channel chassis at location shown. Note location of the set screw in the hub.



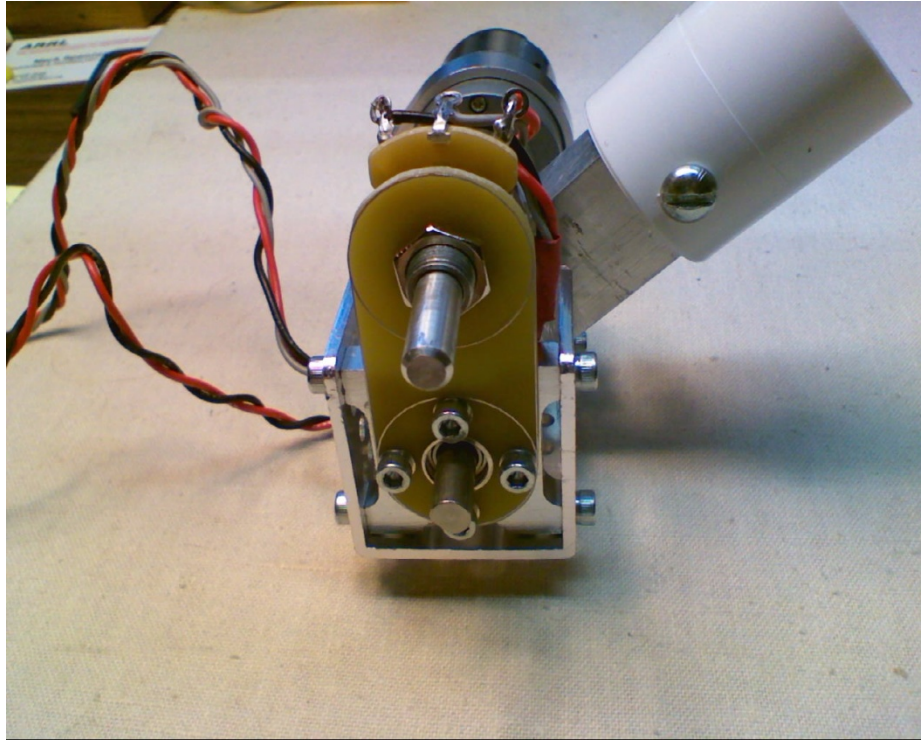
Install pillow bearing then slide extension arm onto $\frac{1}{4}$ inch D shaft, center in the slot. Use external 12 volt DC power to rotate motor if needed so that you can get at the set screw on the extension arm hub fitting.



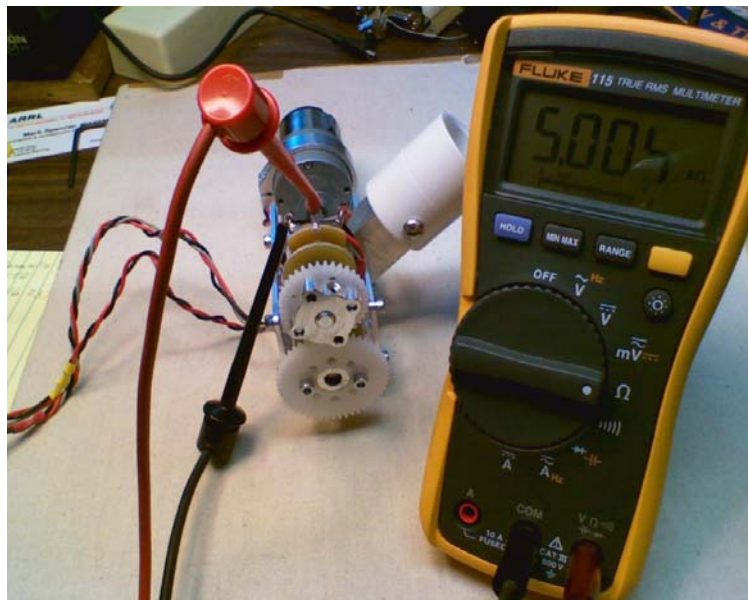
Confirm that there is clearance between the edges of the extension arm and the AZ hub mounting bolts. If the clearance is insufficient, remove extension arm and bevel the edge until desired clearance is obtained.



Cut the two position pot brackets from the circuit board material. Drill the appropriate size hole to receive the pot shafts, probably $\frac{3}{8}$ inch holes. The pots are mounted in the positions that do not have adjacent smaller mounting holes. The other large holes provide clearance for the motor shafts, enlarge those holes to $\frac{1}{2}$ inch. The bracket on the upper right of the picture is the EL pot mounting bracket.

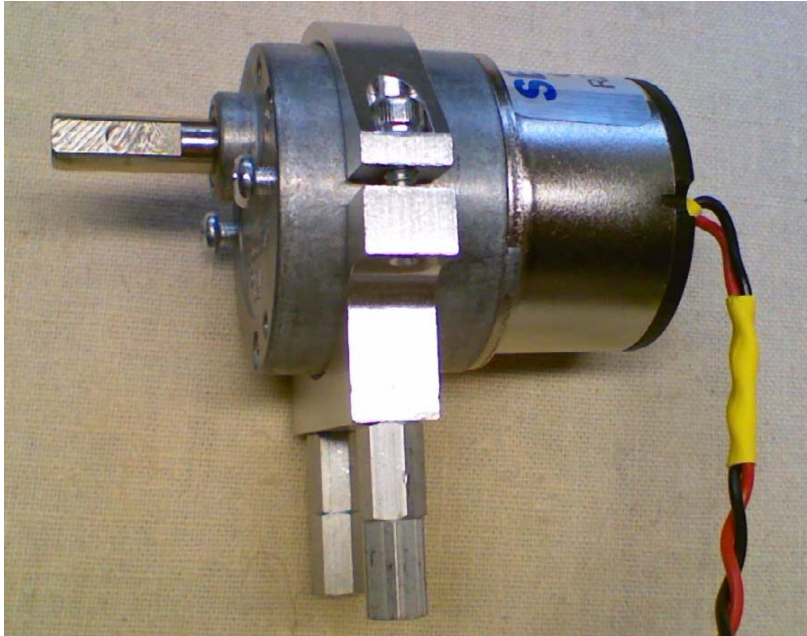


Wire up the EL pot and install the pot on the bracket as shown. Attach the bracket to a pillow bearing with 4 bolts as shown. Rotate the EL motor with DC power so that the extension arm is at 45 degrees from the horizontal as illustrated. Install the pillow bearing with the bracket on the end of the channel chassis assembly.



Mount $\frac{1}{4}$ inch hubs onto a 36 t gear and a 50 t gear using 2 bolts. Install the 50 t gear on the motor shaft extension and tighten the set screw on the flat surface of the D shaft. Using an Ohm meter, set the pot resistor to 5K ohms (half rotation). Carefully slide the 36 t gear onto the pot

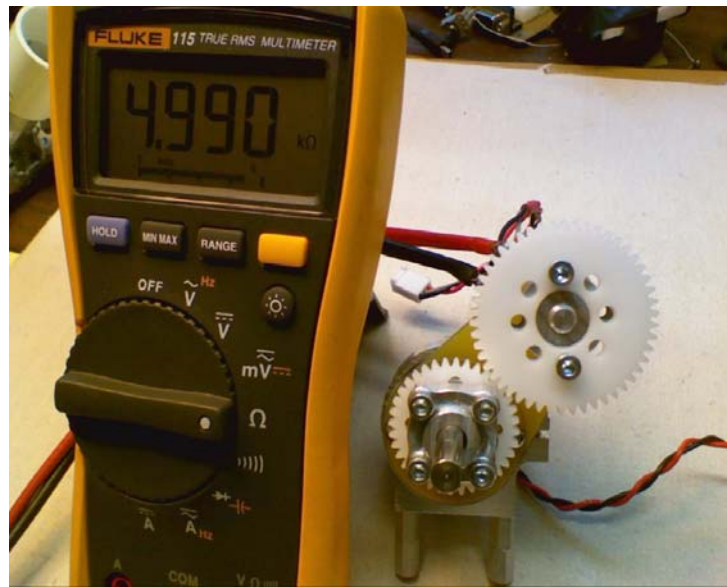
shaft, as shown, trying not to change the pot position and engage the teeth of the 50 t gear. If the pot position changes, using a needle nose pliers, rotate the pot shaft back to 5K ohms (the shaft should move with little resistance because the set screw is still loose). When in position and at the correct resistance, tighten the set screw on the 36 t gear hub. The EL rotor assembly is virtually complete at this stage.



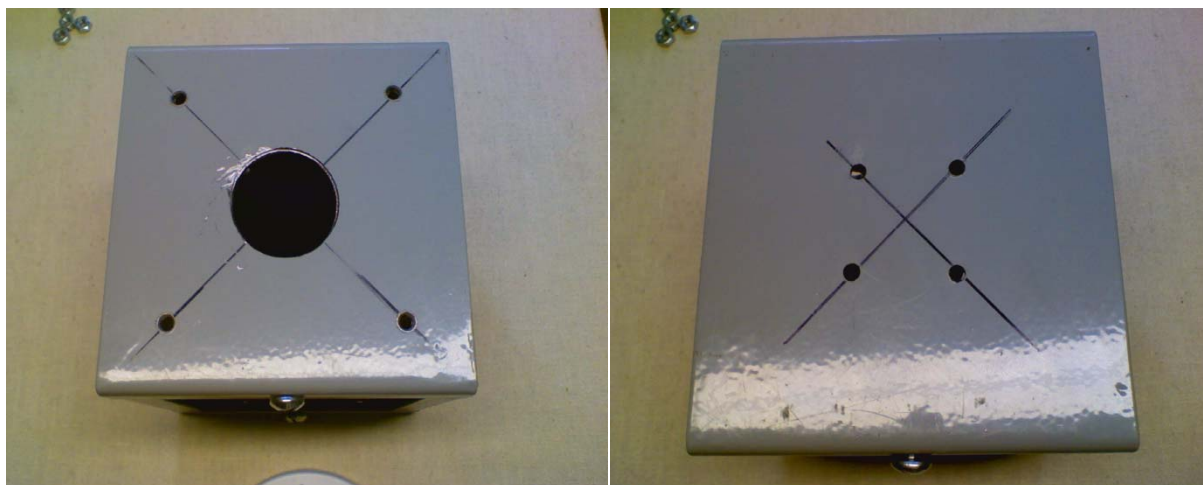
Prepare the 1 RPM AZ motor as shown in the mounting clamp with the hex extensions. Use two “decapitated” $\frac{3}{4}$ inch bolts to connect the hex extensions to the mounting clamp. The bolts should extend only half way into the bottom hex extensions to allow room for the mounting bolts to come up from the other side. Use DC power to rotate the motor shaft flat side as shown.



Mount the prepared pot bracket to the motor chassis with 2-3 mm screws as shown. Mount a 6 mm hub on one side of a 36 t gear (this hub is hidden in the picture) and a $\frac{1}{4}$ inch hub on the other side of the gear with 4 bolts. Slide the 6 mm hub onto the motor shaft and tighten the set screw against the flat side of the D motor shaft. Install a $\frac{1}{4}$ inch D shaft extension (shown) into the $\frac{1}{4}$ inch hub and tighten the set screw. Prepare and install the AZ pot and position the POT leads as shown.

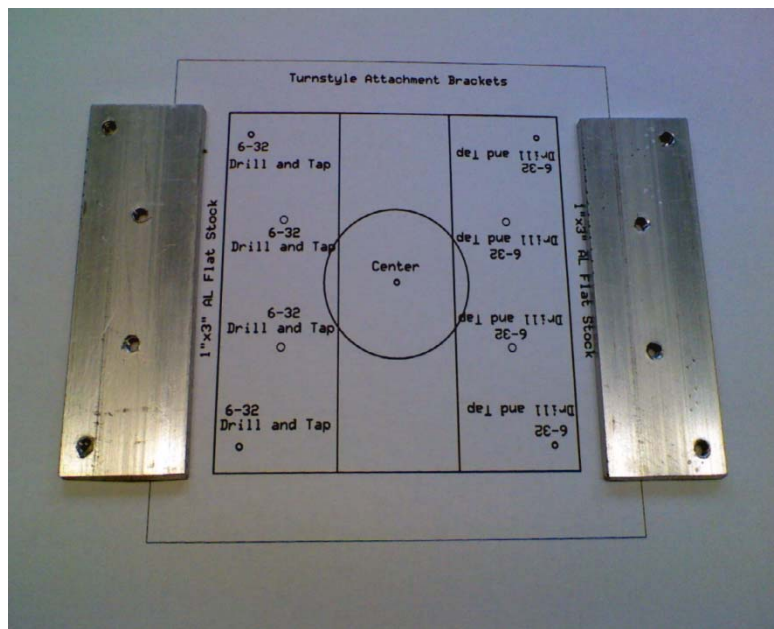


Install a $\frac{1}{4}$ inch hub onto a 50 t gear. As you did with the EL pot, set the AZ pot to 5K ohms. Slide the 50 t gear onto the pot shaft and engage the teeth of the 36 t gear. If the pot moves, use a needle nose pliers to turn the pot shaft to obtain 5K ohms then tighten the set screw in the hub. This completes the assembly of the AZ motor.

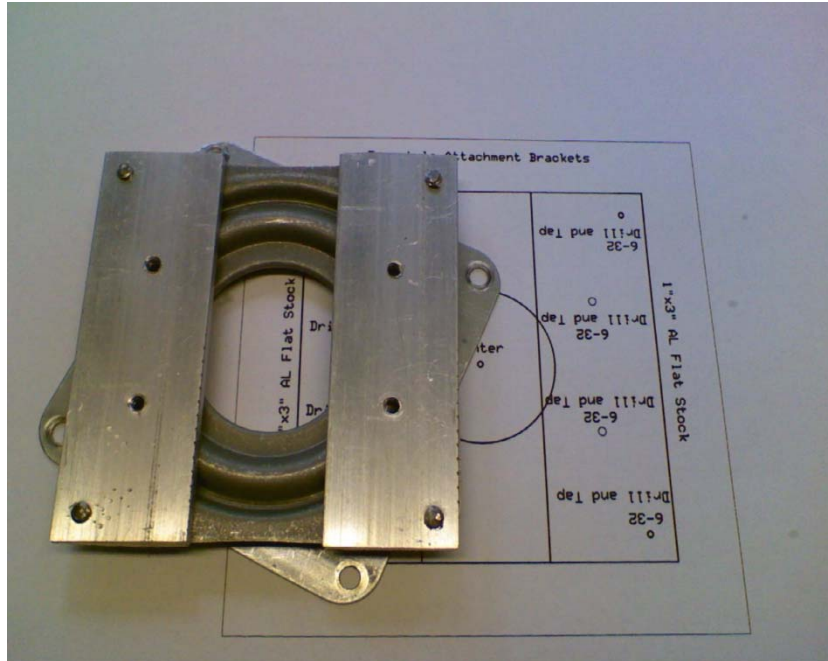




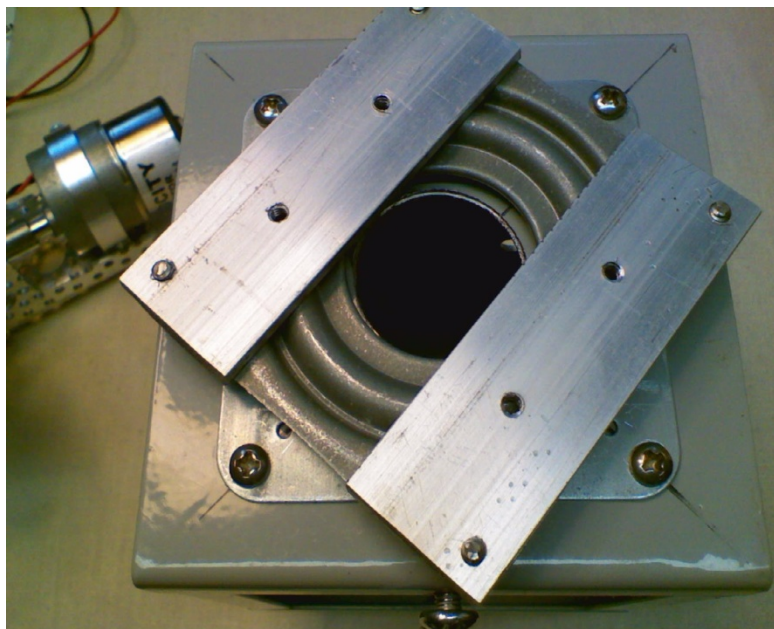
Drill the appropriate holes in the rotor housing as shown. Use the templates in the three PDFs for the three enclosure surfaces. Use a file to clean up any rough edges produced during drilling, especially the larger hole in the top surface (use a hole saw to make this hole).



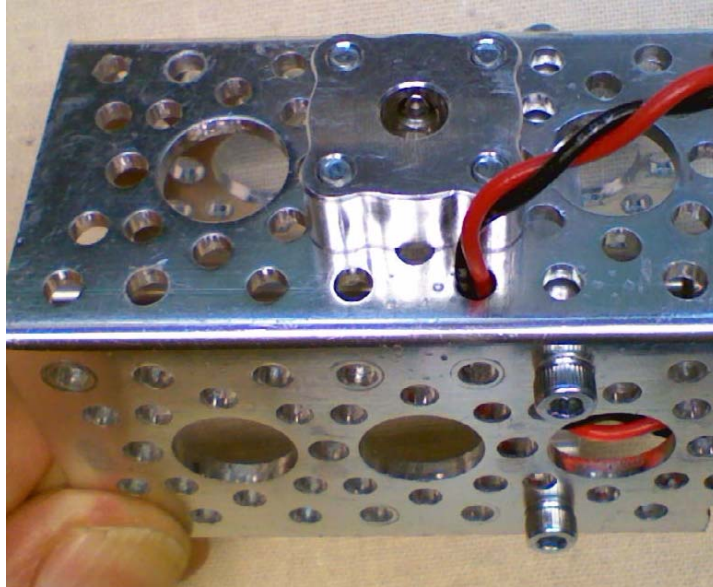
Manufacture two brackets out of aluminum flat-stock, use the templates in the Turnstyle Attachment Brackets PDF as a guide. Drill and tap the holes in the brackets to accept 6-32 screw bolts.



Mount the brackets onto the Lazy Susan bearing assembly using four 6-32 pan head screws from below. Shorten the shafts of these screws so that little if any thread is protruding above the brackets.



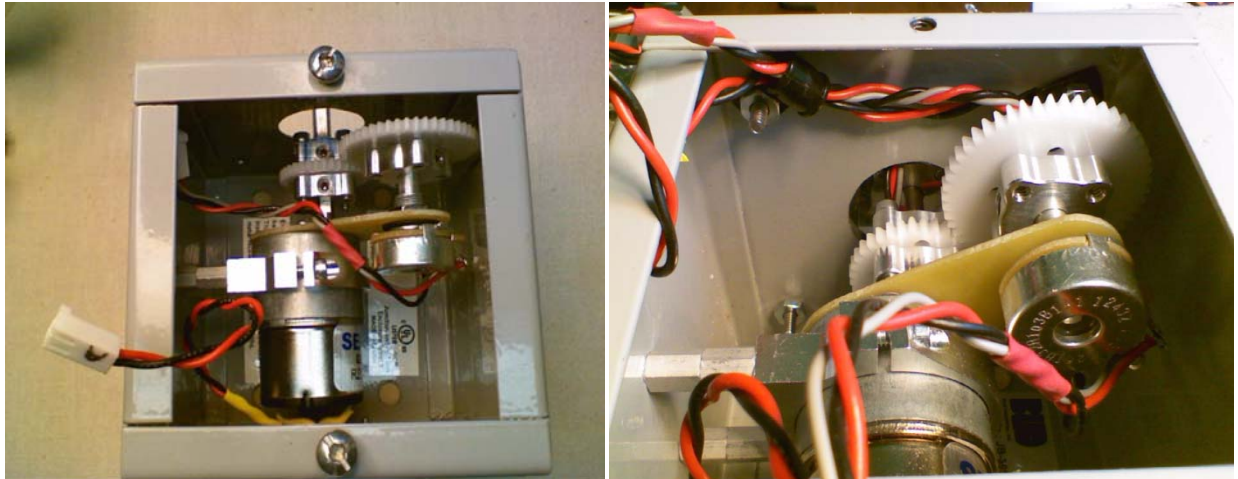
Mount the Lazy Susan bearing assembly to the top of the rotor enclosure using four 6-32 pan head screws with nuts below.



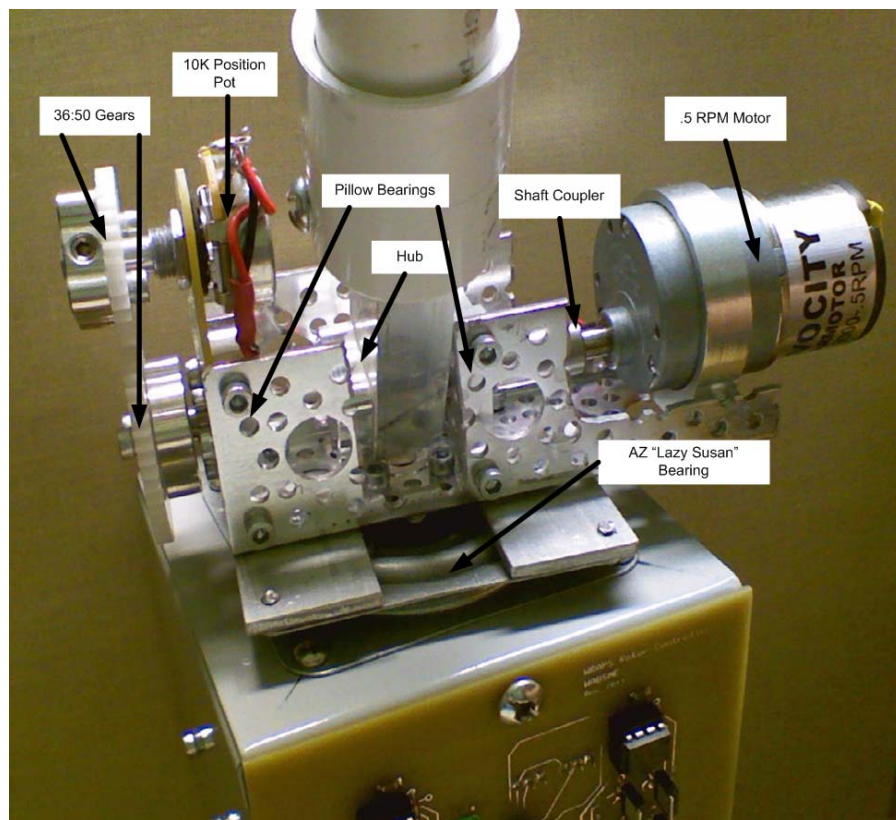
Route the EL motor wiring through a hole adjacent to the AZ mounting hub on the bottom of the channel chassis as shown. Route the EL pot wiring through a convenient large hole in the side of the channel chassis, the EL pot wire will be routed through the large hole in the rotor enclosure top in a moment.



Install two cable clamps on the screws shown to provide clearance above the AZ pot gears when the AZ motor assembly is installed. Route the EL wiring through the large hole in the top of the rotor enclosure and through the cable clamps.



Install the AZ motor assembly into the rotor enclosure using 6-32 bolts through the side mounting holes into the hex extensions. It is going to be a tight fit, but it will fit. Route the wiring so that it can be connected to the circuit board later.



Slide the AZ hub onto the AZ motor extension shaft, line up the mounting holes in the bottom of the channel chassis with the turnstyle bracket tapped holes. Using $\frac{1}{4}$ inch 6-32 bolts, mount the EL assembly to the AZ Lazy Susan bearing. Rotate the EL assembly to line up the AZ hub set screw with the flat of the D shaft extension from the AZ rotor, tighten the set screw. Route the

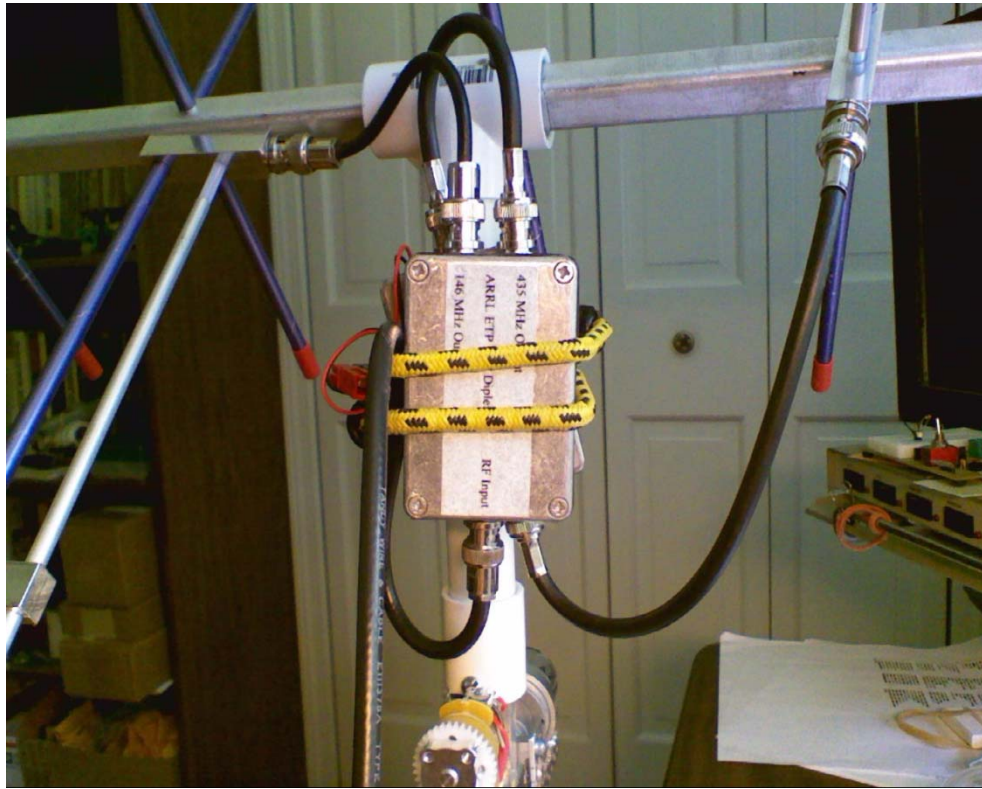
EL wiring so that it is clear of the AZ gearing. Leave enough slack so that the wire will wrap around the AZ motor shaft, but stay clear of the gearing, when the AZ motor turns.

Connect the cables to the appropriate connectors on the back of the circuit board, and install the circuit board on the rotor enclosure face.

Antenna Mount. The antenna mounting scheme you use depends on your desired installation. The following illustrations show what I use for my ARROW installation. A 7 inch section of $\frac{3}{4}$ inch PVC is used to extend the elevation arm of the rotor. A $\frac{3}{4}$ inch PVC "T" is then affixed to the end of the 7 inch section of PVC. A $\frac{3}{8}$ inch diameter hole is drilled at a 45 degree angle through the PVC "T" as shown. The ARROW antenna mast slides into the "T" with a nice fit. The number 1 director 70 cm element is fed through the hole in the "T", then through the appropriate hole in the ARROW mast and the mating side of the director is screwed on to the other side. This places the ARROW at a 45 degree angle which causes the antenna elements to be well clear of the rotor body in operation. This configuration makes for quick set up and tear down of the system for portable operations.



I mount a pre-amp and a diplexer to the 7 inch PVC extension using a bungi cord. The coax feed lines to the 70 cm and 2 meter antenna driven elements are routed as shown in the photograph. The feed line to the rig comes off the PCV extension and clears the rotor in operation. This arrangement keeps the system in balance and keeps strain off the rotor.



The PVC fittings are not glued and held in position by friction fit which makes disassembly easy for system tear down and transportation. Carter pins could be used if a firmer assembly is desired.