Official Documentation

Berlin Experimental and Educational Ground Station

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Technical Note

Version History

Version	Date	Changes	Processor
0.1	2021-07-05	Document creation	Alexis Cabana-Loriaux

Contents

400 Portable Rotator Concept

Abstract

Put a short description of the content of this report here.

400.1 Introduction

Bla Bla Bla

400.2 Project Planning

hmmmmmmmmmm

400.3 Project Work

400.3.1 Electronics

The custom rotator is controlled by a raspberry pi, extended by a custom raspberry pi hat. The hat provides functionallity to read the safty swiches, communicate to two independet magnetic encoder, drive both motors, as well as monitor the motors speed with a quadrature encoder. The Hat also features a EEPROM, which is specified by the raspberry pi foundation, to call it an 'offical' pi hat. The pi and both motors are powered through an of the shelf power over ethernet (poe) adapter.

400.3.1.1 choice of electronics

We had a working prototype within the first couple of weeks, which enabled us to test lots of feature early on. In the beginning, we needed three cables to power the raspberry pi, the motors, as well as to provide a data cable for communication. The power over ethernet adapter allowed us to only have one cable and simplify the design. To move away from our orignal breadboard design connected to some of the shelfs components, we also designed our own raspberry pi hat.

400.3.1.2 how to connect, pinout

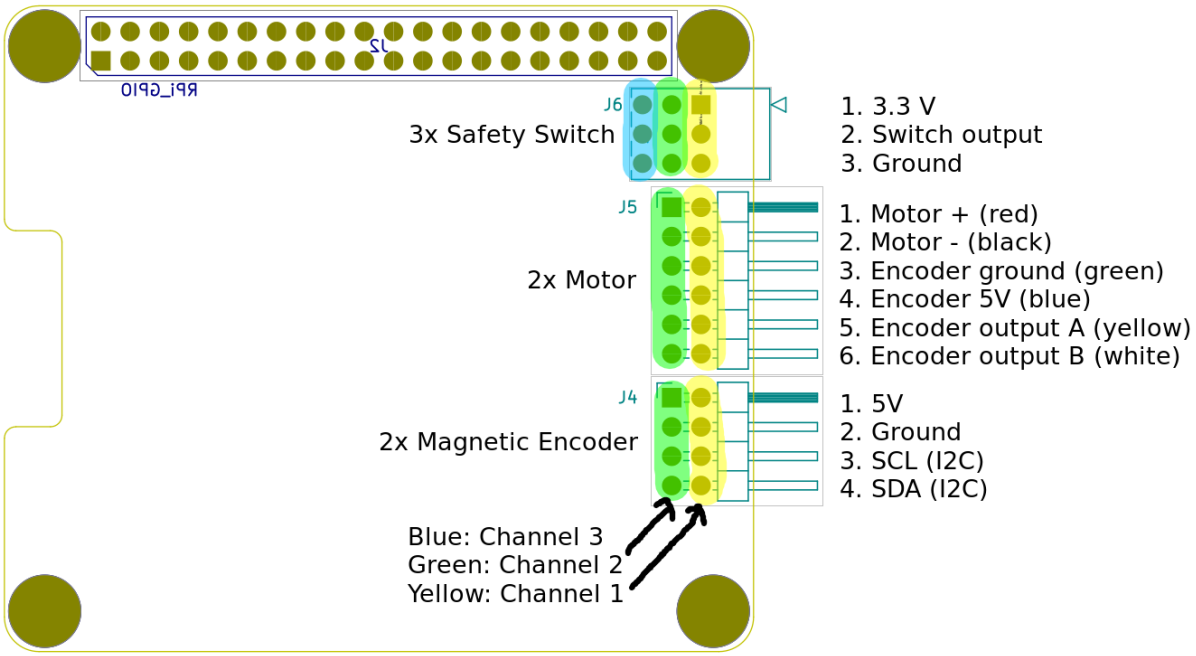

Figure 400.1: Raspberry pi hat pinout

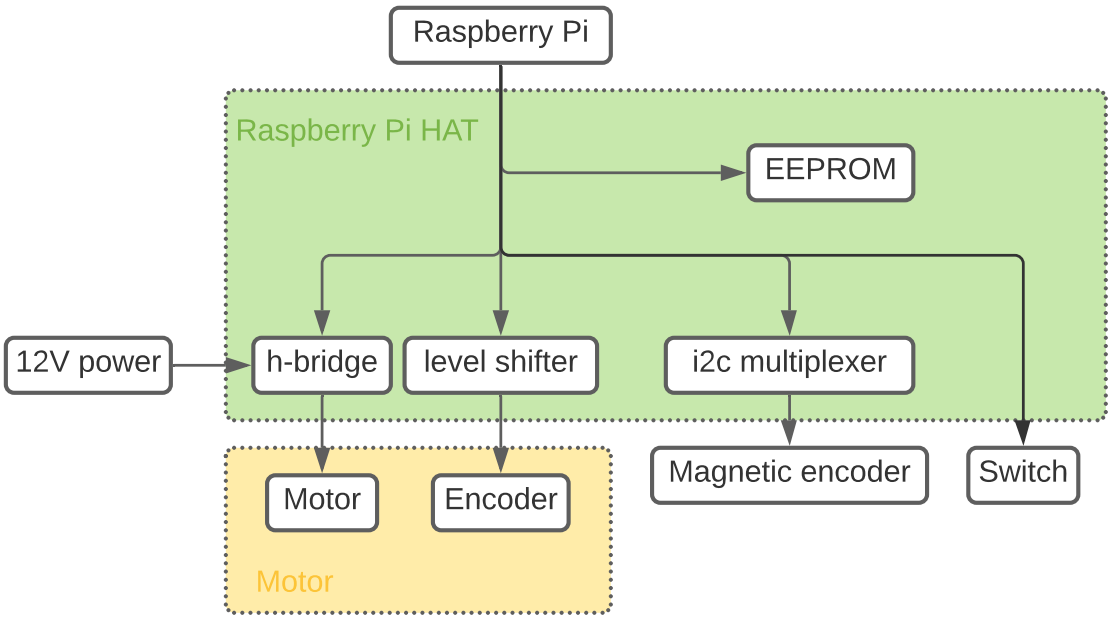

Figure 400.2: Raspberry pi HAT blockdiagramm

400.3.1.3 Electronic Design

400.3.1.4 fabrication and rework

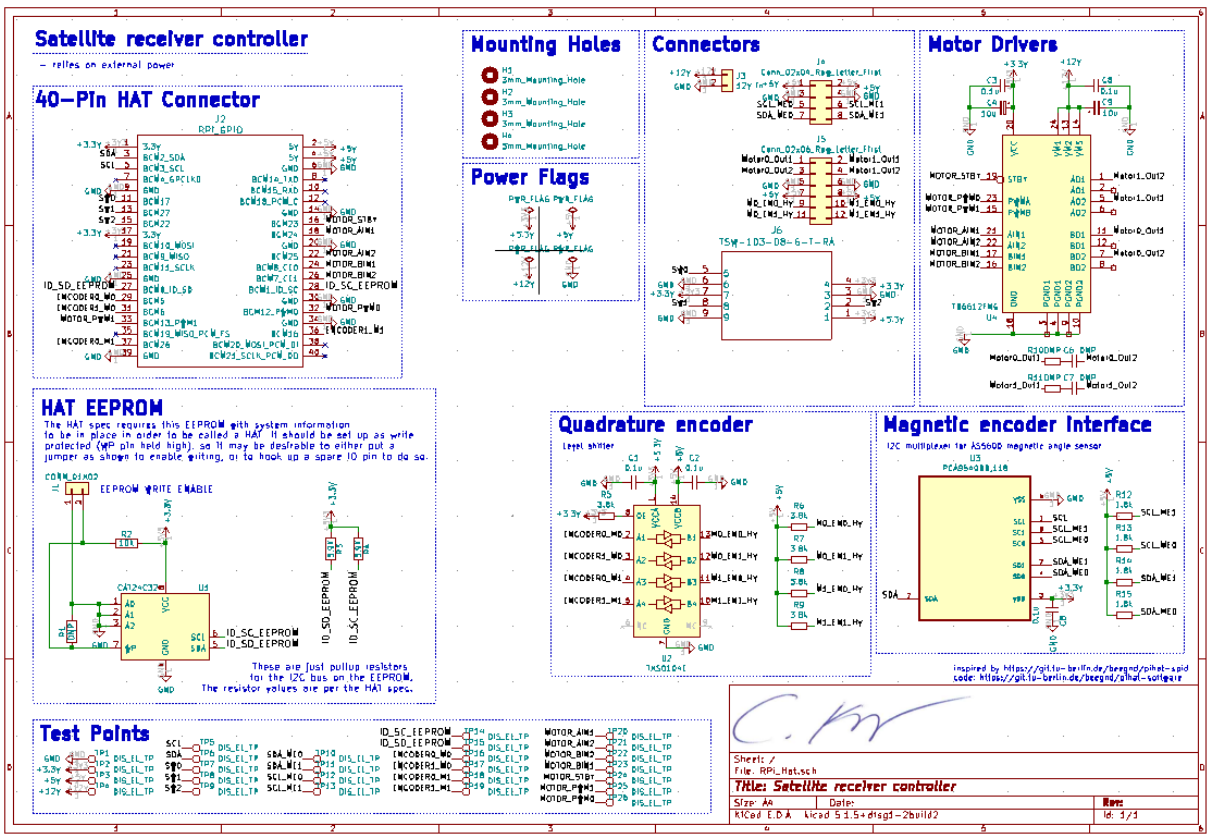

Figure 400.3: Schematic of Raspberry Pi hat

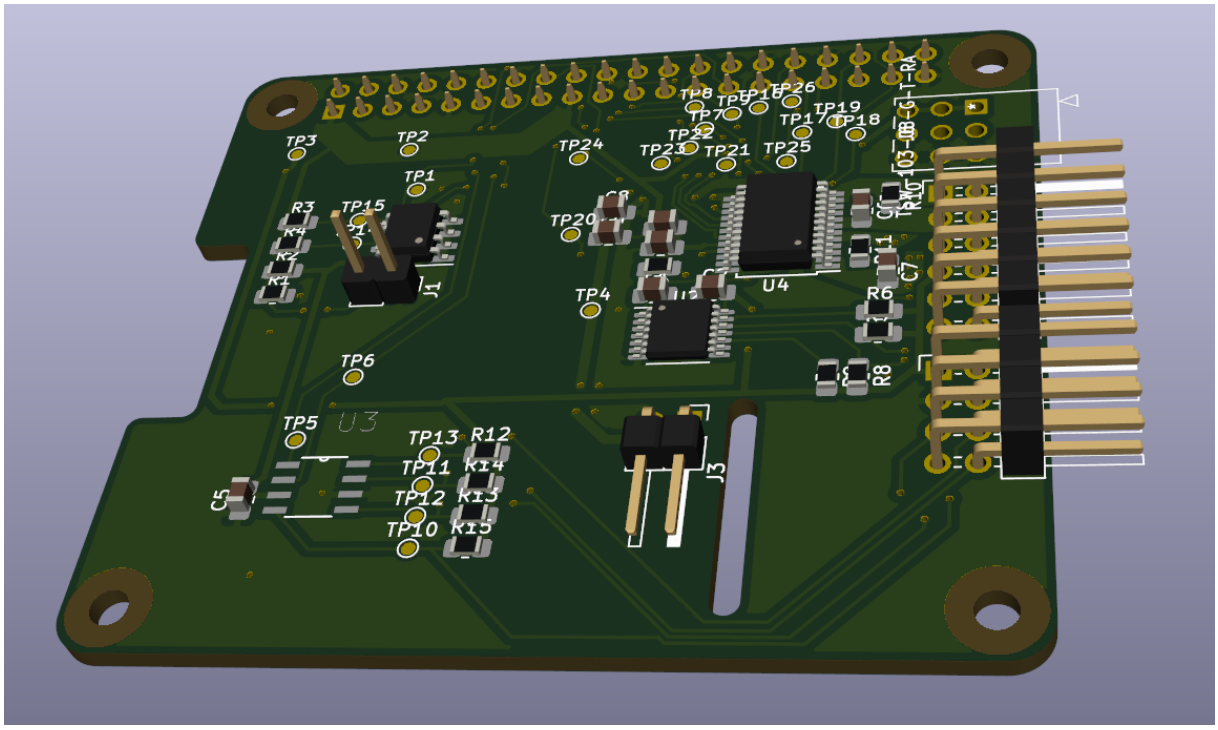

Figure 400.4: PCB of Raspberry Pi hat

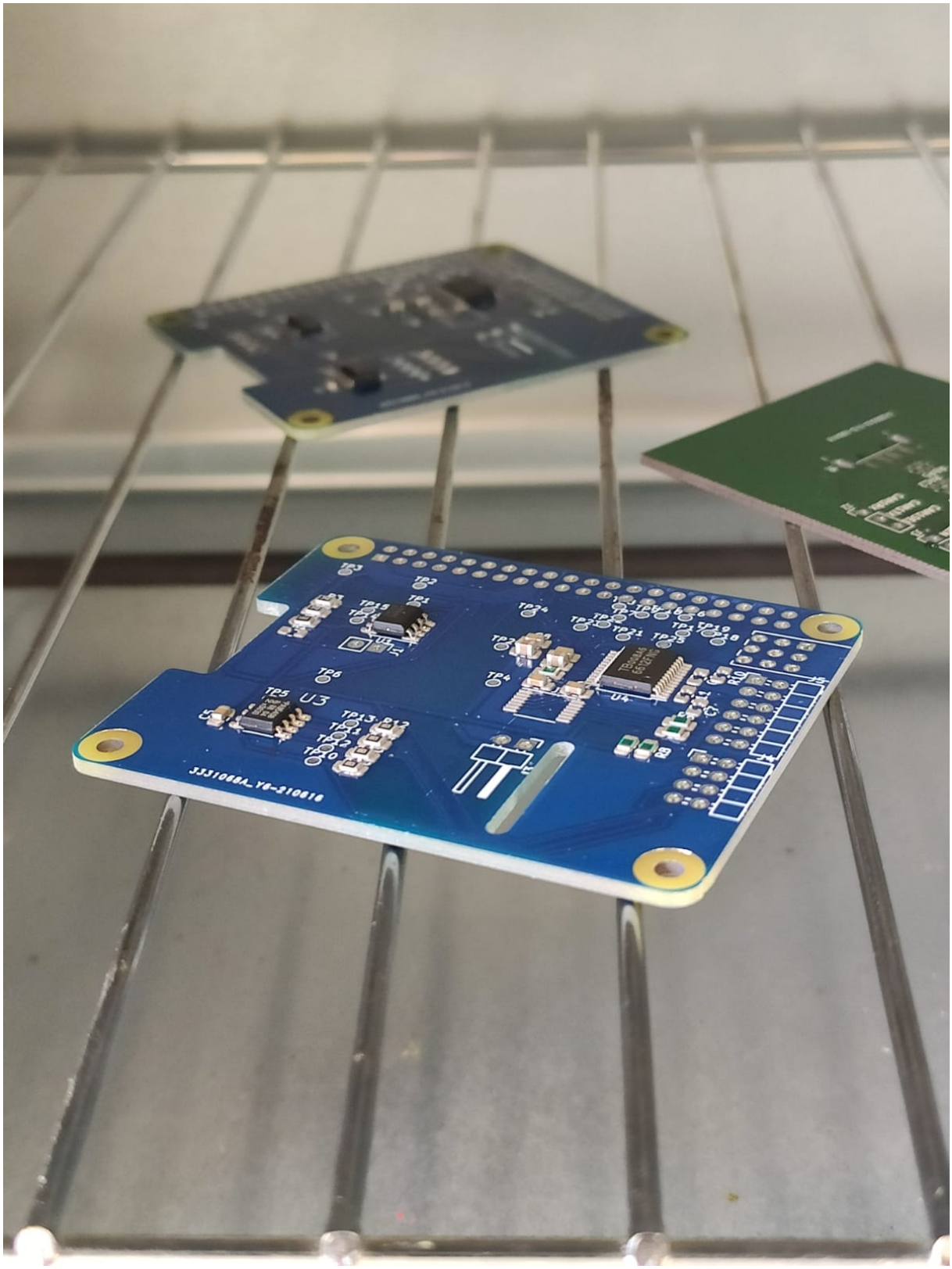

Figure 400.5: Raspberry pi manufacturing

400.3.2 Code

400.3.2.1 Quick Start

what is rotctl? how to start it

400.3.2.2 Raspberry Pi Setup

how to configure the raspberry pi and connect to it

400.3.2.3 code structure

Main features: - Rotctl - Multithreading - Sensors: magnetic encoder, quadrature encoder, switches - Separate driver modules: h-bridge, i2c multiplexer etc. - Position monitoring
how is it threadsafe? how does it work? where to configure the location?

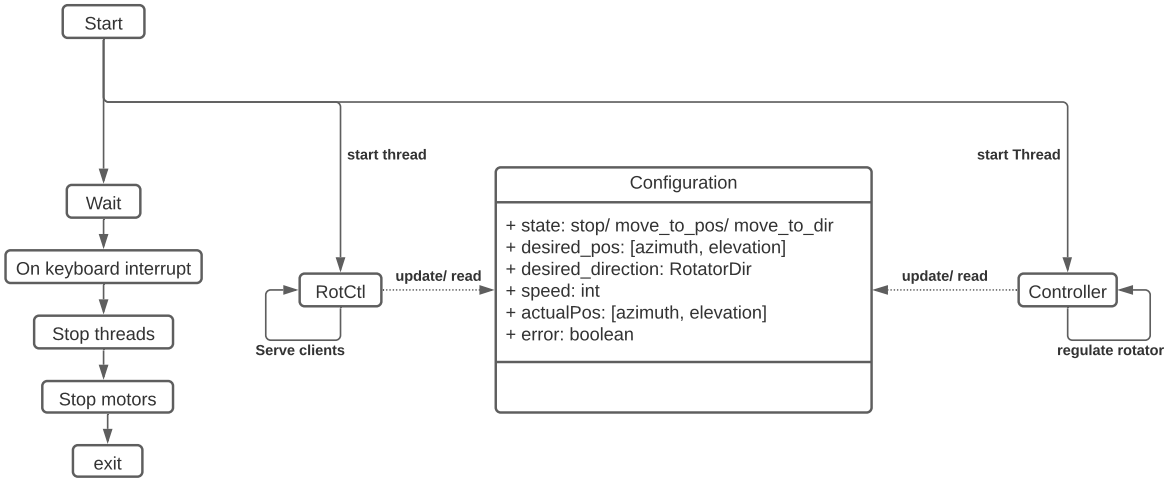

Figure 400.6: Raspberry pi HAT blockdiagramm

400.3.2.4 possible weak points

- untested stuff -

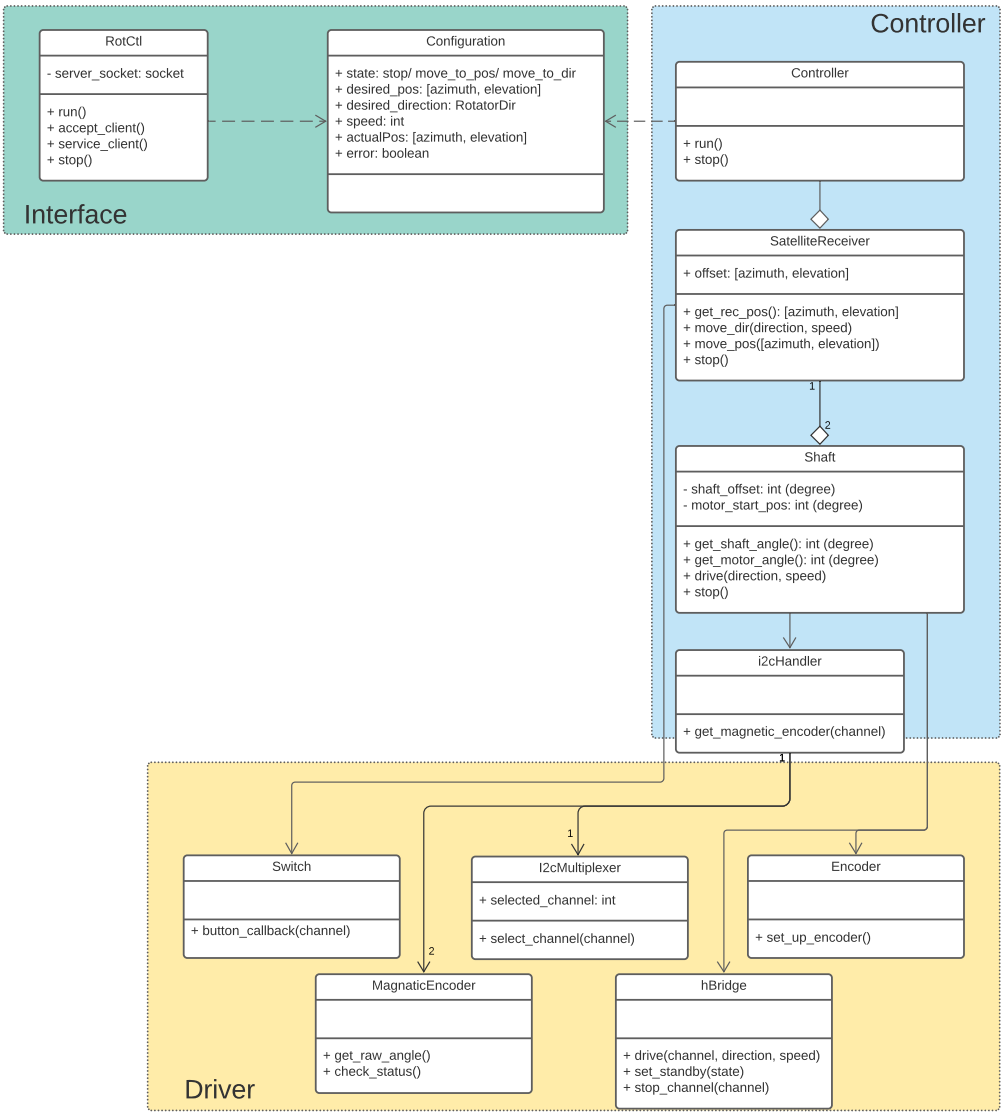

Figure 400.7: Code structure

400.4 Conclusion

Summarize your project work here.

List of Figures