

Water Tank Level Sensor

By **Denver42165** Updated **10 February 2023**

Update:

Community member Chris has had a go at [remaking this project](#) after the original project contributor Denver made the original code repository private. GitHub links below will not work but the original project has been kept here for reference.

Imagine getting home from work, its winter, its cold. You have a shower to warm up and half way through your shower..... your water stops. You wrap a towel around yourself, remove the shampoo from your eyes and go out into the cold to swap the tanks as the water tank you were using had run dry. This was a common occurrence in my house..... but not anymore. Now I can keep visually see the level of water in my water tanks on my iPad and receive an email when the tank level gets low.

Why would I go to this much effort when you can buy off the shelf wireless tank level sensors from Bunnings for \$85. The issue is they only do one tank. I would have to buy 3 kits and have 3 individual monitors mounted on the wall. They all require batteries to be replaced every 6 months, I can only see the data at one place in the house and they still won't stop me from running out of water as I would still have to check them every day. So..... I built my own.

Parts list


- Housing (from electrical supplier)
- TP-Link POE200 splitter and injector
- **Raspberry Pi 3**
- 2 x **Ultrasonic waterproof sensors**
- **Perma-proto board**
- **Resistors**
- **Jumper Wires**
- **On/off button**
- **Barrel to micro USB connector**
- Solder

Tools

- Hot Glue gun
- Soldering Iron
- Battery Drill with spade bit
- Safety gear
- Ladder (for getting to those high places)

Processor

So many to choose from. Where to start? I wanted easy to use for my first project and something I can convert into a gar

 **Help**

the project didn't work (obviously no confidence in my own ability). So, I went for the Raspberry Pi 3.

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The first issue.... which sensor should I use. I looked at 2 different types. Ultrasonic vs pressure sensor. I deemed the pressure sensor inadequate due to it using an analogue signal (4-20ma) and that seemed a little complicated for my first project. There were two types of ultrasonic sensors I looked into. The HC-SR04 wasn't waterproof but the JSN-SR04T was. I was reading online that the sensor would give false readings when not installed in a tube. When the prototype was made I spent 2 weeks trialing different diameter and length tubes..... to find out that I didn't even need one. Lessons 1: too much planning not enough testing. The sensor had a lot of code already written online which made prototyping easy.

Testing Prototype



https://github.com/Denverado/Level_Sensor

Power and router

The second and third issue.... connection to router and power. The location of the rpi3 was to be at the far end of the house. There is no wifi, Ethernet or power at the install point. I was trying to tackle these issues separately until one day staring at my work phone, I had inspiration. POE!! Connectivity to the home network and power, all wrapped up in one easy to install bundle. Yay!!! After researching the topic I decided on the TP-LINK TL-POE200 Power over Ethernet Adapter Kit. The kit allows for 5-volt output built in and enough amps to run the RPi. Only an adapter is required to get it from the barrel fitting to micro USB. I add a power button that had an LED incorporated into it. The LED flashes when not connected to the network, is on when connected and off when the pi is off.

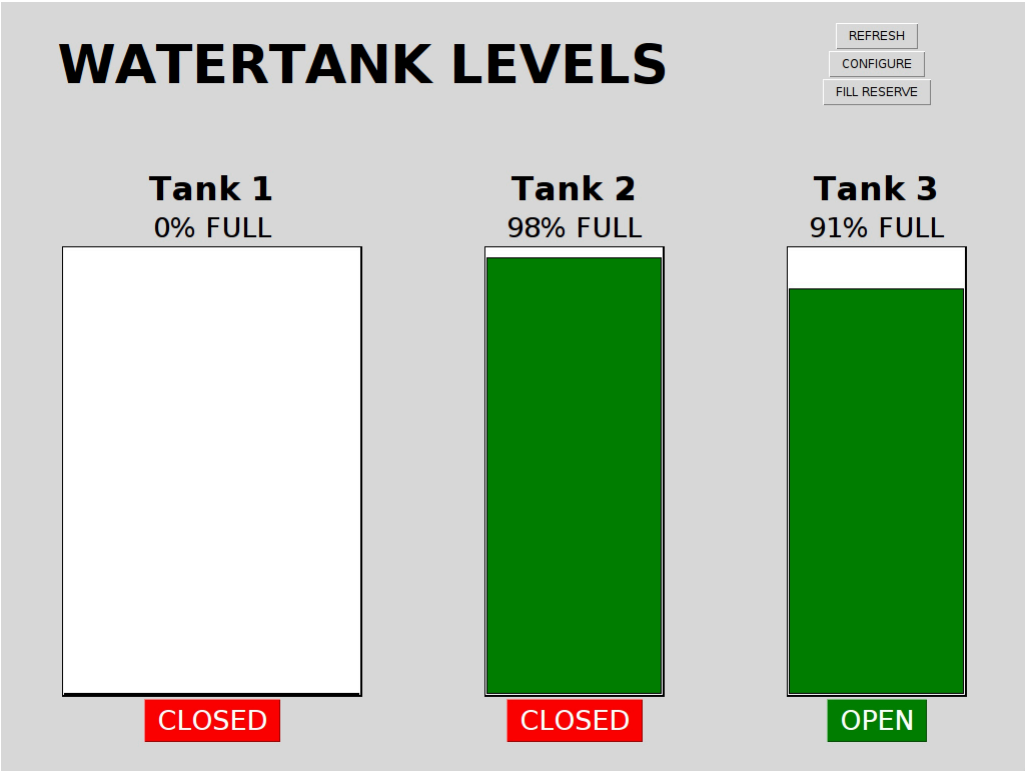
https://github.com/Denverado/Power_Restart_Button

https://github.com/Denverado/Network_LED

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The fourth problem.... how do I display the data. A GUI. I had to make a GUI so simple my wife could operate it. I used VNC to link into the RPi and the GUI starts on the RPi startup. All that has to be done is open VNC viewer on the iPad and the up to date water levels is displayed. All I just had to write a simple code to get an email when the tank is low and when it was full. Easy as!



https://github.com/Denverado/Water_Tank_GUI

Mounting the Components

The final problem was how to mount the project. A hot glue gun and some M2.5 standoffs were my friends. A weatherproof container, help from my wife and dad to run CAT 6 cables, a couple of drills and presto!!! A water tank sensor. I showed my neighbor and he wants a tank sensor too.



Final Install



Where to from here?

Now I have a taste for coding and this small project work, I want to do more..... I have another tank that needs a level sensor added, maybe with a temp and humidity sensor on it too. I could add some valving on the tanks so they automatically change when they get low. The flow meter on the dual house pumps that switch over when one fails and measure how much water we use would be perfect.

Tags: [pi](#) [raspberry](#) [level](#) [ultrasonic](#) [water](#)

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Comments

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**Sam**

December 2017

Great project Denver! Practical projects are always the most satisfying to build.

**jskogsta**

December 2017

Awesome project! Just wondering whether it would be possible to use the Raspberry Pi Zero W - provided there is wifi access to the tank, and how reliable "reconnecting" etc. would be. Had any look at that anytime? It would shave a few dollars off the project cost... though reckon wired ethernet would be probably more reliable... ??

[1 reply](#)**Sam**[▶ jskogsta](#) December 2017

I'm sure Denver will be able to provide better insight, but using a WiFi connection shouldn't be an issue at all. Provided it's in range, it has built in handling to ensure that data is sent and received correctly.

**Denver42165**

December 2017

It can absolutely be run from a RPi zero W. I tested it on a zero as well. I only used the RPi 3 and the Ethernet as I didn't have power at the site where it was to be installed, so I used POE to get power there. I am about to build another one that runs on an onion from battery and solar. That one will be wifi only.

[1 reply](#)**Andrew54467**

January 2018

Are you getting much inaccuracy due to the temp and humidity inside the tank?

[1 reply](#)**Denver42165**[▶ Andrew54467](#) January 2018

@[Andrew54467](#), I am lately getting fluctuations in readings. The existing program uses a single reading to get the level. i am going to modify the program in the coming weeks to take an average or mean of 5 readings to get better accuracy. I will let you know what i come up with.

[1 reply](#)**Denver42165**[▶ Denver42165](#) February 2018

The averaging program seemed to of done the trick. I used the mean of multiple depths instead of the average.

**Mark65052**

June 2018

Can you share the GPIO/resistor/sensor layout please?

I'm new to this and the article skips over what resistors to use and how to connect things up 😊

[1 reply](#)**Denver42165**

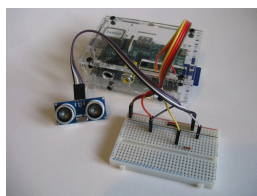
July 2018

Sorry for the late reply.

I used this site as a reference.



Raspberry Pi Spy – 30 Dec 12



Ultrasonic Distance Measurement Using Python - Part 1 - Raspberry Pi Spy

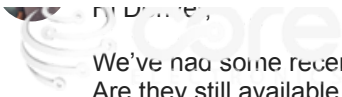
Raspberry Pi tutorials and guides to help you learn and build awesome projects. Sensors, displays, screens, motors, servos, lights, LEDs and more!

[2 replies](#)**Stephen**

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[▶ Denver42165](#) October 2018



We've had some recent interest in the Github files you've shared in this project, but the links no longer seem to work. Are they still available somewhere?



Brett77713

January 2019

I am interested in this project, does anyone have the github code?



Nick78282

► Denver42165 January 2019

Hi Denver,

The Github file links are not working, are you able to update?
Also, the enclosure used, can you give some rough dimensions?
Thanks

Nick



Simeon41332

May 2019

Bumping this. I'm interested in the github links also.



Jon86276

May 2019

I'm interested in finding these missing links too. Has anybody had any success yet?



John46896

► Denver42165 March 2020

Hi Denver - are you able to share the github files please mate? Has anyone else found them?

[1 reply](#)



Chris44916

May 2020

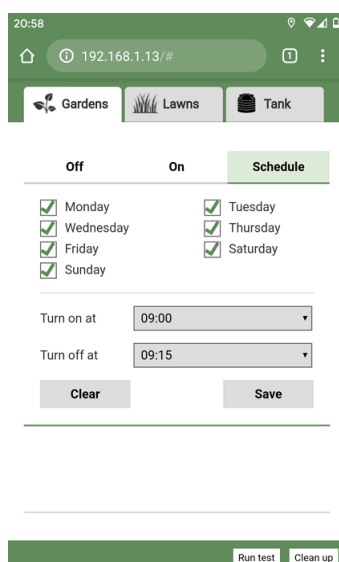
Great project!

Was inspiration for mine, making up a part of an automated irrigation system.
Although I am using Python code to take the distance measurement to the water level in the tank (the earlier link was a lot of help for that), the rest of my UI is served up via a web browser.

I also had encountered some trouble with variance of the distance measurements. At times it was up to ~30mm. My solution was to take a bunch of individual measurements (10/12 or so), remove the outliers, then average whatever was left. There's still a little bit of wobble in the resulting measurements. But I think it's acceptable.

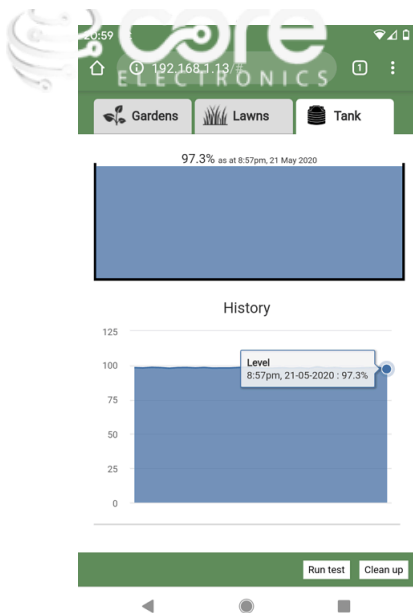
I used a 2.2k and a 3.3k ohm resistor as a voltage divider off the Echo output of the sensor. To take its 5volts down to the 3volts that the Raspberry Pi prefers. This bit was important so as not to damage the GPIO.

Happy to field questions.



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Phil125589

► John46896 June 2020

Hi Jon and John,
I had started this project a while ago, and then I was side tracked. I have gone back through my backups, and found I still had the code files, but not the data files.
Let me know if you still want these and I'll upload them?

2 replies



Wolf

► Phil125589 July 2020

I'd also love to see updated or forked code for this project - as the original files seem to have gone missing from github. Although we will need to attribute the original author @Denver42165



Oliver Leader

► Phil125589 July 2020

Hey Phil,

Sorry, I've just seen your message after Wolf's bump. That would be fantastic. I actually sent an email to Denver a little while ago but he may no longer use that email address.

These are the GitHub links we're trying to patch up:
https://github.com/Denverado/Level_Sensor
https://github.com/Denverado/Power_Restart_Button
https://github.com/Denverado/Network_LED
https://github.com/Denverado/Water_Tank_GUI

Regards,
Oliver
Support | Core Electronics



Rohan68862

August 2020

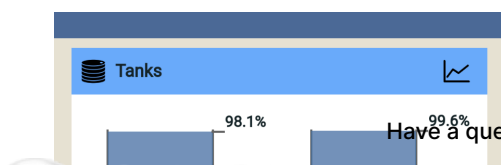
Guys, i would really love for this project to be brought up to speed again. I have multiple uses for this project and it would save me hours and hours of development work if we can get it going again. All the github links seem to be broken and i have tried to find other projects similar with little or no luck.



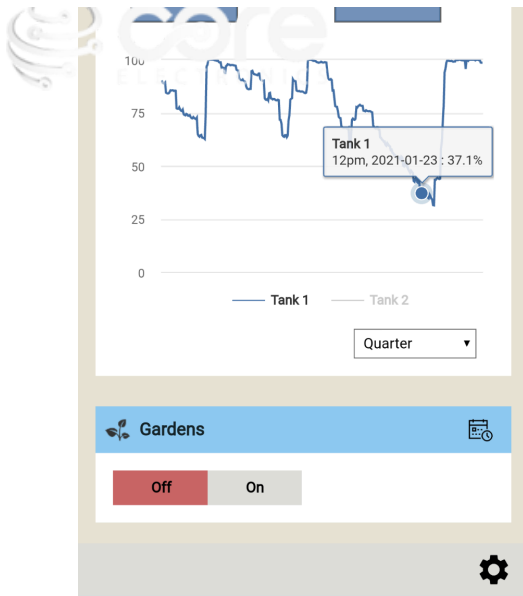
Chris44916

September 2020

I made some updates to my version of this project. Some code clean up, although mostly cosmetic based changes. It's on my github at:
https://github.com/Chris820/irrigation_system



of this guide today!



1 reply



Bryce

► [Chris44916](#) September 2020

Awesome work Chris,

If you could also please email support@coreelectronics.com.au with your new links to the GitHub we'll fix our project page for you too.

Bryce
Core Electronics | Support



Mitchell

September 2020

Hi Denver, awesome project!

Just out of curiosity, do you have instantaneous hot water? I was under the impression that the hot water tank is always full with either cold water or hot water.

ABOUT US

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