Lucerne University of
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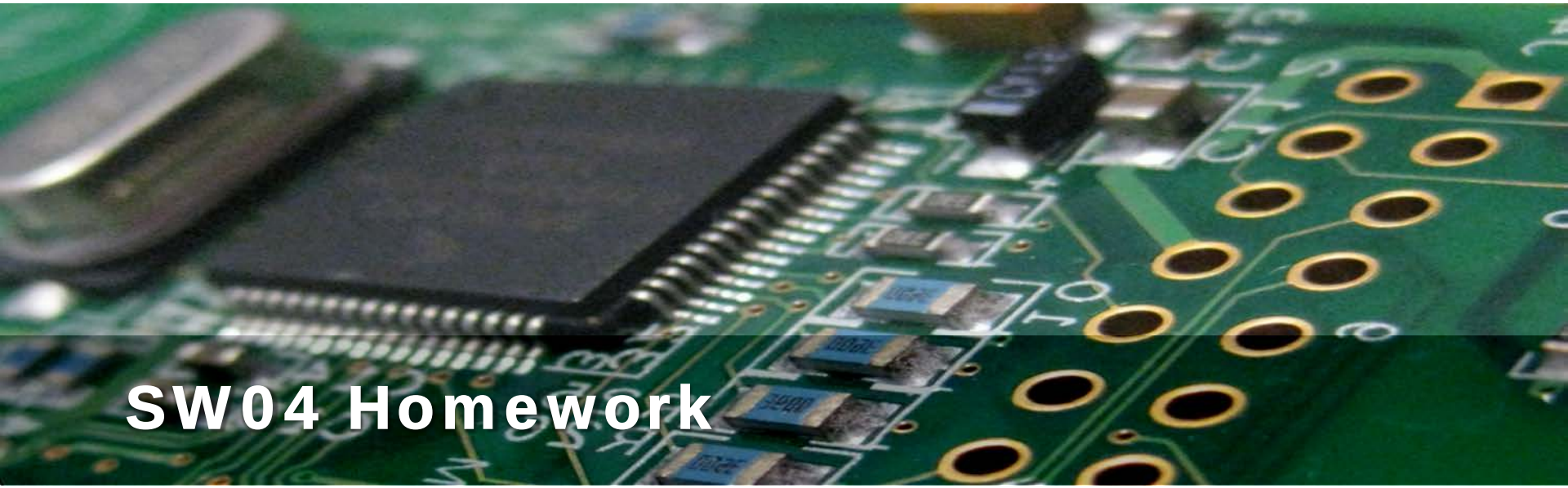

SW04 Homework

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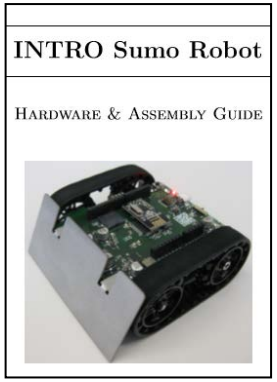
Homework / Self Study in SW04

- Self-Organized
- In preparation RTOS/FreeRTOS (~2.5h)
  - 2 Beningo Webinars
  - ➔Quiz?
- Robot (~2-3h)
  - Assemble 2nd team robot
  - ➔Testing functionality in SW05
- Prepare for SW05 (~2h)
  - Read
    - SW05a ARM Cortex.pdf
    - Script, Chapters 18.3 + 18.4
    - ➔ Questions and ‘fast forward’ in SW05

Jacob Beningo



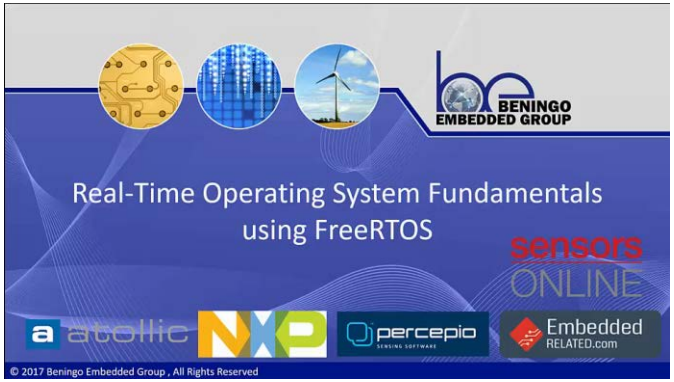
Webinar: RTOS Getting Started

- https://atollic.wistia.com/medias/icw37wn1ck
- bare metal or RTOS
- concurrency, scheduling
- RTOS characteristics
- Task Control Block
- Task states, context switching
- Creating task, blinking LED

Jacob Beningo

Webinar: RTOS Fundamentals

- https://attendee.gotowebinar.com/register/5368854085884518915
  - needs registration ☹
  - Source Code: http://beningo.us8.list-manage.com/track/click?u=ec02eb9313642ab1a1ef7b5fe&id=0abcf3204a&e=62dafd9570
  - Mutex, Semaphore, Queues
  - Task Synchronization



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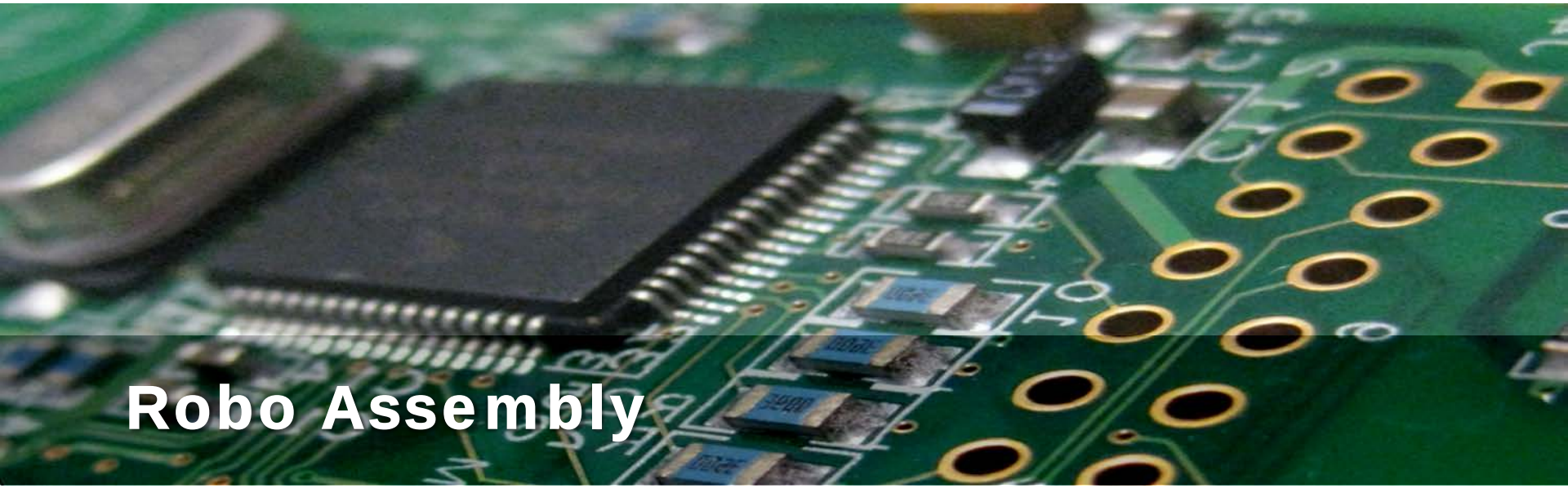

Robo Assembly

“Hopefully that works…”

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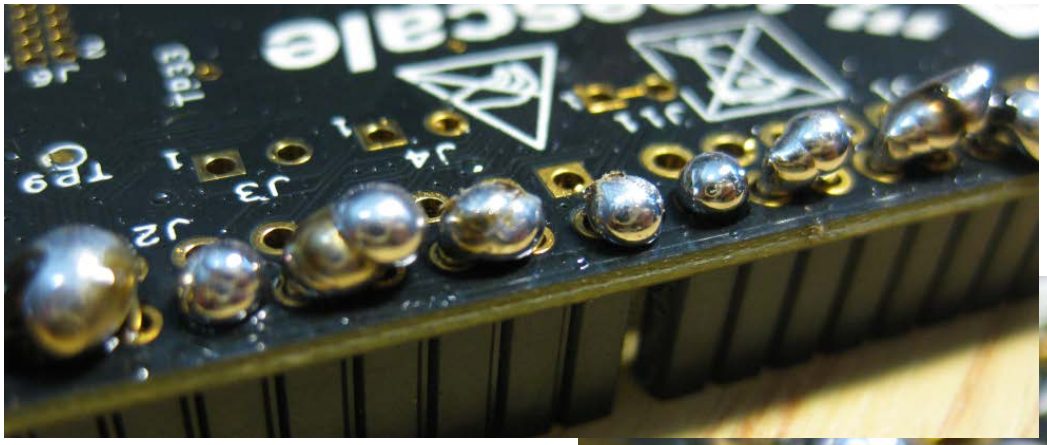
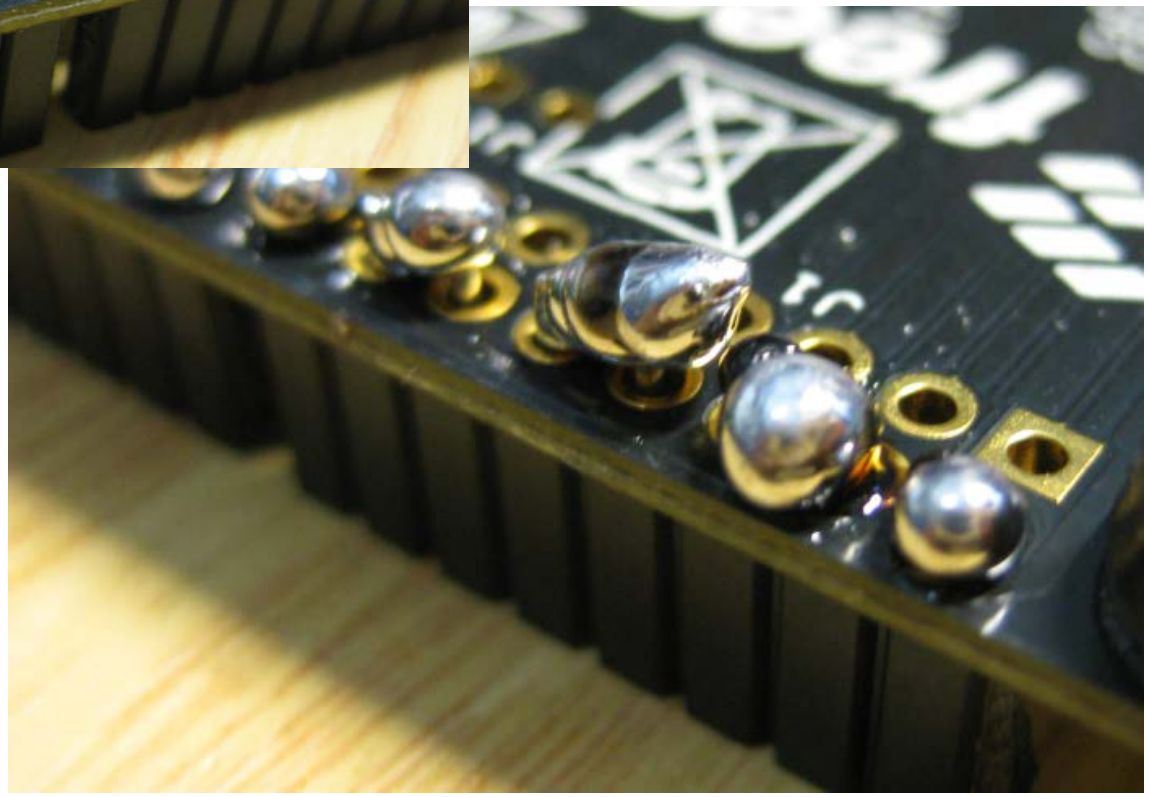
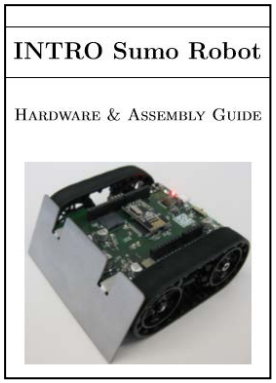
Ask for HELP to avoid THIS!





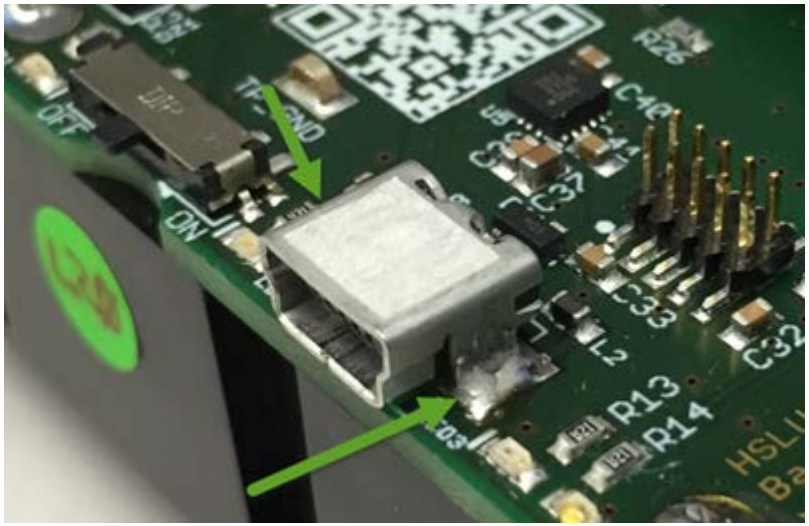
Material

- PCB plus Mini-USB
- 1 Chassis Kit
- 2 round Magnets
- 4 SMD Hall Sensors
- 2 Motors (1:75 HP)
- Headers (4pin ➔ workshop)
- 1 Blade
- 1 Reflectance Sensor Array
- 1 Stackable Arduino Header Set
- 1 2x12 SDM Header
- 1 nRF24L01+ Module
- Assembling Guide



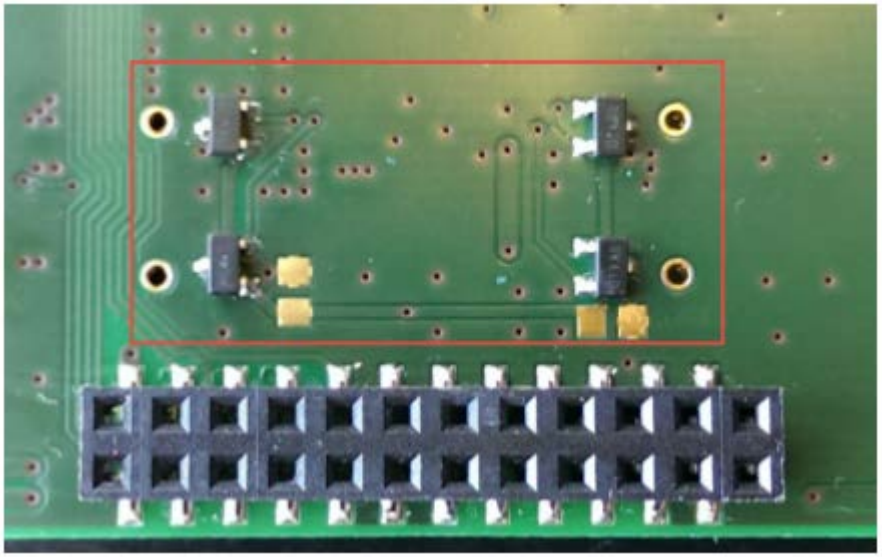
PCB Assembly

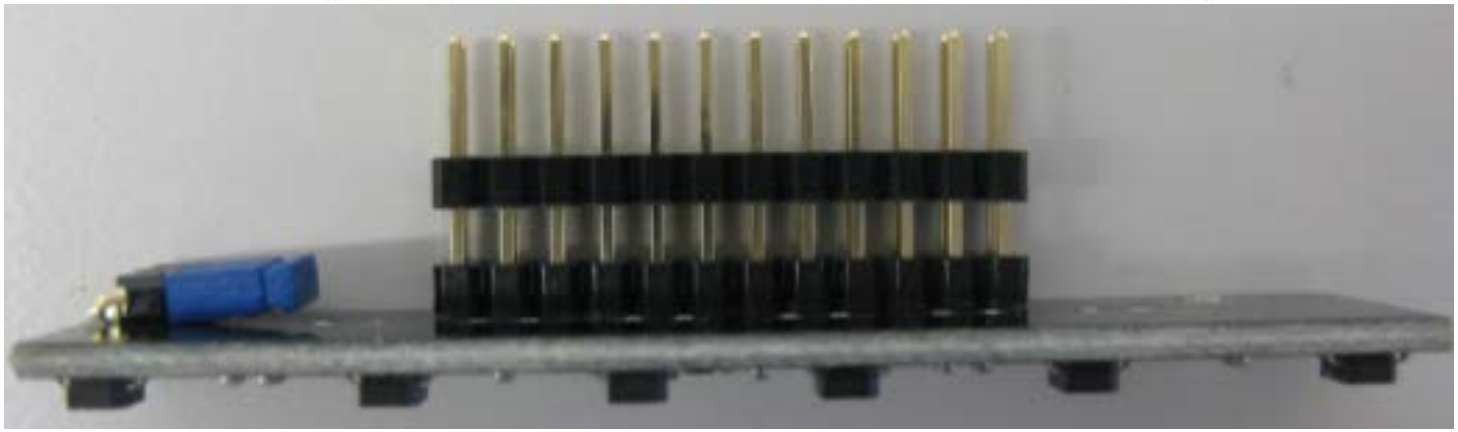
- Mount
  - Hall sensors, reflectance, headers
  - nRF24L01+ transceiver
  - Motors, battery connectors
- Have ‘flat’ PCB bottom side!
  - Cut pins before soldering
  - Isolate motors from PCB!
- Reinforce USB connector!



Hall Sensors and Reflectance

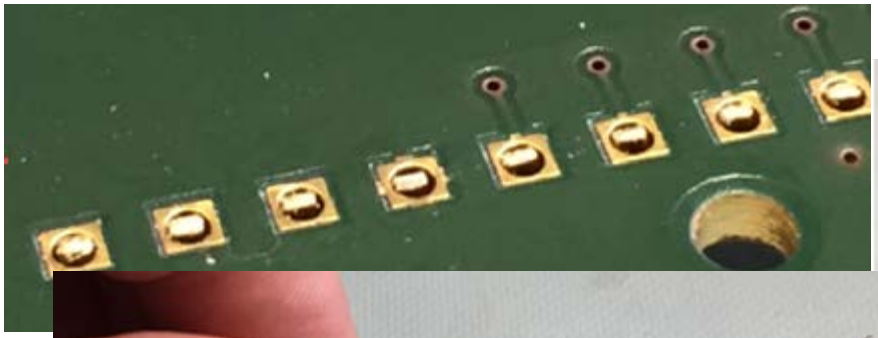
- SMD (get help!)

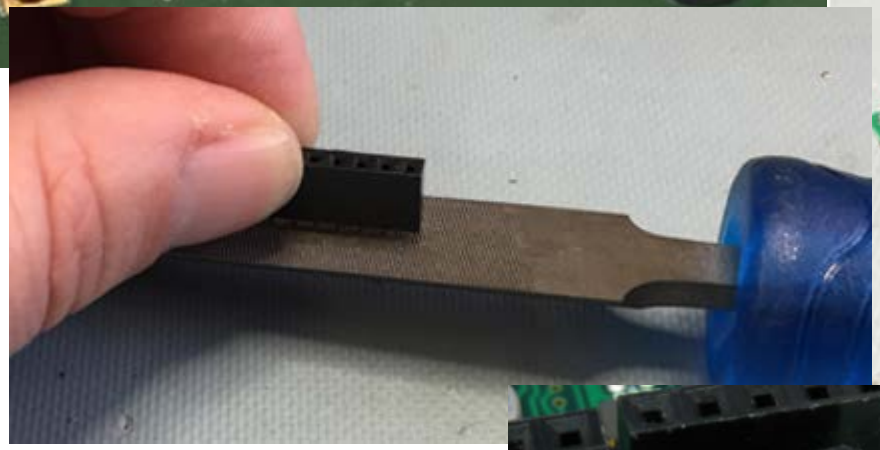


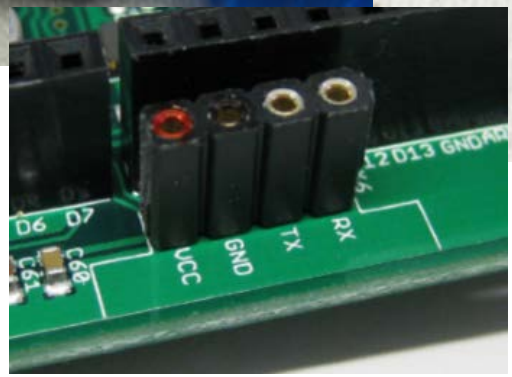


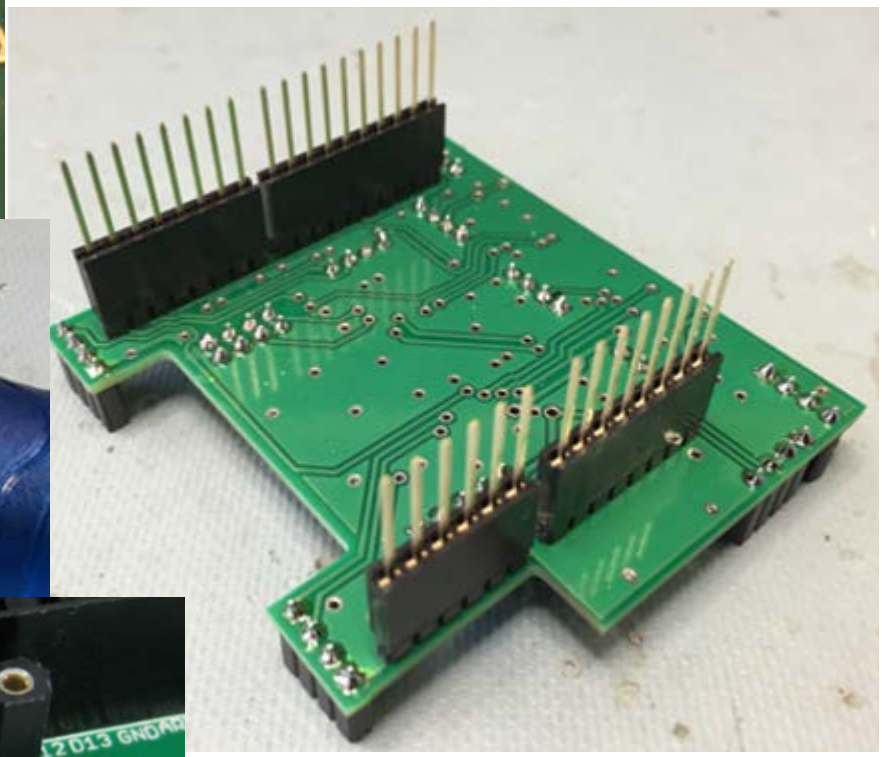
Headers

- The bottom of the board has to be as flat as possible!



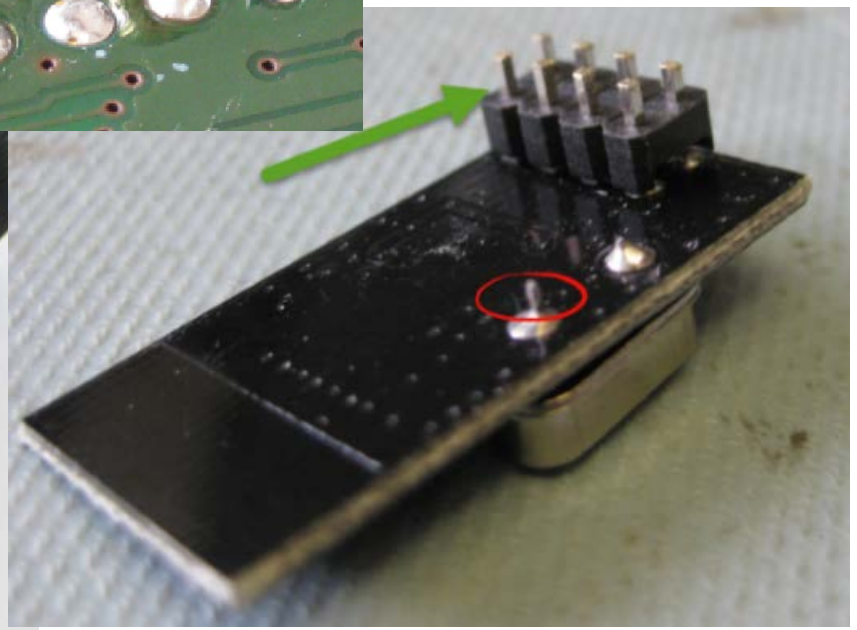


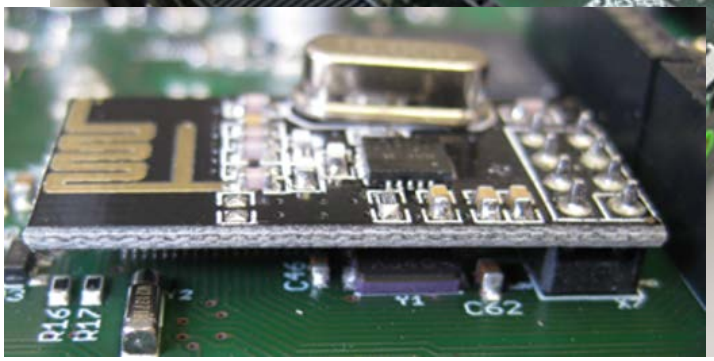




nRF Module

- Bottom of PC as flat as possible!
- Flatten quartz of module to avoid shortcut!
- Mount module horizontally aligned



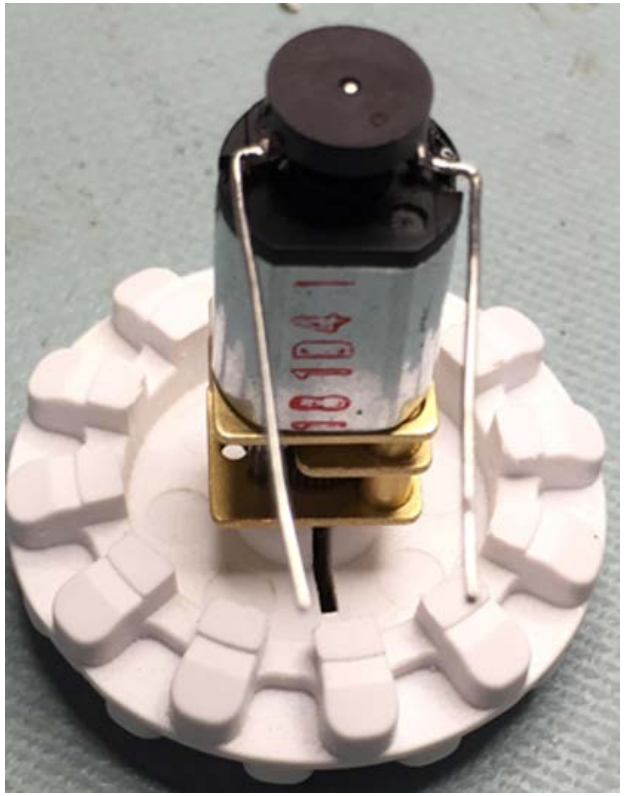


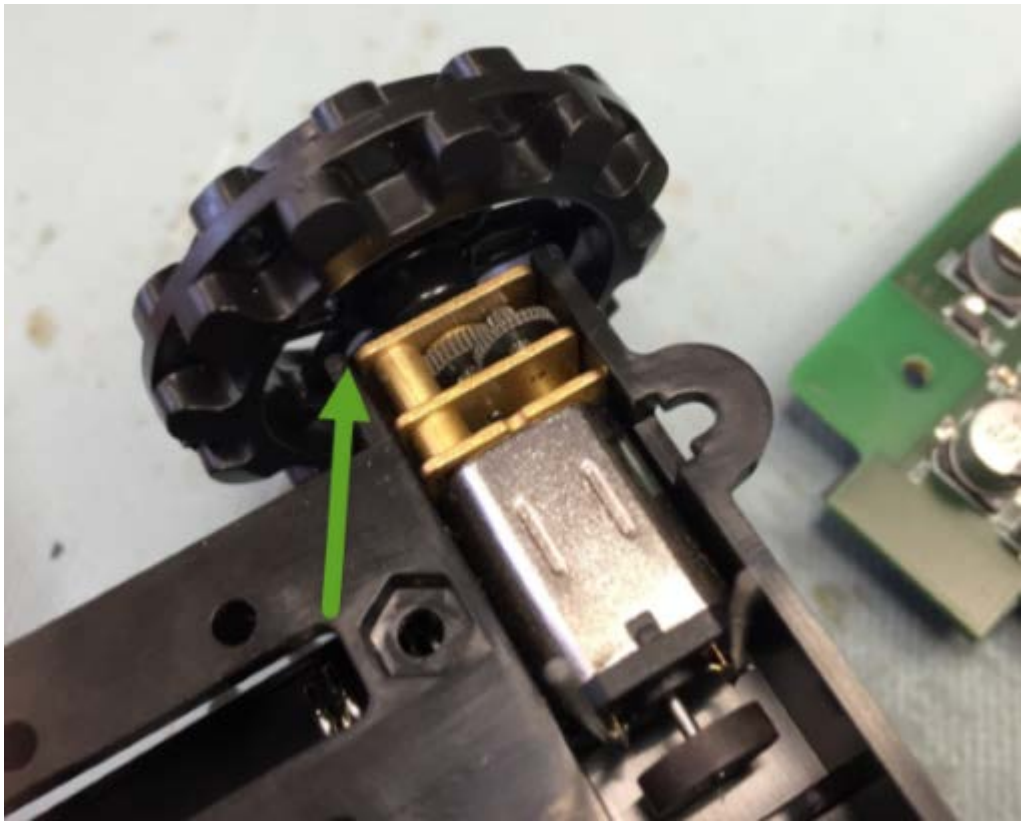
Front Wheels

- Use Band Filing
- Do not use too much force!

Motors

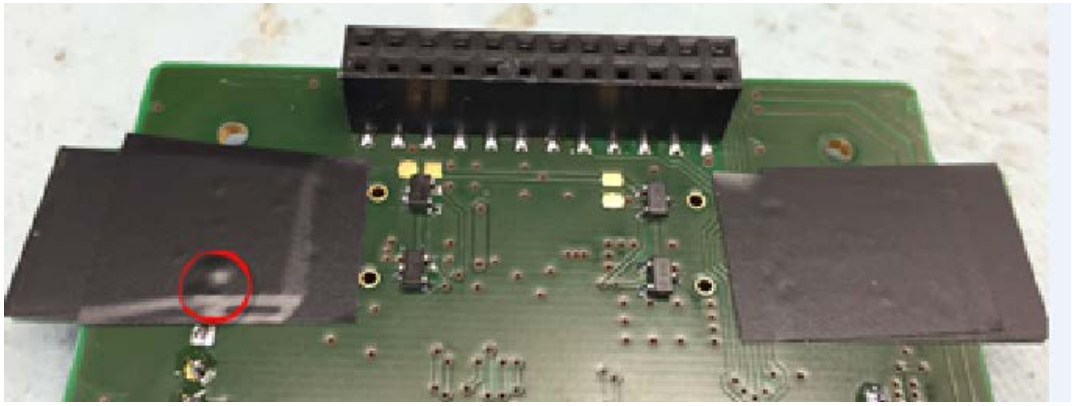
- Don’t forget to mount the magnets
- Properly align, check that gear is not blocked

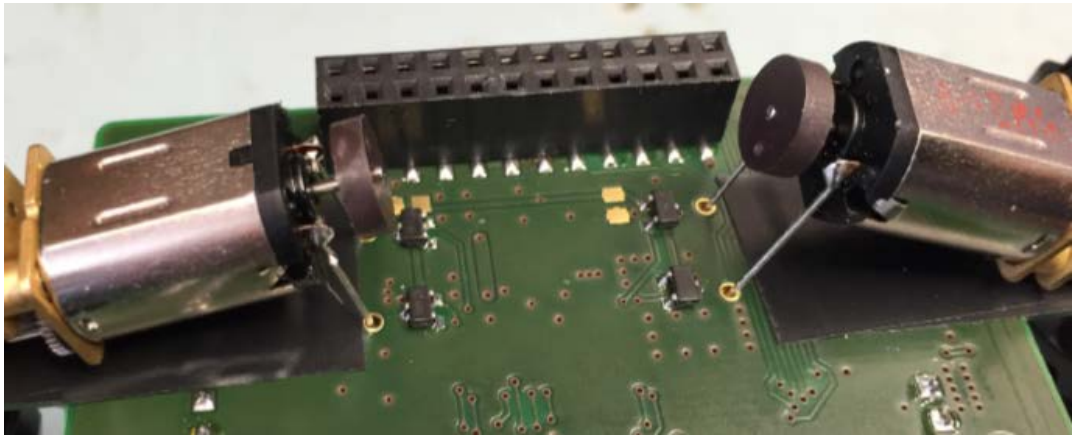




Mounting Motors

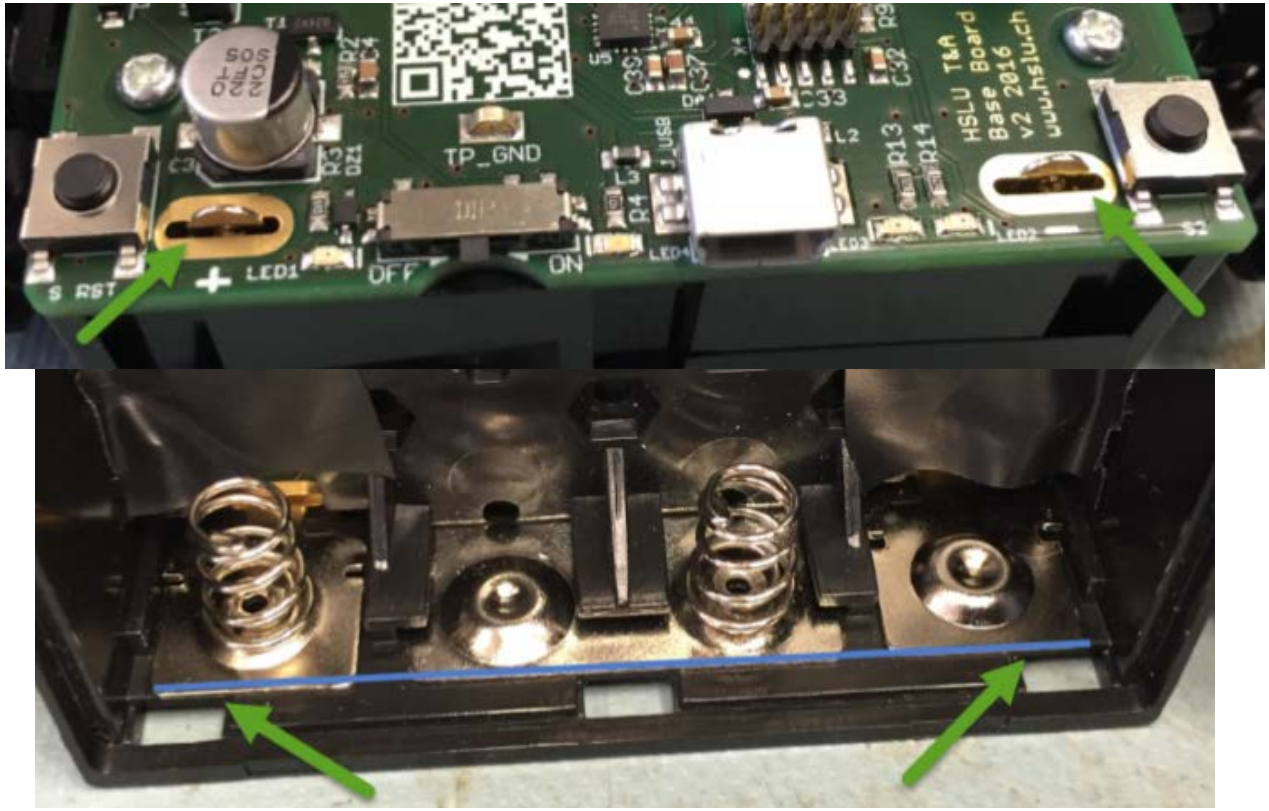
- Use 2 Layers of Electrical tape to avoid shortcuts
- Cut/file through hole pins





Battery Connector

- Match to the holes (PCB can be removed from chassis)
- Align Connectors (use tape to hold it in position for soldering)



Summary

- Get help, work together
- Organize yourself
- 4pin side header (for Bluetooth module): available in workshop area
- cut down white wheels
- avoid shortcuts
  - Motors with PCB
  - nRF module with microcontroller
- Make bottom of PC as flat as possible
- Instructor can test functionality with test program (SW05)