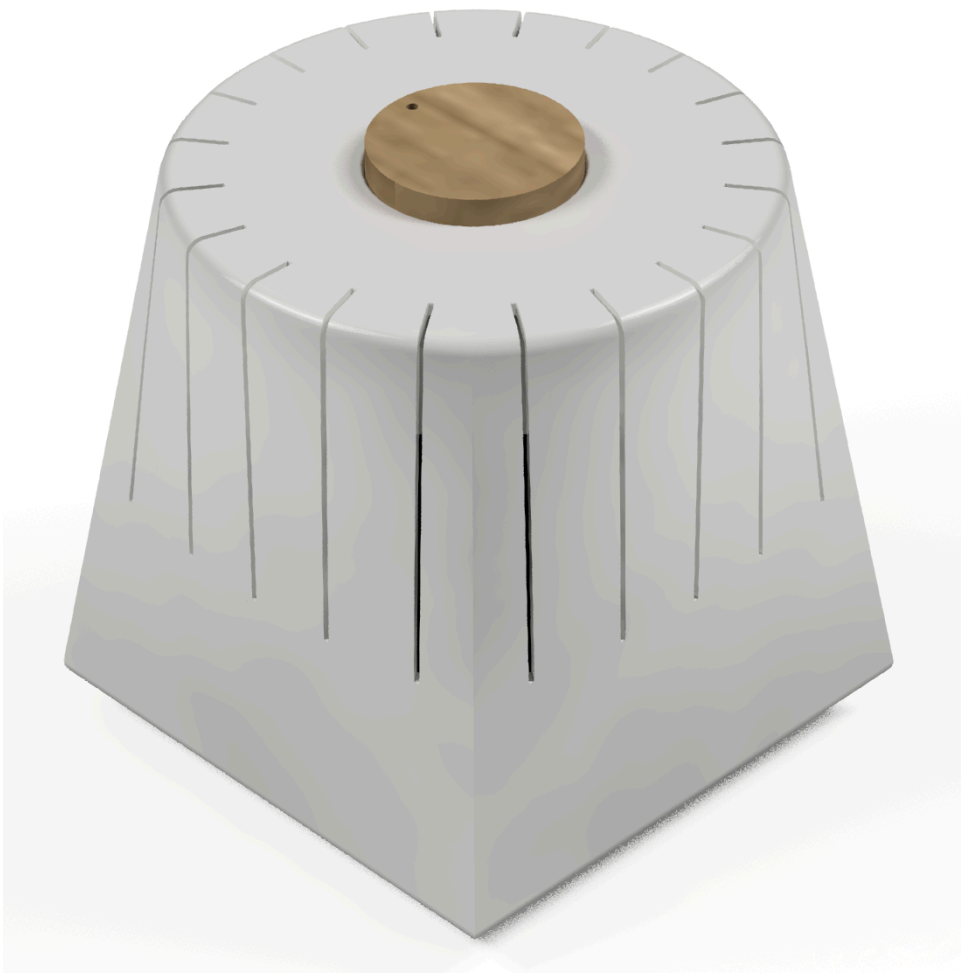


Roomie

15.05.2025

Scope

This is a short guide on how to assemble the Roomie speaker and what needs to be done to get the firmware running.

Description

The way Roomie works is in general straight forward. There are wooden chips with a diameter of 35mm. One chip consists of magnets and a NFC (NTAG) chip with a specific UID. In a database (local) the corresponding spotify playlist link is mapped to the UID. So once the chip is placed in the pocket of the Roomie device, the NFC reader reads the UID and the raspberry pi searches in the database if this UID matches to a spotify URL stored in the database. If valid, this link is handed over to raspotify and played. You could also select a different device to play the music like google nest hub or so, but the reason I built my own speaker is that this way I have more control over the system. (often the spotify app gets shut down by external software to save power, so raspotify would not find a device to play music).

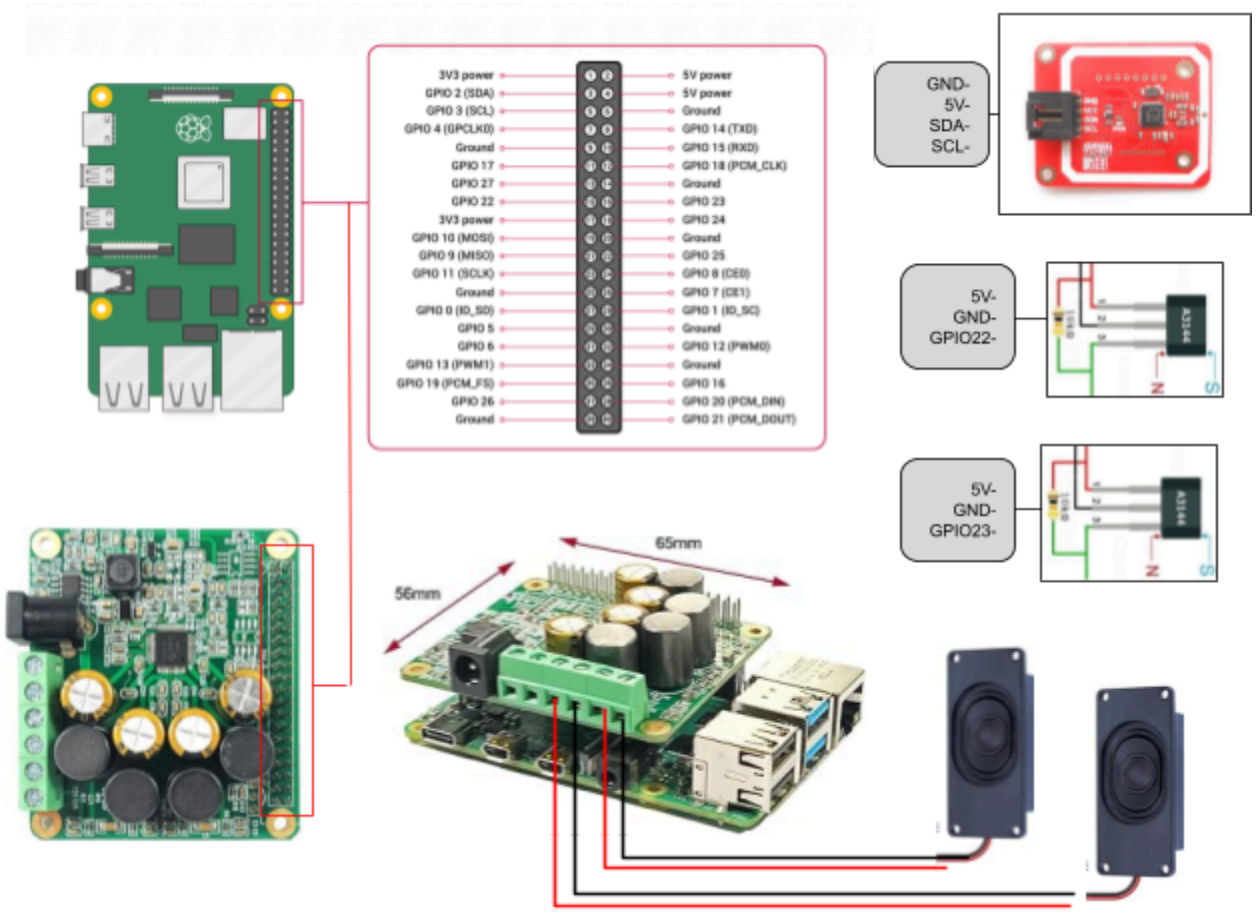
If you remove the Chip from the pocked the music stops, if you turn the Chip inside of the pocked you can forward or revert songs. This is done via the two Hallsensor that are also placed below the pocket and detect the change of the magnet inside of the Chip. As the Sensors are close to each other the direction is detected if one goes LOW and the next one follows soon after.

The database currently has a storage for the mapping of songs to uid, one for available spotify devices and one that shows the history of used chips.

The whole database system is more for fun and totally overengineered, you can get the same result by just storing the playlist link in the NFC NTAG and not using a database at all.

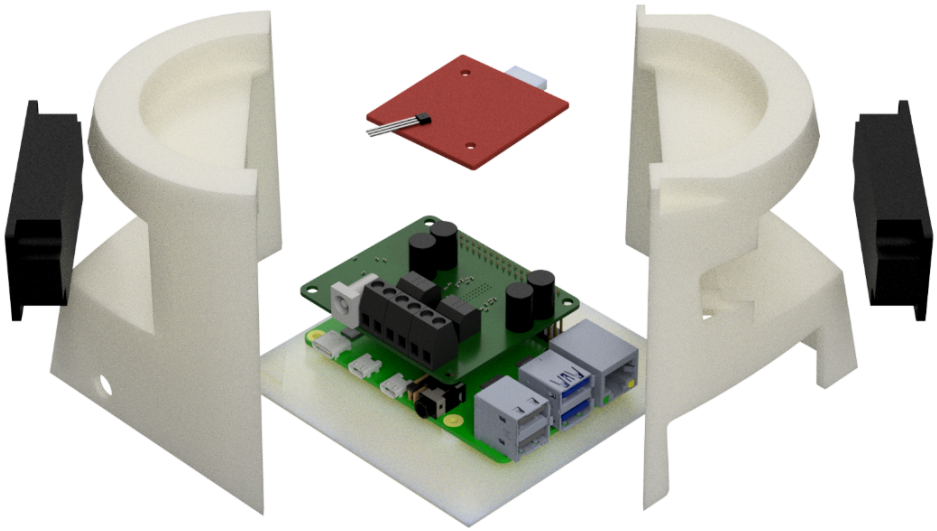
Hardware

Overall there is not a lot of soldering to do, most of the connection can be done via cables. The only thing that requires a bit of soldering is the 10kohm pull up resistor for the A3144.



The whole device is powered via the power jack of the TAS5713 and an external 12V-20V power supply with at least 2A as the HiFi module requires some power.

In the next picture you can see the placement of the parts, the A3144 sensors and the RFID/NFC reader are hot glued on the outer cover of the device to get a defined position to the wooden NFC chip:



All plastic parts are 3D printed, used my anycubic Mega 3D printer, it is not super great but does the job.

Firmware

So first you need to get an OS on the Raspi. I used Raspberry Pi OS without a desktop and controlled the whole device via SSH.

Once the OS is installed on the device and you have access to the raspberry you can start to install raspotify: https://github.com/dtcooper/raspotify

I had quite some troubles getting the HiFi hat running, but I guess I deleted some configs by error, it should work nicely out of the box.

As a last step get the python files from here:
https://github.com/mlacher/Roomie_Music_Player

You need to place your spotify credentials in the config.json to get it running.

There are a lot of libraries to install, as I have more hardware than software expertise I am not sure how this can be done automatically but I am sure there is a way-

Last words

I know this is not half of the information most likely necessary to get the device working, but I am not sure if anyone will ever read this anyways if so please get in contact with me and I will support you the best way possible-