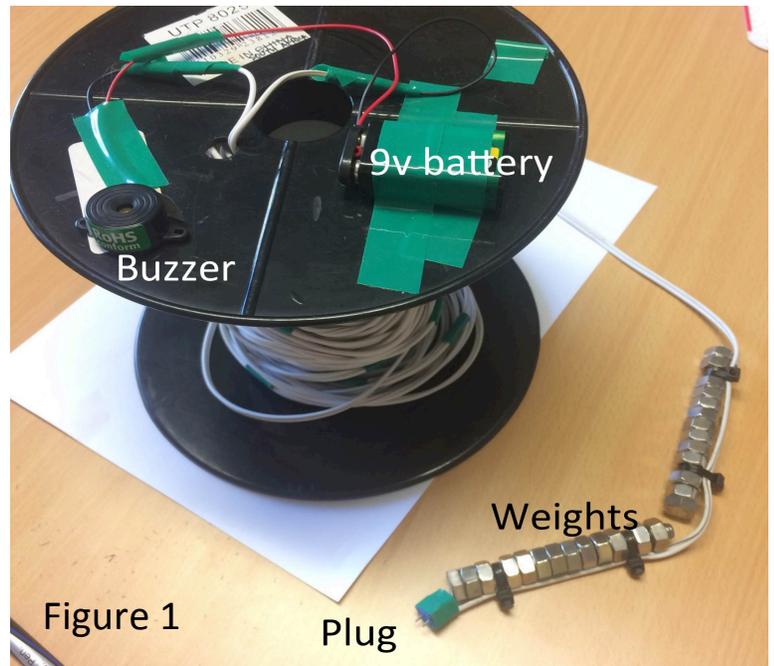


# How to build a dip meter for USD \$13

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## Summary

This is a method for building a dip meter for measuring depth to water table in even the smallest boreholes. The device is < 2 cm diameter. The device is an open circuit, such that when the two open ends touch water (a conductor) the circuit is completed and a buzzer sounds. No soldering required. You will need to make a trip to an electronics store, one that sells electronic components for building computers and other gadgets. Here in South Africa I went to a store called ElectronicsFG, and the components cost about USD \$13.

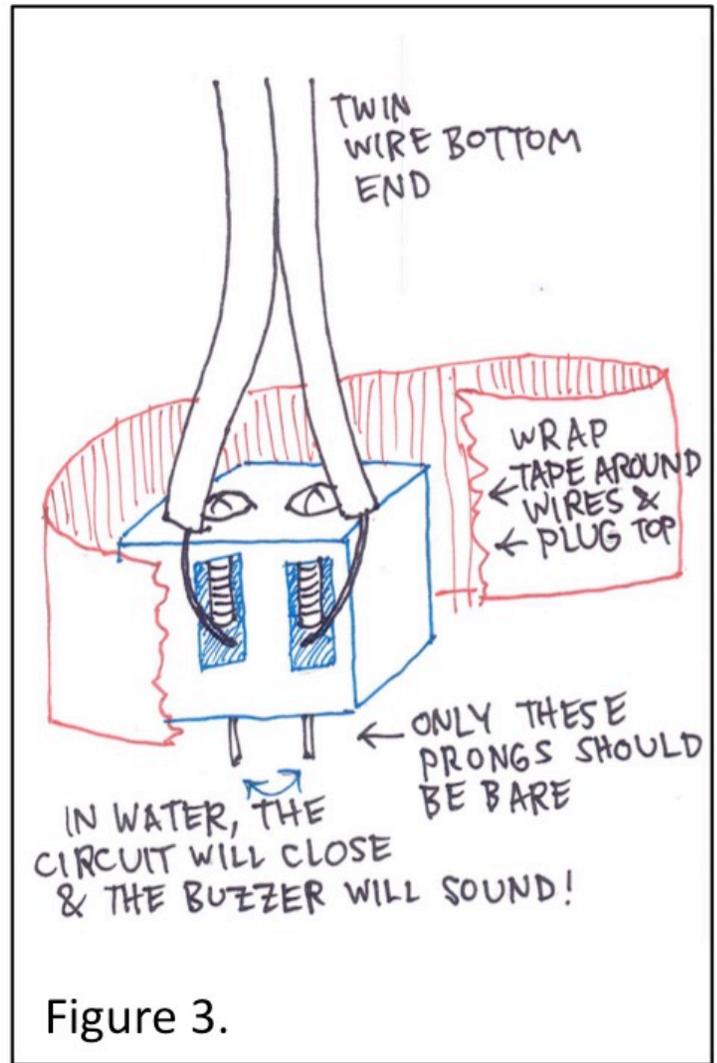
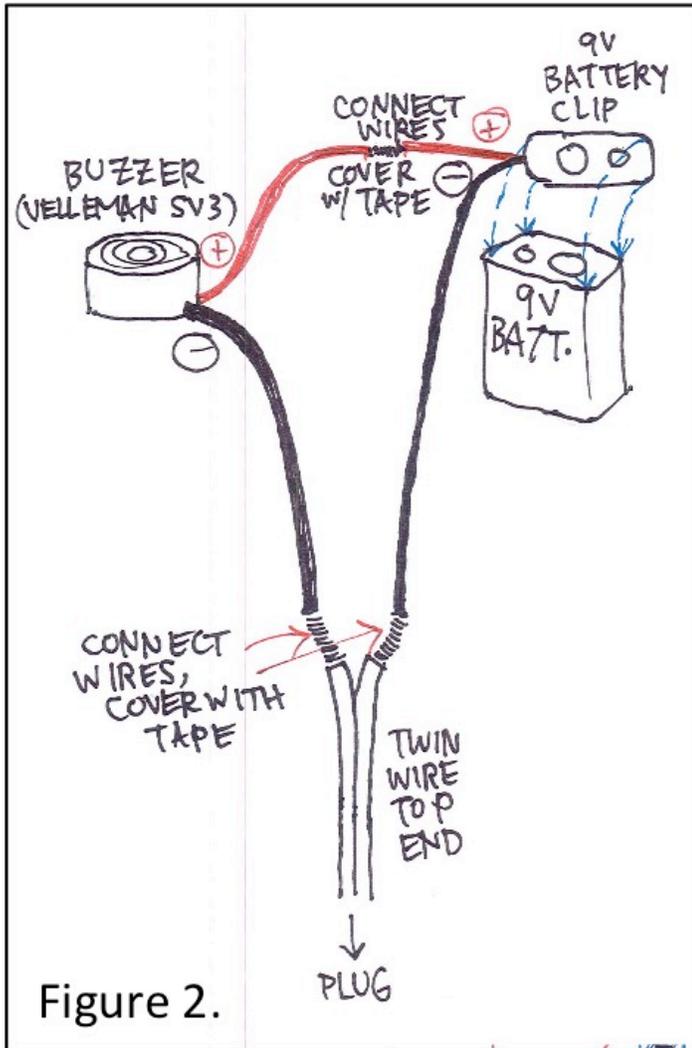
## Materials

- 9 volt battery
- 9 volt battery clip
- Buzzer: Subminiature buzzer 1.5-15Vdc / 10mA lead type (similar to what is inside a smoke alarm)
- Plug: PCB Terminal block 2 screw 5 mm pitch
- Small screwdriver (Phillips or flat head depending on type of screw in the plug)
- Twin wire in desired length for measuring depth to water table, I used 0.5mm wire. You could also use 2 separate wires if twin wire is unavailable.
- Spool for wire
- 2 stainless steel (or other rust resistant) bolts, I used 8 x 90 mm
- 24 or so stainless steel (or other rust resistant) nuts to fit above bolts
- Small cable ties / zip ties
- Electrical (insulating) tape
- Wire stripper or knife
- Permanent marker

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## Steps:

1. Follow the diagram in figure 2, below, to connect the 9v battery, clip, and buzzer to the twin wire. Connect the red wires from the battery clip and the buzzer. Connect the black wire from the battery clip to one of the twin wires. Connect the black wire from the buzzer to the other twin wire. Use electrical tape to cover all connections.



2. Follow the diagram in figure 3, above, to connect the bottom ends of the twin wire to the plug. The plug is necessary to keep the bare ends of wire from touching each other. Strip one cm of each of the wires. Insert one stripped end into one of the openings. Screw the bolt down to hold the wire in place. Repeat with other wire end. Wrap electrical tape around the bare wires and plug so that bare wires will not contact water. You can now test your dip meter in water!

3. Follow the diagram in figure 4, right, to attach weights to the bottom end of the twin wire. The weight is necessary to keep the wire taut. Put nuts on the bolt, leave gaps for zip ties. Tighten zip ties around bolt and twin wire. Repeat with second bolt (or as many as you need.)
4. See figure 5, below. From the plug end, use tape to mark 1 m (or any interval) measurements. Label each mark. In the field, you can measure the distance between the marks using a tape measure to get the exact depth to water table.
5. Tape battery and buzzer wire to spool. Disconnect battery clip when not in use. See the photo in figure 1 for the finished product.

Notes:

- I have found that when you are measuring depth to water table, once the plug has touched water it may “hold on to some water” and keep buzzing even after you lift it above the water table. You may need to gently shake the end up and down to get water off of it to get it to stop buzzing if you need to measure the depth again.
- You may want to put some sort of rod through the spool to make it easier to wind and unwind.
- You could also insert an LED into the circuit.

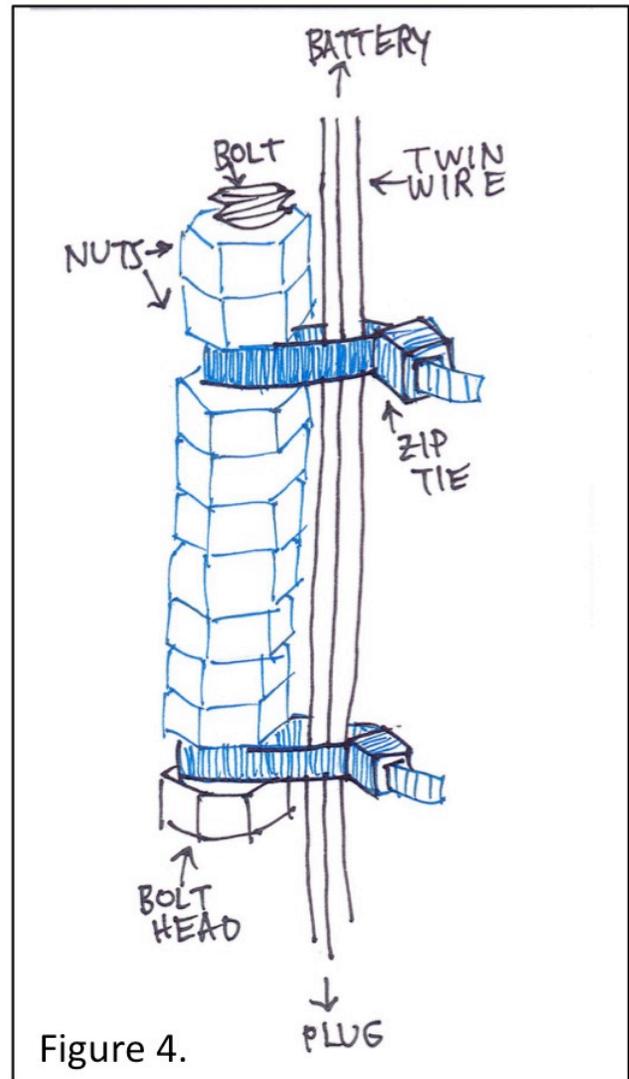


Figure 4.

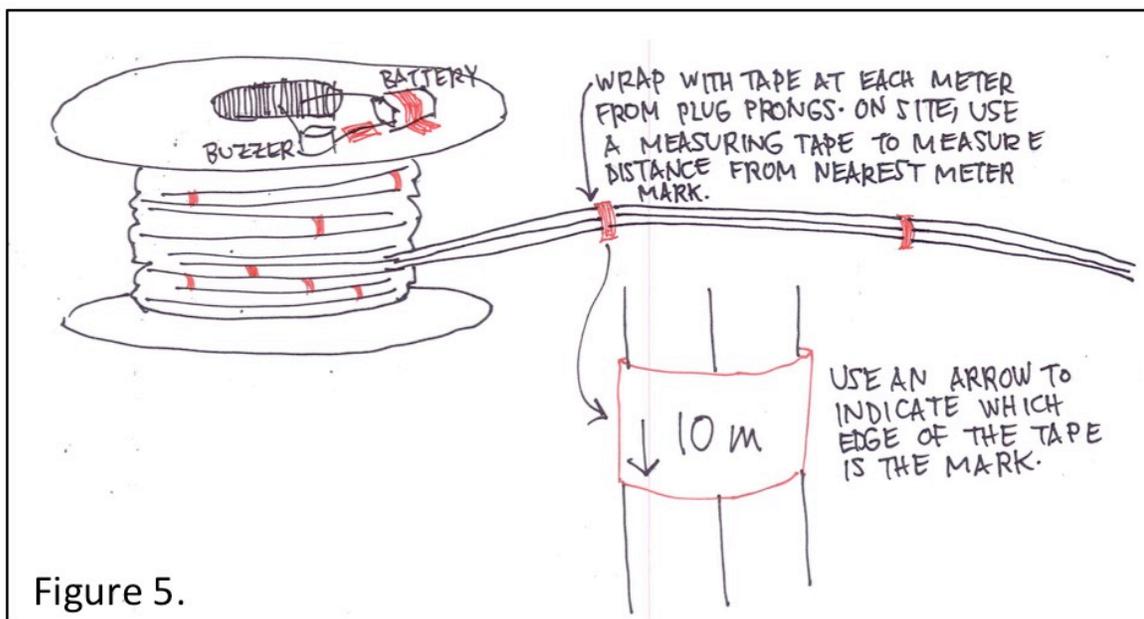


Figure 5.