

Build Plan

(All measurements in sketches)

(Also, glue in all screws)

1. Organize materials into two categories: electrical components (like arduino) and mechanical components (like bearings).
2. Build the rectangular base w/brackets in four inside corners, and then use 3 inch screws to secure all four corners also (screw through one piece of wood into the other).
3. Build solar panel frame, putting brackets in every corner, and then use 2.5 inch screws in the four outside corners, same strategy as the base. Put velcro on solar panels and frame. Make photoresistor mounts, drill hole to fit photoresistors tightly. Mount photoresistor mounts to frame with glue and brackets.
4. Build lower triangular structure, making sure to glue the two pieces together and put a screw through (3 in.) at the top. Line up the center point of the base with the tip of the structure. Screw structure to base using 2.5 inch screws.
5. Build posts for bearing system on high side, and drill $\frac{1}{4}$ hole through both posts on both sides. Mount posts to base with brackets.
6. Build high side triangular structure, and secure two pieces with glue first (24 hours to dry clamped) then screw it together. Drill $\frac{1}{4}$ in. holes through bottom of each side of structure at appropriate angle (level with holes in posts).
7. Drill a hole slightly smaller than the bearing on the outside of each side of the triangular high side structure (facing away from the project), hammer 1 bearing in each hole. Make sure hole is at same angle as smaller $\frac{1}{4}$ hole.
8. Assemble bearing system with bolts and washers, see sketch.
9. Build bolt mount platform (glue two pieces of plywood together to make $\frac{1}{2}$ " thickness), attach to lower triangular structure with three brackets: two on bottom one on top. Put threaded rods in, secure with washers and nuts on both side of platform.
10. Build both c brackets and mount them to with appropriate length screws (2.5 or 3 inch your choice) to the solar panel frame. Use lots of glue (extra glue) on the screws.
11. Cut groove (drill multiple holes close to each other so they overlap) in c bracket on low side, then put supporting piece on open side of groove. Screw supporting piece on with 2.5 inch screws. Groove should be a touch bigger than $\frac{1}{4}$ ".
12. Make T shaped bracket and drill $\frac{1}{2}$ inch holes for the rods, drill $\frac{1}{4}$ inch hole for bolt. Mount on rods with nuts and washers, cut down $\frac{1}{4}$ inch bolt to 3.1 inches w/hacksaw. Put bolt through T bracket, put on a washer outside of the bracket

- behind the bolt head, put nine washers on the inside of the bracket (before the groove), put a washer and nut (loose) on other side of groove.
13. Make motor mount platform (glue two pieces of plywood to make $\frac{1}{2}$ " thickness). Use scrap pieces from angle cut of high side structure upside down on either side of the tip on the high side. It should look flat. Mount the scrap pieces to high side tip with glue and screws. Mount hinge to new flat top of high side then mount hinge to motor mount platform.
 14. Cut metal tape with holes to fit over motor and go across motor mount. It should not stick out past the edges of the motor mount. Mount the motor with the metal tape with holes by putting screws through every available hole. Use 1" screws. Motor should face straight towards the low side structure.
 15. Mount coupler to high side c bracket. Put coupler on, mark holes with pencil (trace inside of coupler holes). Drill holes, screws should fit tight. Put lock nuts on screws, cut screws down with tin snips (this will take a ridiculous amount of force) Hardly any screw material should stick past the nuts. Then mount motor shaft into coupler with grub screws. Use blue thread lock (or loctite) on grub screws. Tighten grub screws hard but don't strip them. Let thread lock dry at least 30 min before use.
 16. Make battery platform, put two pieces of plywood and glue them to get $\frac{1}{2}$ " thickness. Mount 1.5x1.5"s on top of platform, screw platform onto base.
 17. Wire all electronics on perforated circuit board, solder photoresistors to wires. Put motor wires in motor plug. Run all wires to battery platform, leave lots of slack for photoresistors (in between solar panel frame and high side/low side struts). Mount all electronics on battery platform. Cut and strip 12V male cigarette lighter extension cord and put in into the power input on motor driver. Ziptie all wires to frame appropriately.
 18. Lay solar panels on velcro. Plug in Arduino usb cable to Arduino, then plug that cable into the extension cable. Plug extension cable and 12V input to motor driver into battery. Tie excess extension cable (USB) to frame with zipties.
 19. Turn on battery. You're done!