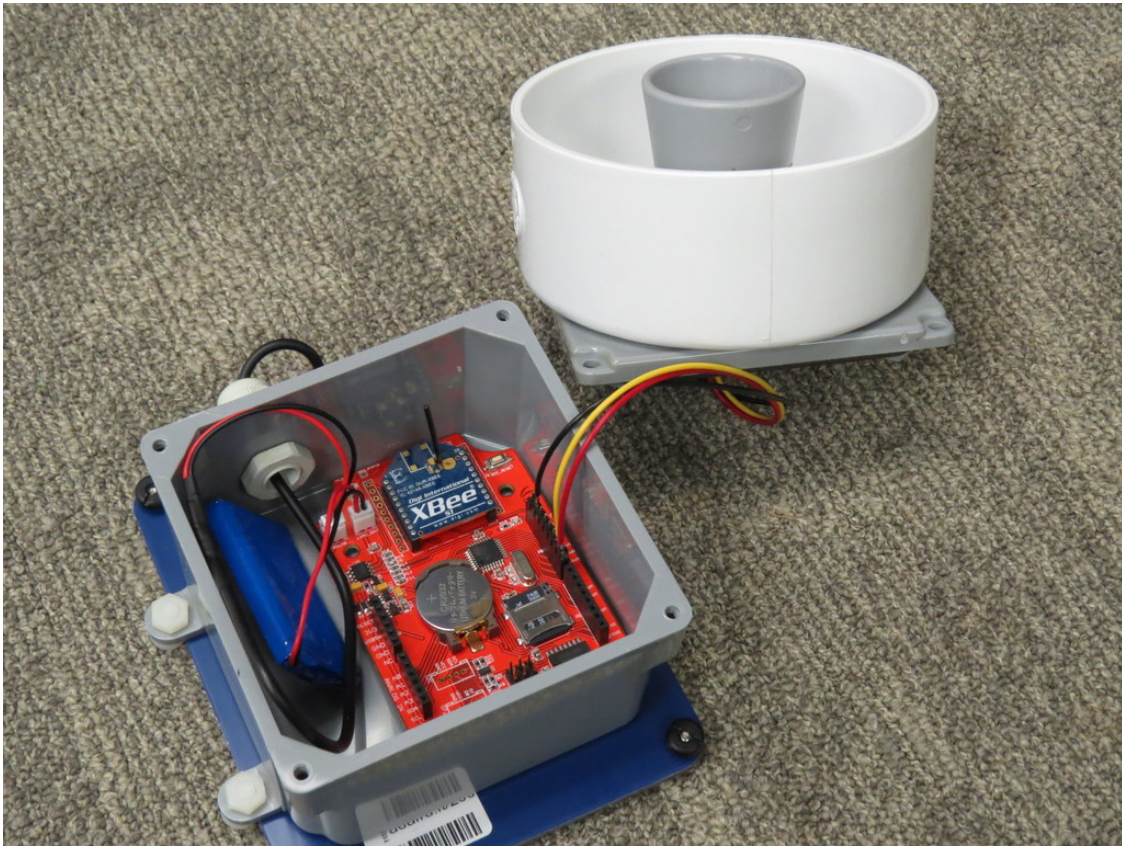
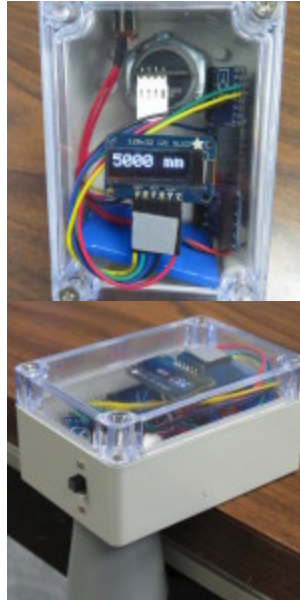


# ULTRASONIC WATER DEPTH SENSOR



We have been using submersible pressure transducers for water level measurements for many years, but some of our installations are in areas with very shallow water that might freeze during the winter. Most pressure transducers will be damaged if they are in water that freezes, so we've been experimenting with an ultrasonic rangefinder that will allow us to measure the water level from above. The ultrasonic sensor is [Maxbotix MB7389](#). Maxbotix makes a variety of different models, but this one is specifically made for outdoor water level measurements. The sensor has TTL serial output so it is very easy to integrate it with one of our Arduino-based loggers. It has a resolution of 1 millimeter, internal temperature compensation, and can measure anything between 30 centimeters and 5 meters.





For testing, I mounted one sensor in a plastic enclosure with a clear lid. Inside the enclosure is a battery, Arduino Fio board, and a small LCD display to show the live data. I can easily add an Xbee radio to the Fio if I also wanted to transmit the data. With this testing device, I was able to try the sensor in a variety of locations and aiming at different targets, and I determined that the sensor performed as expected.





Then I mounted another sensor inside the plastic end-cap that is used with 4-inch PVC perforated drain tile pipe. The pipe can be found at hardware stores for around \$10 for 10 feet. It has lots of holes in it to allow water in and out, and when the pipe mounted vertically in a stream, it acts as a stilling well to make the surface of the flowing water smoother. It also keeps leaves, grass, and other debris from interrupting the path between the sensor and the water surface. I mounted the lid of a waterproof electrical conduit box to the top of the PVC cap by drilling a hole big enough for the sensor, which gets secured with a standard 3/4" NPT nut. Inside the box there's a Seeduino Stalker datalogger board with Xbee radio and a LiPo battery. On the top of the box I mounted a weatherproof 6v solar panel, which is routed into the box through a cable gland to keep the battery charged. So the entire assembly is weatherproof and can be simply slipped on and off the top of the stilling well pipe.

The solar panel keeps the battery charged, so the batteries will never need to be replaced. The datalogger can store the data on a microSD card and/or transmit it via Xbee radio or 3G cellular module. I tested the sensor in different water conditions and compared it to manual measurements made with a metric ruler and automated measurements made with digital-output pressure transducers, and the measurements are very accurate. I'll share more details about the data in an upcoming post.

Source : <http://envirodiy.org/ultrasonic-water-depth-sensor/>