

Instructions for Implementation and Use

1.1.1 Printing

1.1.1.1 Materials:

ABS

ABS-compatible 3D printer

Superglue

Slicing software

1.1.1.2 Procedures:

Download all relevant STL files.

Slice the files into GCODE with the slicing software of your choice.

Print resolution should be 0.3mm layer height or better; all models printed here used a 0.2mm height.

Transfer GCODE file to 3D printer or printer control software and begin print. Use appropriate temperature(s) on extruder and hotbed according to filament specifications.

Print files according to table below:

Part name	Quantity	Infill percentage
Shaft 1	1	100
Shaft 2	1	100
Shaft 3	2	100
Wheel bearing a	2	100
Post clamp	1	50
Bearing holder	3	100
Motor housing	1	100
Motor spacer	1	100

Figure *Error! No text of specified style in document.*-1 Table describing infill % and quantity

Assemble pieces according to 3D model using a strong plastic-binding adhesive, such as superglue.

1.1.2 Frame assembly

1.1.2.1 Materials:

¼” thick plywood sheet

Superglue

Nail gun and wood-compatible adhesive

1.1.2.2 Procedures:

Cut the pieces according to table below:

Part name	Quantity	Length (mm)	Width (mm)
Side walls	2	175	75
Inside wall	1	154	75
Rear wall	1	168	75
Floor	1	154	52

Figure 5-8 describes quantity and dimensions of frame walls

Drill a 1/2" (diameter) hole in the left side of the inner wall.

Assemble the box according to the 3D model with glue and nails, then let dry. The glue will generally take ~24 hours to dry, but the structural rigidity should be immediate due to the nails.

When assembled, the frame should look like this:

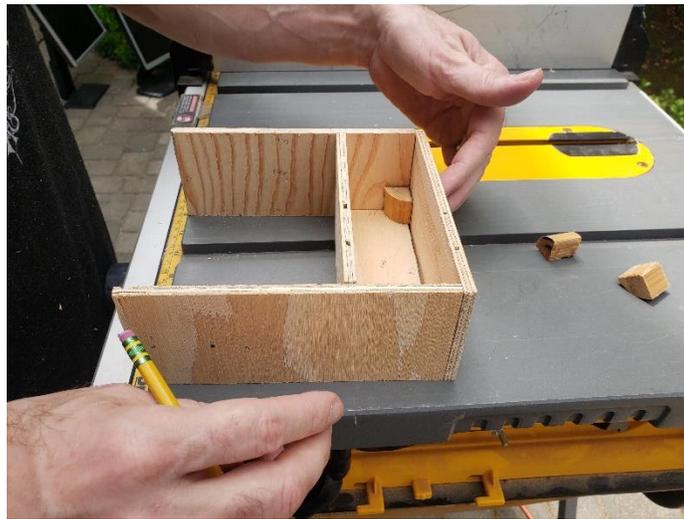


Figure *Error! No text of specified style in document.*-2 Picture of wooden frame being built

1.1.3 Electronics assembly

1.1.3.1 Materials:

Heatshrink tubing, heat source (lighter)

Soldering iron, solder

Wire

DC jacks

Voltage regulator

Motor

1.1.3.2 Procedures:

Slide a heatshrink tube onto each end of the extension wire.

Twist the **positive** wire of the motor onto the **negative** end of the extension wire and vice versa; the polarity swap is due to the direction the motor is spinning creating a negative voltage.

Solder the wires together.

Slide the heatshrink tube over the exposed wire and apply heat to insulate the connections.

If you have not completed 'components assembly' yet, revisit this step later.

Thread the extension wire through the hole in the motor mount component/inner wall and slot the motor in.

Carefully solder the extension wires to the input of the voltage regulator.

Solder another length of wire to the output terminals of the regulator and secure the regulator to the frame with an adhesive.

As the portable power supply that is used has a **center-positive** DC input, the center contact of the DC jack needs to be soldered to the positive end of the wire. Slide back the plastic sheathing on the DC jack and carefully solder positive to the center and negative to the outer contact.

Replace the plastic sheathing over the contacts.

1.1.4 Components assembly

1.1.4.1 Materials:

3D-printed parts

Superglue and/or wood-compatible adhesive

Frame

Skateboard wheel

Motor

Bearings

Voltage regulator

Wire

1.3mm x 3.5mm DC jacks

Soldering iron, solder

Hardware

1.1.4.2 Procedures:

All parts printed have a small size difference between the shafts and their appropriate sockets as a tolerance factor for inconsistent sizes of pieces from 3D printing.

Glue 3D-printed components together according to the 3D model; make sure when gluing a shaft to an adapter or a gear to set the shaft completely perpendicular to the component you are attaching it to.

Insert the wheel bearing adapters into the skateboard wheel and glue them together using a plastic-compatible adhesive; superglue or Gorilla glue is appropriate. Assemble other components attached to skateboard wheel.

Glue the bike seat post clamp's hinge to the outer rear wall of the frame.

Let glue dry for at least 1 hour.

Glue bearing holders, motor mount and motor spacer onto plywood sides according to this diagram:

Complete the electronics assembly before proceeding.

After electronics assembly is complete, slide the 16-tooth motor gear adapter on the motor gear. Place a bearing in the adjacent bearing holder and carefully put the axle in the bearing. The plywood is flexible enough to allow bending if necessary.

Insert another bearing into the front-left bearing holder and insert the assembled components (skateboard wheel, 96-tooth gear, axles). Put another bearing in the right-side bearing holder and carefully put the axle in the bearing. The two main gears should now be touching and should rotate one another.

Insert the bolt into the rear hinge and secure the nut to the other end. Tighten and adjust as necessary to maintain a good connecting friction between the skateboard wheel and bike tire.

Clamp the frame around a bike seat post and insert the screw into the clamp, securing it into the nut. Tighten screw as needed if clamp is too loose.