

shipout/backgroundshipout/foreground

Router hardware— Plan of approach

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1.1 Issue

The Crownstone hardware can be controlled from a smartphone. However the use of a smartphone means:

1. no switching from a distance
2. no continuous storage of the energy usage
3. not for example, being able to react to changing electricity prices.

By using a hub like a PI with an Crownstone dongle with Home Assistant from a Homey this becomes (partially) possible, but a lot of functionality stays absent.

1.2 Objective

Crownstone want to offer a router that has different features:

1. direct Bluetooth Mesh support
2. Long term energy storage
3. Matter Border Router support
4. connections
 - Ethernet (RJ45)
 - smart meter(RJ11)
 - Heat pumps/solar panels/charging stations(RS485, screw connector)

The router will be placed in a fuse box and is an addition to a smart home hub(not a replacement). Especially the RS485 connection are important, because the router will play an important role in the energy management. The router will also be modular.

2 Project activities

To complete the project successfully, some activities have to be completed during the project. Furthermore a product has to be developed. The most important activities that have to be done will be displayed in table ??.

Preliminary investigation	The project has to be read through and it needs to be investigated what the project entails.
Requirements	The Requirements will be composed and this will be done after the preliminary investigation, because more is known at that point.
Designing hardware	The hardware need to be designed. This will be done after the requirements and the architecture have been made.
PCB design, assembling and testing	After designing the hardware, the PCB has to be designed. After designing the PCB it also has to be assembled and tested.
Writing and maintaining documentation	The documentation has to be written and maintained. This is necessary, because the mistakes can be read back and corrected.
Keeping contact with the client	Contact shall be kept with the client, this will make sure that the clients wishes will be followed

Table 1: project activities

3 Project boundaries

There are also boundaries in the project. The boundaries are not worked on in this project.

Writing software	Barely any code will be written. The code will be wirtten by someone else.
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Table 2: Project boundaries

4 intermediate results

During the project intermediate results and partial products will be made. In ?? all the intermediate results and partial products will be given and expanded upon.

Plan of approach	The beginning of the project.
Planning	The planning of the project. The planning will be updated during the project.
Project document	The projectdocument will document how the product is designed and made.
Research	In the project document shorter versions of the research will be put. In the attachments the full researches will be put.
Hardware	Hardware will be designed and made in the project.
PCB	The PCB will be designed and created.

Table 3: intermediate results

5 Quality

The quality of the project

6 Costs and benefits

7 risk analysis

	Risk	Consequence	Solution	Impact [1-5]	Chance [1-5]	Notes
1	Covid-19 comes back and the Netherlands will go in lockdown again.	Everybody can't go outside anymore which means the necessary equipment for testing is unavailable.	Try to do as much as possible remotely	3	1	A lot of this project can be done remotely. The only problem would be the testing. Even if there is a lockdown there is a big chance the office is still open.
2	The PCB doesn't work, because of a hardware mistake	The hardware wont work which will cost time and money	It has to be tested again on a breadboard until it works and then the PCB will be changed accordingly.	2	3	There is a chance this will happen and it will depend on the mistake what the impact will be, however there is a high chance it will not be a big issue.
3	I get severely ill	I wont be able to work because of the illness	Getting more time for the project or someone else will take over, this means clear documentation so it can be taken over easily	5	1	This will probably not happen and documentation will be ready if this is the case anyway.
4	The laptop on which progress is made malfunctions or erases all files	All the work could be lost that was done offline.	Make sure the necessary files are stored somewhere else as backup	3	2	Its not that big a problem because the documentation will be done online. The important things that can be lost will be Altium files so a git for that will be created.
5	Running behind the schedule	The product will not be able to be done on time	Hold strictly to the planning and if it changes talk about it.	3	2	
6	Change in plans	The Job gets changed	If it is manageable try to keep the changes in mind, if not finish the original job	4	1	This is very unlikely and it depends on the situation.
7	Problems in shipping of hardware	The necessary components wont arrive	Try alternatives or simulate as much as possible if the alternatives aren't available either	3	3	There has been a component shortage because of China. This could mess up the project quite a lot.

8	Not enough communication with the client	Misunderstandings could happen or the progress of the project will not be correctly conveyed	Talk at least once per week with the client if possible	3	1	
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Table 4: risk analysis