

Mini-Mapper

1: Project introduction

sky blue trades

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Top-level requirements

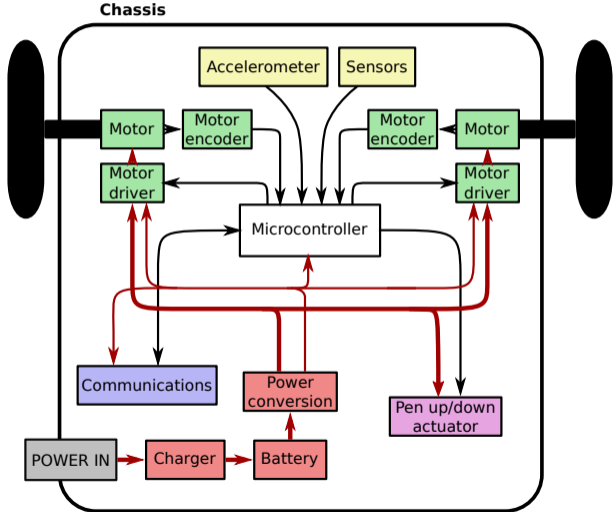
Functional requirements

- ▶ Mapping
- ▶ Turtle graphics
- ▶ Direct control

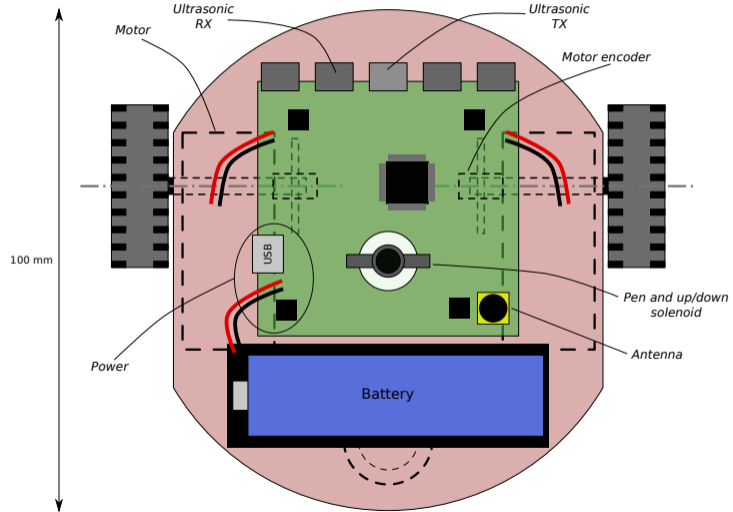
Non-functional requirements

- ▶ Cheap
- ▶ Easy to assemble
- ▶ Easy to test
- ▶ Easy to program, using all free tools
- ▶ Fun
- ▶ There's no such thing as cheating

System block diagram



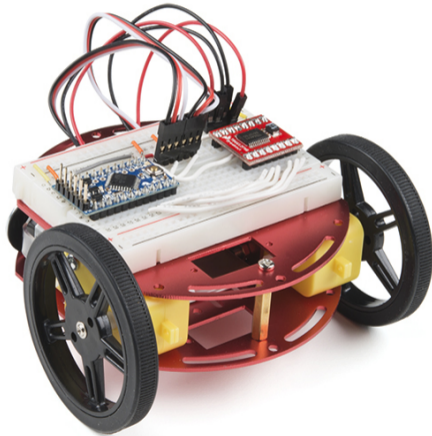
Rough mechanical design



Mechanical components



Mechanical components



Mechanical components



Software possibilities

- ▶ Direct control with game controller
- ▶ Turtle graphics (Logo interpreter?)
- ▶ Mapping (smarts on PC?)
- ▶ Autonomous mapping
(safety monitor + ML/GA mapper?)

Where to start?

Motor driver and encoder

- ▶ Prototype motor driver board
(like CE GoGoGo)
- ▶ Develop motor algorithms:
 - ▶ Odometry
 - ▶ Precise distances
 - ▶ Curves
 - ▶ Acceleration and braking

Where to start?

Communications

- ▶ Not Bluetooth!
- ▶ Infra-red? Maybe not.
- ▶ Some other radio band? ISM 434 MHz?
- ▶ Build a simple radio stack, end-to-end.

Where to start?

Ultrasonic sensors

- ▶ Transmit a pulse, time how long it takes to bounce back. Simple, eh?
- ▶ How do you drive the transmitter?
- ▶ What does the signal look like at the receiver?
- ▶ Amplification?
- ▶ Detection?
- ▶ Just pulse time?
- ▶ Or can you get more?

<https://www.skybluetrades.net/projects>

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