

# Water Leak Detector

## Enclosure Build Instructions for 3D printed chassis

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Version 2 case 3D printed by Shapeways

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[https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Terms\\_of\\_Use\\_License\\_and\\_Disclaimer.docx.pdf](https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Terms_of_Use_License_and_Disclaimer.docx.pdf)

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# What You Will Need

## From the materials list

1. Obtain a 3D printed chassis and bezel
2. Printed bezel pdf file
3. 8 ea. 6-32 bolts
4. 16 ea. 6-32 nuts
5. 1 ea. Micro Servo with 3 mounting screws

## From your previous assembly steps

1. 2 ea. RJ11 jacks on breakout boards
2. 1 ea. WLD PCB
3. 1 ea. Push button with wires soldered
4. 1 ea. Toggle switch with wires soldered

## Tools

1. Hot glue gun
2. White glue
3. Screw driver
4. Long nose pliers

# Step by Step Instructions

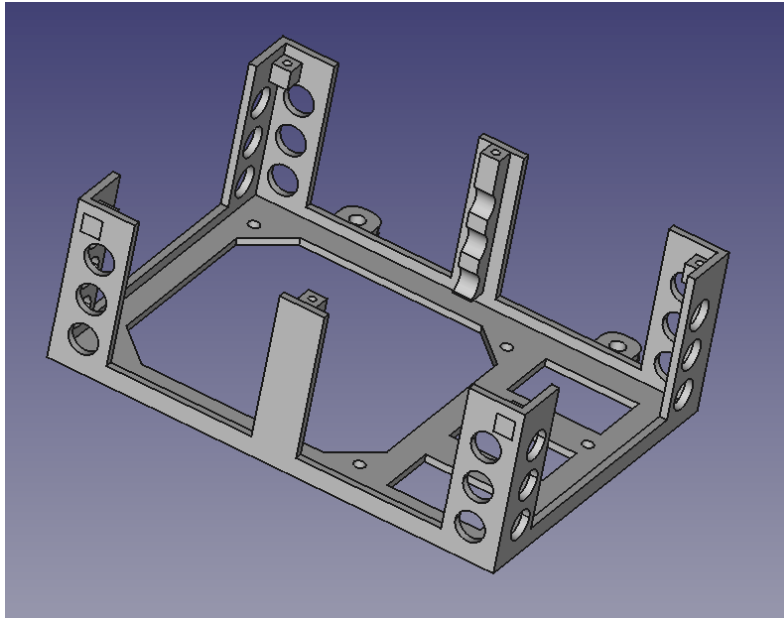
## 1. Order or make 3D parts

This enclosure requires you to either make or buy the 3D printed parts: chassis and bezel. The parts are currently available for purchase from Shapeways - a URL is provided in the parts list document. As of today the two parts cost about \$40.

If you have access to a 3D printer, you could print the parts yourself. There are two STL files:

```
Case/casebottomskel.stl  
Case/casebezel.stl
```

The models were created with FreeCAD and the two FCStd files are included in the Case folder (see: <https://github.com/TeamPracticalProjects/WaterLeakSensor/tree/master/Case>). If you do modify the case or bezel, do not remove the attribution to Team Practical Projects.



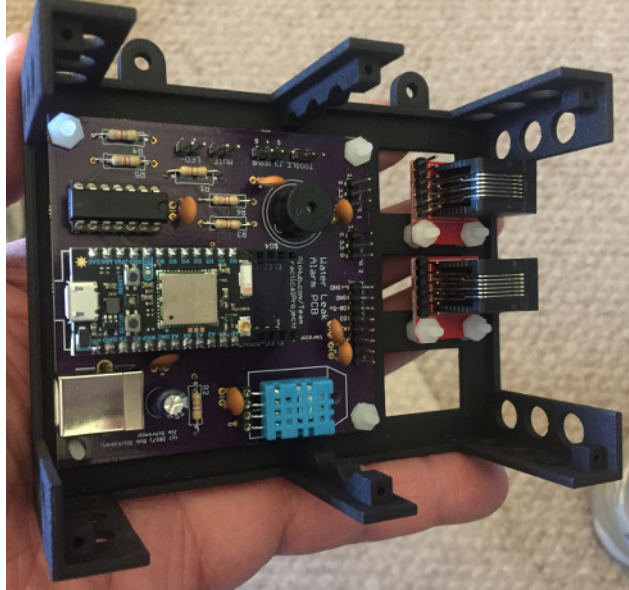
Version 2 Chassis in FreeCAD

## 2. Mount PCB

Position the WLD PCB in the chassis and use 4, ½-inch 6-32 bolts to hold it in place.

## 3. Mount RJ11s

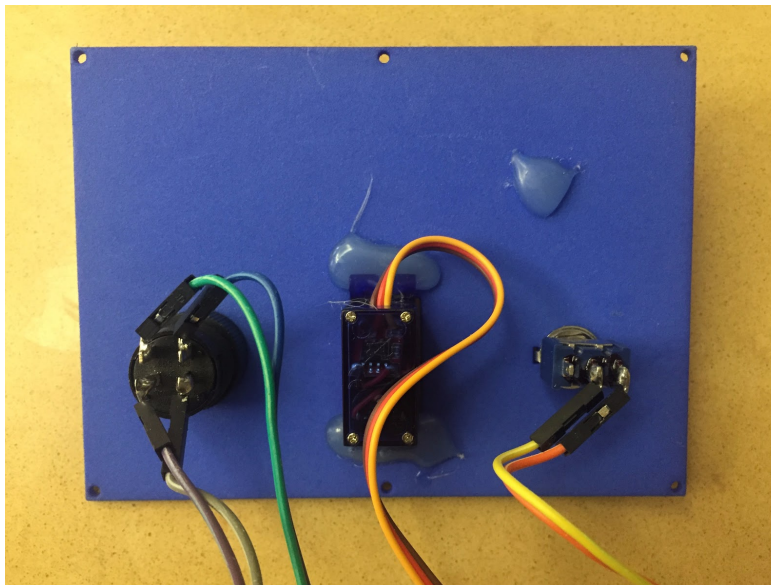
Position each RJ11 breakout board in the chassis and use 4, ½-inch 6-32 bolts to hold them in place.



Chassis with PCB and RJ11 boards mounted.

#### 4. Assemble Bezel

In this step you will add three components to the bezel.



Back of 3D bezel with components mounted.

### a. Mount Servo

Place the servo into the bezel from the back. Be sure the rotating shaft is near the center of the bezel. Use some hot glue to hold it in place.

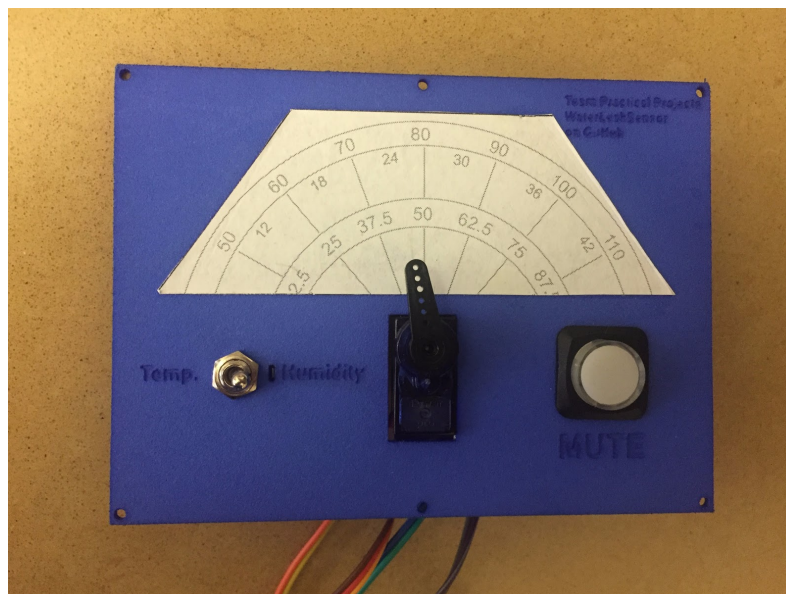
### b. Mount toggle switch

Remove the top nut and lock washer from the toggle switch. Place the switch into the bezel from the back, making sure that the small, bent registration tab fits into the supplied slot. From the front, add the lock washer and nut. Tighten the nut.

### c. Mount push button

Remove the round plastic washer from the back of the push button. Thread the push button wires through the round hole from the front of the bezel. Thread the washer back onto the push button base, making sure that the little plastic “fingers” are towards the bezel; these fingers help to lock the washer in place. Make sure the square faceplate of the button is square to the sides of the bezel and tighten the plastic washer.

## 5. Glue on bezel pdf



### Finished bezel, version 2

Print out the file `Graphics/CaseDial.pdf` (see: <https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Graphics/CaseDial.pdf>)

Be sure to select the “actual size” choice in your printer properties.

Find the 3D case dial and cut it out along the dotted lines. Test that it fits into the depression on the face of the bezel; trim it if necessary.

Apply a bit of white glue to the depression on the face of the bezel and spread it out. Carefully place the printed dial into the depression and smooth it flat.

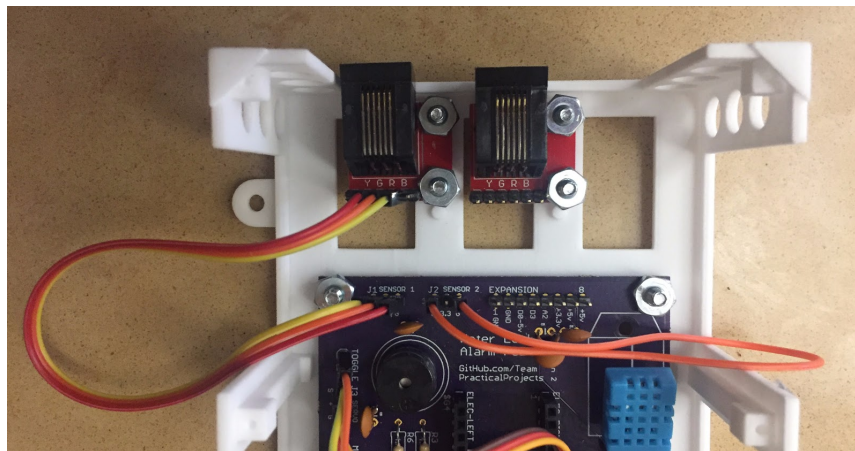
## 6. Wire it all up

It is now time to connect all of the separate pieces together.

1. Wire up the RJ11 boards to their respective connectors on the PCB using three female-female header wires peeled off from the 40 wire ribbon cable. See the wiring diagram and photo below. Further instructions can be found in Section 3 of the “WLD Installation and User Manual” at:

[https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/WLD\\_Firmware\\_Installation.docx.pdf](https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/WLD_Firmware_Installation.docx.pdf)

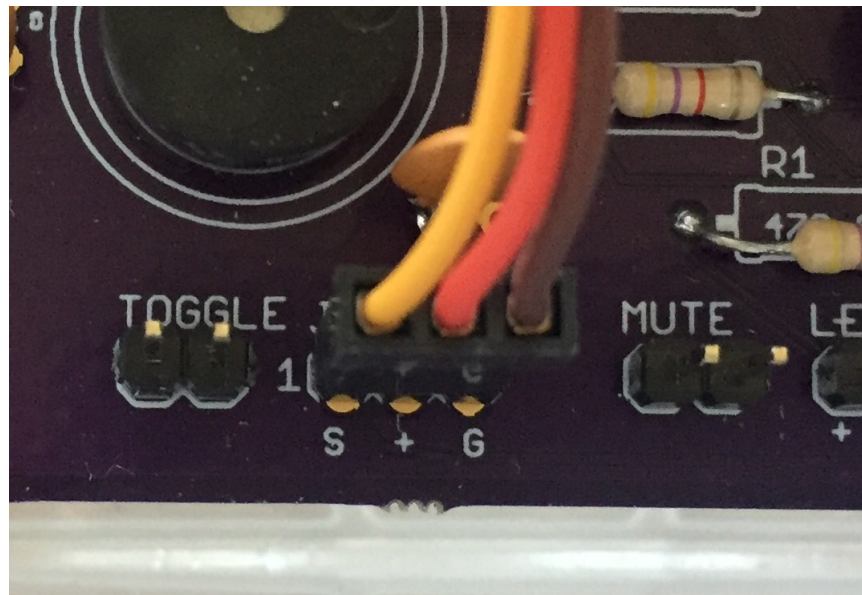
- 2.



Showing one RJ11 connected to PCB with three wires. The second Sensor header is not connected and a jumper wire is in place on the PCB to prevent an alarm condition.



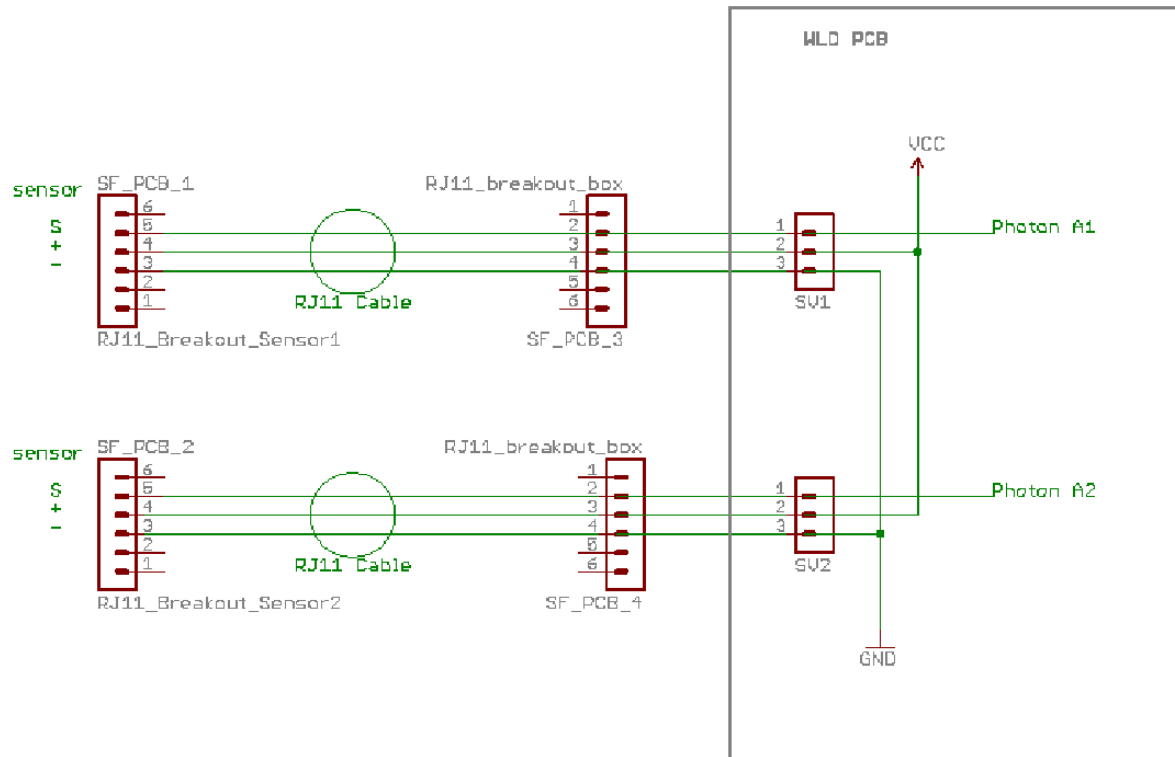
3. Connect the two wires from the toggle switch to the “toggle” pins on the PCB. There is no polarity to worry about here.
4. Connect the three wire cable from the servo motor to the servo connector (J3) on the PCB. Wires from left to right are: orange, red, brown.



Servo cable connected

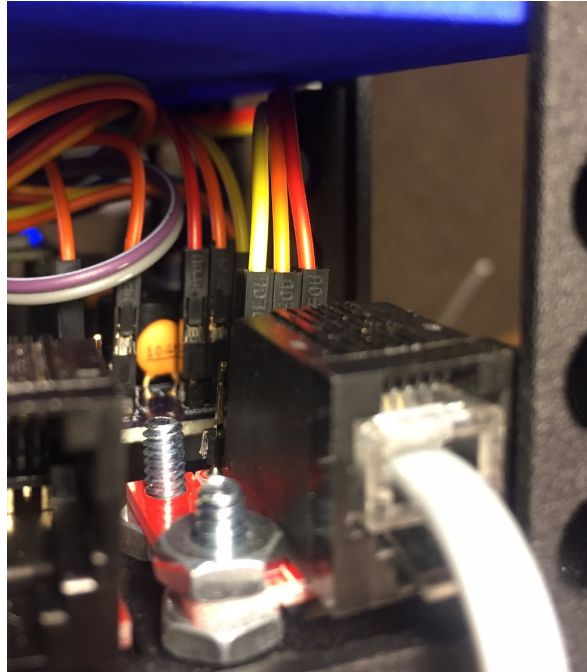
5. Wire the push button switch leads to the “mute” connector on the PCB. There is no polarity to worry about here.
6. Wire the pushbutton LED leads to the “LED” connector on the PCB. Be careful to observe the polarity marked on the switch and on the PCB. If you wire this backwards you won't hurt your devices but the LED will not light.





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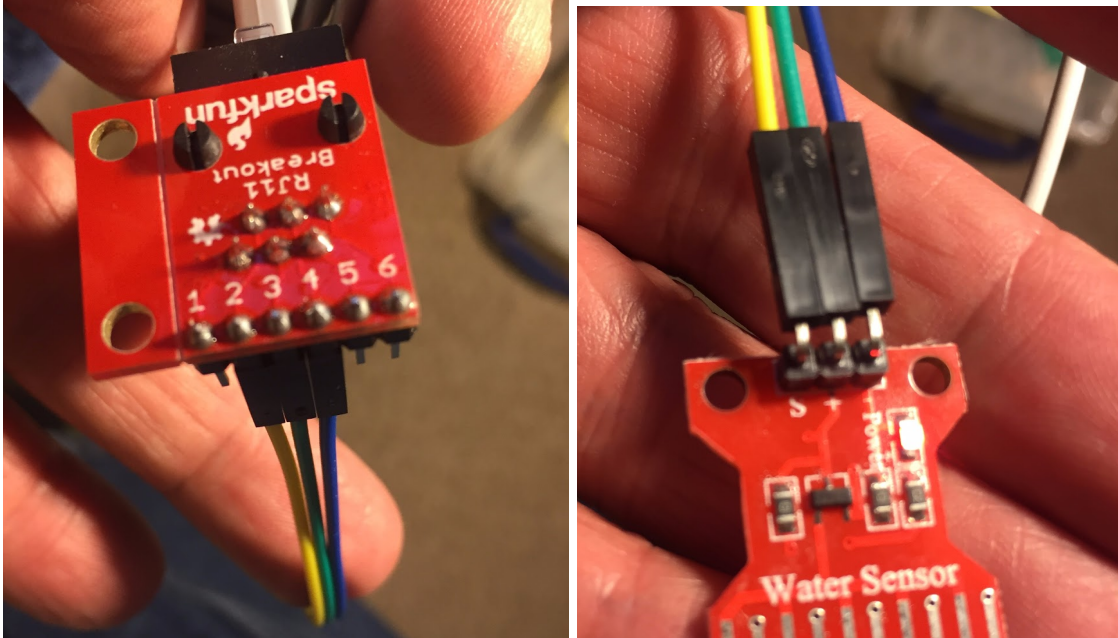
Diagram of wiring PCB to RJ11 boards, to sensors



Note PCB to RJ11 cabling. Cable is twisted; yellow on right of PCB and on the left of the RJ11 breakout board.



View of bottom of RJ11 breakout board.

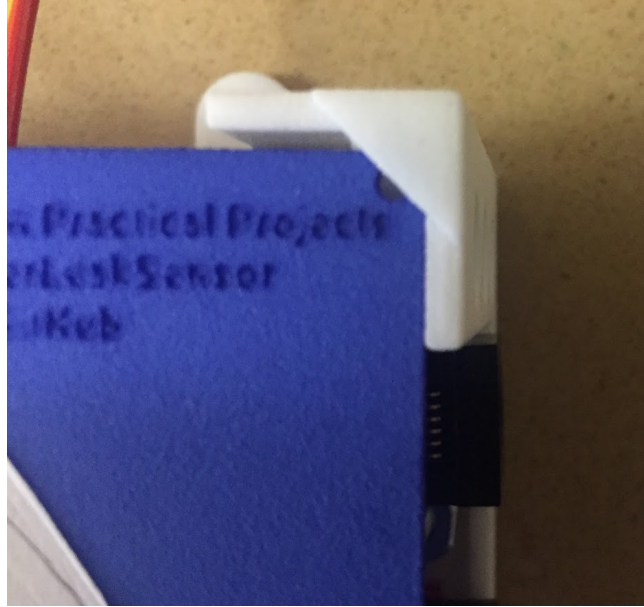


The far end of the sensor cable showing RJ11 breakout wired to a water sensor.

## 7. Mount bezel to chassis

The bezel is held in place to the chassis by four small covering tabs at the corners of the chassis. (See photo.) Place the bezel into position and under the left two tabs. If the bezel does not fit, then lightly sand the top of the bezel at just the tip of each corner until it does slide in.

Now gently flex the chassis at the upper right tab to allow the bezel to slip in under the tab. Do the same gentle flex at the lower right. The bezel should fit snugly, but not too tight.



Detail of bezel corner under upper right chassis tab.

If you want your bezel to be more secure, you can use two of the mounting screws that came with the micro servo to attach the middle of the bezel to the middle supports of the chassis.

Your device is now completely built!



Version 2 of the 3D case, assembled.