

Parts preparation information for the Mini Sumo BB1 robot.

1. The parts list for the robot (included in kits except where noted):

A Maker Pi RP2040 kit in box. The box includes one Maker Pi board, 4 Grove connector to female header pin cables, a mini screwdriver, and 4 adhesive feet. The feet are not used in this project.

Two ToF (VL53L0X Time of Flight) sensors of the type pictured in this document. The header pints are pre-soldered on the sensors included in the kit.

Two edge detection (TCRT5000 infrared reflective) sensors of the type pictured in this document (with right angle header pins, sensor and adjustment screw on opposite sides).

Two N20 6 volt gear head motors, low torque models only. 150 or 200 rpm motors suggested.

Wire and heat shrink for motor leads if they are not pre-soldered to the motors. The leads are pre-soldered in kits.

Two 43mm x 19mm treaded tires mounted on 3mm D shaft wheels, as shown.

One 4 x AA battery holder of the type pictured in this document, along with 4 AA batteries.

A minimum of ten m3 x 10mm pan head screws (referred to as bolts in the documentation).

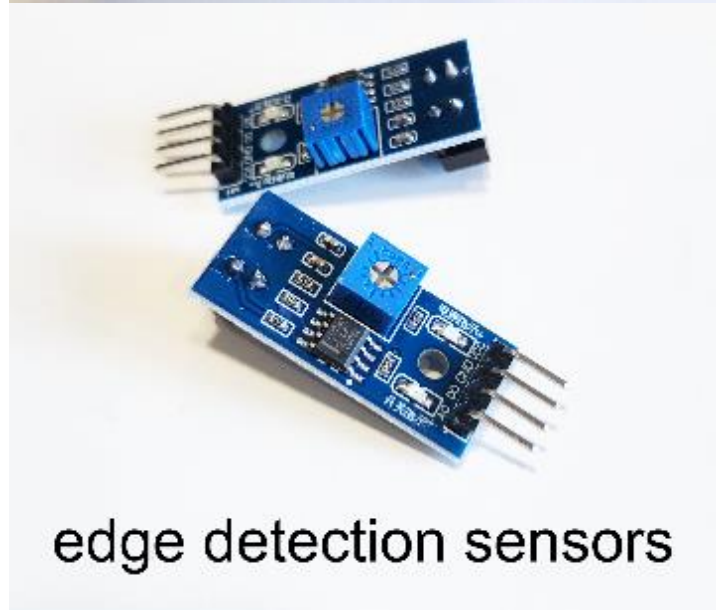
One m3 x 10mm countersunk screw (referred to as bolts in the documentation).

A minimum of 11 nuts for the m3 bolts.

Four 3D printed body parts.



Maker Pi kit
in box



edge detection sensors



wheels

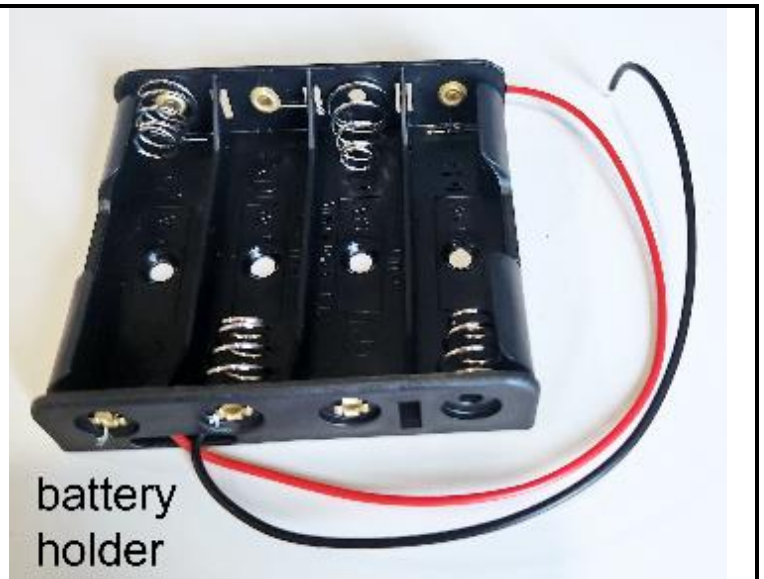
Ballast weight as desired. About 200 grams of steel BBs are suggested and included in kits. These need to be kept from getting loose. They can be left in the bag when inserted in the main compartment of the robot body or mixed with a small amount of glue (not included in kits) to distribute them among multiple compartments in the body. ALL parts of the robot should be weighed to make sure it is below 500 grams before the BBs are glued into place.

A micro USB cable for programming, along with downloaded software.

A Phillips screwdriver. There is one in the Maker Pi box but it is smaller than ideal.

Small needle-nosed pliers. These are not included in the kit.

Access to a scale to weigh the finished robot and make sure it does not exceed 500 grams. Not included in the kit.



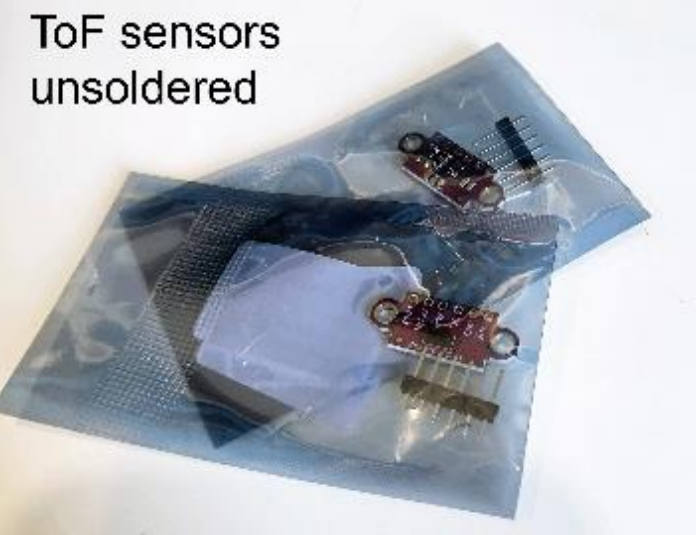
2. If the motor wires are not soldered to the motors and this exposed wire at the connection covered with heat shrink, this will need to be done with two pairs of wire, about 80mm long.

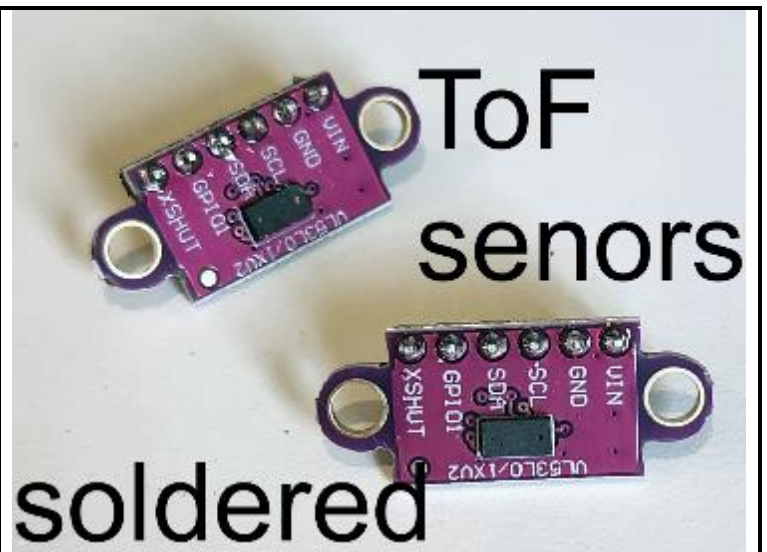
The edge detection sensors usually ship with right angle header pins already soldered on and in anti-static bags. They do not need further preparation.

The ToF sensors usually ship unsoldered with header pins included in the anti-static bag.

The yellow protective film covering the black rectangle on the ToF sensors will need to be removed if it has not already been done. It has been removed from sensors in kits.

If the ToF sensors have not had their header pins soldered on, this will need to be done. The longer pins are in the back of the sensor and it is soldered from the front.





3. The four 3D printed parts of the BB1 robot body: main body, fender bar, lid, and blade can be printed with standard settings. Printing time varies widely but plan on 8 hours of print time total. Kits include parts usually printed in PLA, which is brittle so be careful to not force it while constructing the robot. PETG is a more forgiving material if you are printing your own parts.

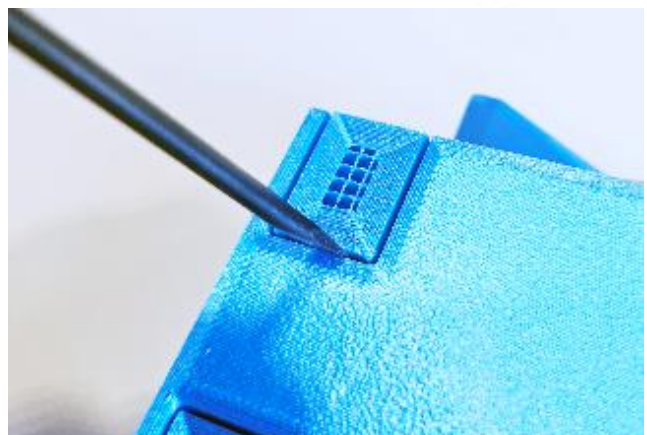
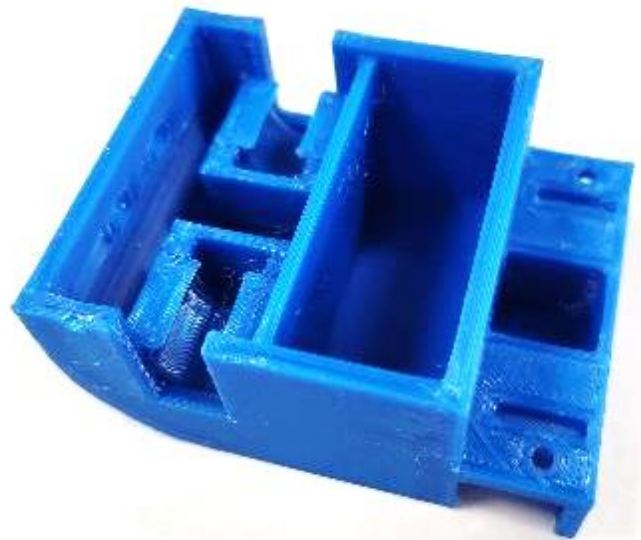
Only the main body needs to be printed with supports. The body is printed upright on the printer bed, as shown. Once it is off the printer the supports can be removed by popping them off the side of the body and at the curved rear from underneath. The supports interface to the main body does not need to be cleaned up fully, although the bolt holes should be cleared.

The fender bar is printed “face” down on the bed, as shown.

The lid should be printed upside down on the bed, as shown, with the flat side on the bed.

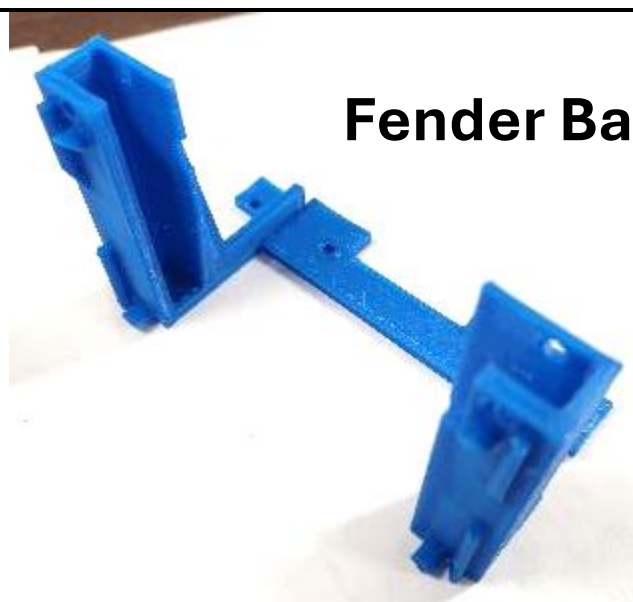
The blade is printed with its back (the flattest part) on the bed, as shown. It does not need supports.

Main Body

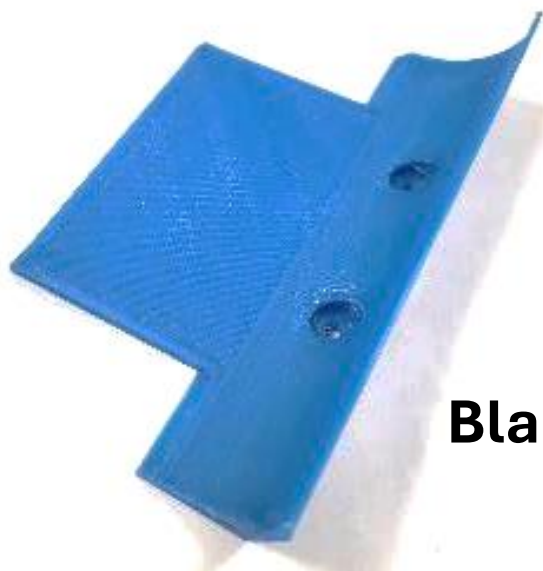


Some holes may need to be cleared with a 3mm drill bit (included in kit) to accommodate bolts without breaking the part.

Parts preparation is complete and assembly can begin.



Fender Bar



Blade



Lid