Water Leak Detector - Read Me First

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NOTICE: Use of this document is subject to the terms of use described in the document "Terms_of_Use_License_and_Disclaimer" that is included in this release package. This document can also be found at:
https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Terms_of_Use_License_and_Disclaimer.pdf

Table of Contents.

1. Welcome.

Welcome to the Water Leak Detector project! The Water Leak Detector (WLD) is an IoT device that can monitor two specific locations for the presence of water. When water is detected an alarm will sound and an alert will be sent to a smartphone. The WLD also includes a temperature and humidity sensor. These values are displayed on a dial and also in a smartphone app.

This document will help you to decide whether you should proceed to purchase parts and materials and proceed to build a WLD for yourself or for others. If you decide to proceed and build one or more WLDs, this document will serve as a top level guide through our extensive documentation. All of the documentation for this project is sourced and maintained at:

https://github.com/TeamPracticalProjects/WaterLeakSensor/tree/master

Please carefully review this entire document before deciding to proceed with this project:

> **Section 2** of this document contains a list of materials that you should review before you decide to order parts, materials and/or begin construction of a WLD. We _strongly recommend_ that you review this material in order to ensure that you have the skills, tools and facilities to undertake a project of this complexity.

> **Section 3** of this document provides you with an overview of the complete contents of the GitHub repository where we have maintain the project documentation. You will need to refer to this section in order to locate the documents, firmware files, CAD files, and other material that you will need in order to build, install and test a WLD.

> **Section 4** of this document provides you with selection guide for the _three enclosures_ that we have designed and documented. You only need one enclosure for this project. Owing to the cost and complexity of the enclosure, we have provided three different designs for you to choose from. Choose only one of these designs for your project enclosure. It is important for you to make your decision up front, so that you order only the parts and materials that you will be needing to build your WLD.

2.   Review This Material Before Proceeding!

We **strongly recommend** that you review all of the following documents before proceeding further with this project. **We are not responsible** if you purchase parts and materials for this project and later discover that you do not have the necessary skills, tools, facilities or time to complete it!

- You **MUST agree** to our terms of use, license and disclaimer requirements and limitations before proceeding further. The following document contains these details:

  https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Terms_of_Use_License_and_Disclaimer.pdf

  By proceeding past this point, you implicitly agree with everything in this document.

- We **recommend** that you review the WLD concept document:

  https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Water_Leak_Detector_Concept.pdf

  This Concept document will help you understand what the WLD is and whether or not a WLD will meet your needs and expectations.

- We **strongly recommend** that you review the WLD Installation and User Manual, at:

  https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/WLD_Installation_and_User_Manual.pdf

  This document will provide you with insight about what this project consists of and what infrastructure is required to install and operate the WLD.

- We also **strongly recommend** that you review the WLD Frequently Asked Questions document, at:

  https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/WLD_FAQ.pdf

  Please pay particular attention to the Building/Installing questions in order to ensure that you have the proper tools, materials, and infrastructure to build and install a WLD.

- You will also need accounts with particle.io and blynk.cc. These accounts are free, but you do need to register with these sites. You do not need to know how to write software, but *you do need to carefully follow the instructions* that we provide in order to install our software on your Photon device and on the Blynk app on your smartphone.

3.   Order of Assembly.

The WLD build process consists of a number of steps. Each step completes a module in the overall process. While you can do steps in a different order, we have provided you what we think is the most straightforward path to success:

1. **Choose the enclosure you want to use**. You have 3 choices:

   a.   Plastic box
   b.   3D printed chassis
   c.   Laser cut wooden box

   Read below (section 4) in this document for help in choosing the best enclosure for you.

2. **Obtain all the parts from the parts list.** The parts list can be found at:

   https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/WaterLeakAlarmPartsList.pdf

   Note that the Parts List has a required section and then sections for each of the enclosure options. You will need to obtain all required parts and also those parts listed for the enclosure option that you chose in the step above.

3. **Assemble the printed circuit board and RJ11 breakout boards**. Once you have obtained the necessary parts, proceed to assemble the printed circuit boards following the instructions at:

   https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/PCB%20Assembly%20Instructions.pdf

4. **Assemble the enclosure that you selected**. Use the set of instructions that pertain to your selected enclosure option:

   - Cut plastic box:
     https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Enclosure%20Build%20Instructions%20Plastic%20Case.pdf

   - 3D printed enclosure:
     https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/Enclosure%20Build%20Instructions%203D%20Printed.pdf

- 2D laser cut enclosure:
  https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Docume
  ntation/Enclosure%20Build%20Instructions%202D%20Box.pdf

5. **Install and test the Blynk app on your smartphone.** Instructions can be found at:

   https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/
   The%20Blynk%20WLD%20Project.pdf

6. **Install the Water Leak Detector firmware**. Instructions can be found at:

   https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/
   WLD_Firmware_Installation.pdf

7. **Install the WLD and test it.**   Instructions can be found at:

   https://github.com/TeamPracticalProjects/WaterLeakSensor/blob/master/Documentation/
   WLD_Installation_and_User_Manual.pdf

4. Choosing The Best Enclosure For You

The WLD provides instructions for three different enclosures: plastic box, laser cut box, 3D printed chassis. Which one you use depends on you. <u>Choose only one</u> of these options before proceeding to order parts and materials.

1. If you are price sensitive, the plastic box is the least expensive option. This uses a $3 plastic box available from your local office supply store or over the Internet.

2. If you have access to a laser cutter, then the laser cut box is a nice upgrade from the plastic box. The laser cut box can have a beautiful etched dial and be either enclosed or open in design. (If you don't have access to a laser cutter, Team Practical Projects *may be willing* to sell you one at cost. Contact us at TeamPProjects@gmail.com).

3. If you want the most professional looking device, the 3D printed chassis is for you. You can order the chassis and bezel from Shapeways for about $40, using the CAD files that we provide. Or if you have your own 3D printer, then you can print the chassis and bezel for a few dollars in material.

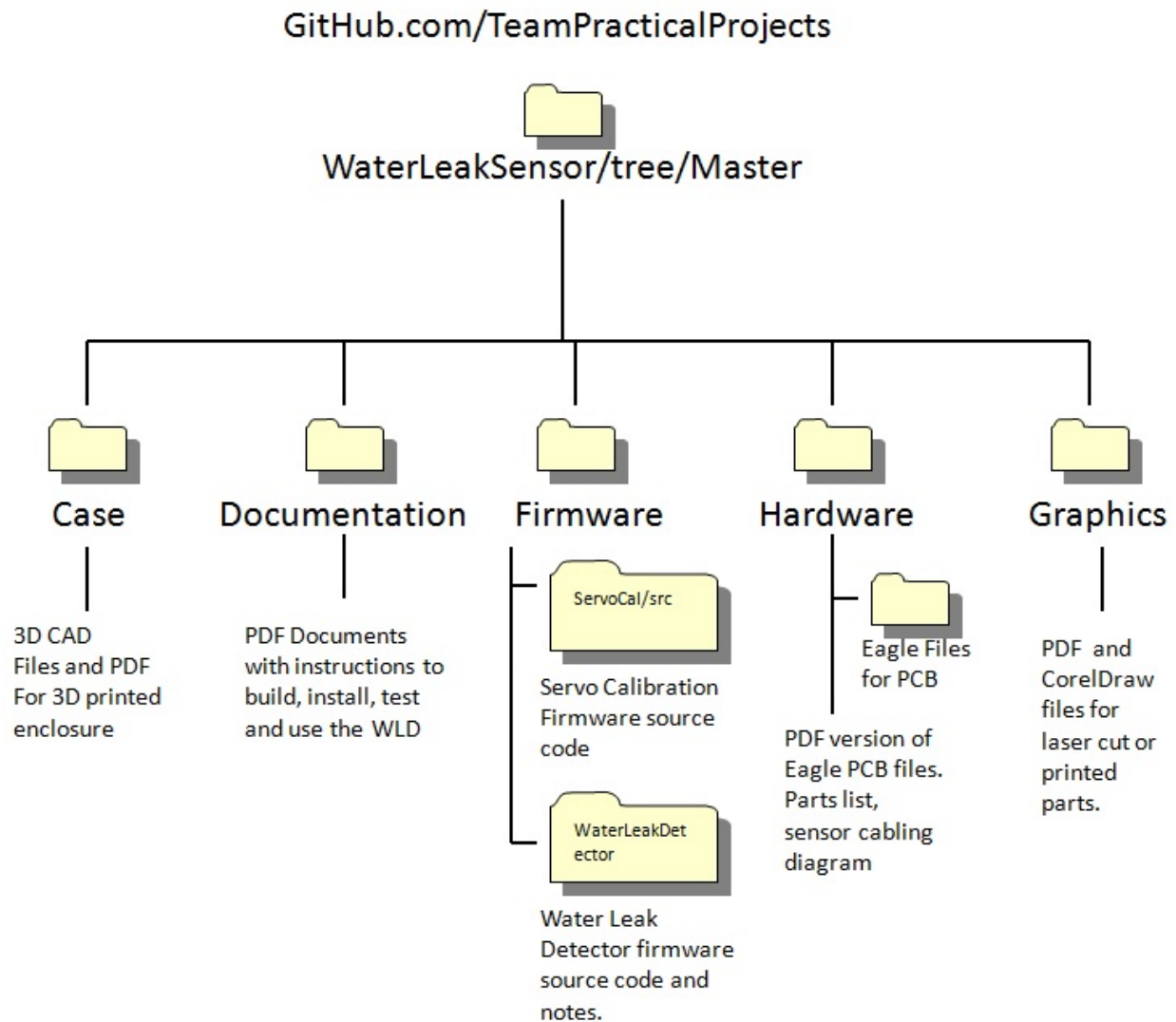|	Plastic Box	Laser Cut Box	3D Printed Box
Pro	● Cheap ● Sturdy	● Looks very good ● Simple to make ● Offers a few choices of style	● Looks professional ● Really, it looks great ● Print it on your own 3D printer at low cost
Con	● Looks DIY ● Cut it yourself ● Dial is cardboard	● Need a laser cutter	● Need a 3D printer
Buy	Team Practical Projects may be willing to sell you the laser cut parts. Contact us: TeamPProjects@gmail.com		Buy from Shapeways for $40
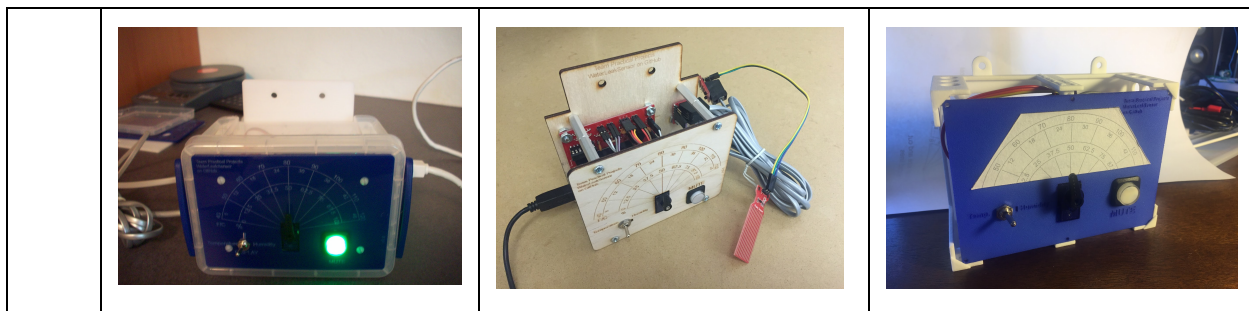
Photos of: (left) Plastic Box (with laser cut faceplate), (center) Laser Cut Box, (right) 3D Printed Box.

5. Overview of the WLD Project Documentation.

The figure below depicts the documentation tree for the WLD project. The WLD project files are posted and maintained in the GitHub repository:
https://github.com/TeamPracticalProjects/WaterLeakSensor

GitHub.com/TeamPracticalProjects

WaterLeakSensor/tree/Master

Case

3D CAD Files and PDF For 3D printed enclosure

Documentation

PDF Documents with instructions to build, install, test and use the WLD

Firmware

ServoCal/src

Servo Calibration Firmware source code

WaterLeakDetector

Water Leak Detector firmware source code and notes.

Hardware

Eagle Files for PCB

PDF version of Eagle PCB files. Parts list, sensor cabling diagram

Graphics

PDF and CorelDraw files for laser cut or printed parts.

5.1. CASE Folder.

The CASE folder contains 3D CAD files for manufacturing the enclosure skeleton and the bezel. Free CAD source files are provided under the open source license for this project. Use these files if you want to modify our case design:
- casebottomskel.FCStd (enclosure skeleton)
- casebezel.FCStd (bezel)

If you want to use our case and bezel designs as is, you can buy them off of the Parts List from Shapeways, or you can use the following files with a 3D printer of your choice:
- casebottomskel.stl
- casebezel.stl

We have also provided a PDF version of the bezel design: casebezel.pdf

5.2. DOCUMENTATION Folder.

This folder contains the Parts List and all of the human readable documentation for the WLD project. This documentation contains the Concept Document, Terms of Use License and Disclosure Document, assembly instruction documents for each of the assembly steps described in section 3, above, a Troubleshooting document and some handy Frequently Asked Questions (FAQ) and answers.

5.3. FIRMWARE Folder.

The FIRMWARE folder contains two subfolders:
- *ServoCal/src*: contains the source code (.ino file) for the servo calibration software.
- *WaterLeakDetector*: contains an src subfolder that has the source code for the Photon in the WLD (.ino file).

5.4. HARDWARE Folder.

The HARDWARE folder contains .pdf files for the PCB schematic and board layout. It also contains a .pdf file describing the sensor wiring to the main PCB. The subfolder *Eagle files* contain the Eagle .sch and .brd files that can be used if you wish to modify our PCB design.

5.5. GRAPHICS Folder.

The GRAPHICS folder contains the CorelDraw source file for all of the laser cut parts (*CaseDial.cdr*). Use this file if you wish to modify any of our 2D laser part part designs. This

folder also contains a .pdf version of this file (*CaseDial.pdf*). This latter file can be used to view the 2D drawings without needing the CorelDraw software. You can also use this file to print out full size renderings of the bezel scales for the 3D and cut plastic box enclosures. You can use these renderings as templates for cutting 2D parts and/or in lieu of laser engraving the servo meter face scale..