



E2.05 – Mazed & Confused

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Sponsors: Mr. Naidu & Mr. Brown / NXP



Overview

Create an autonomous robot that successfully and efficiently traverses a maze.

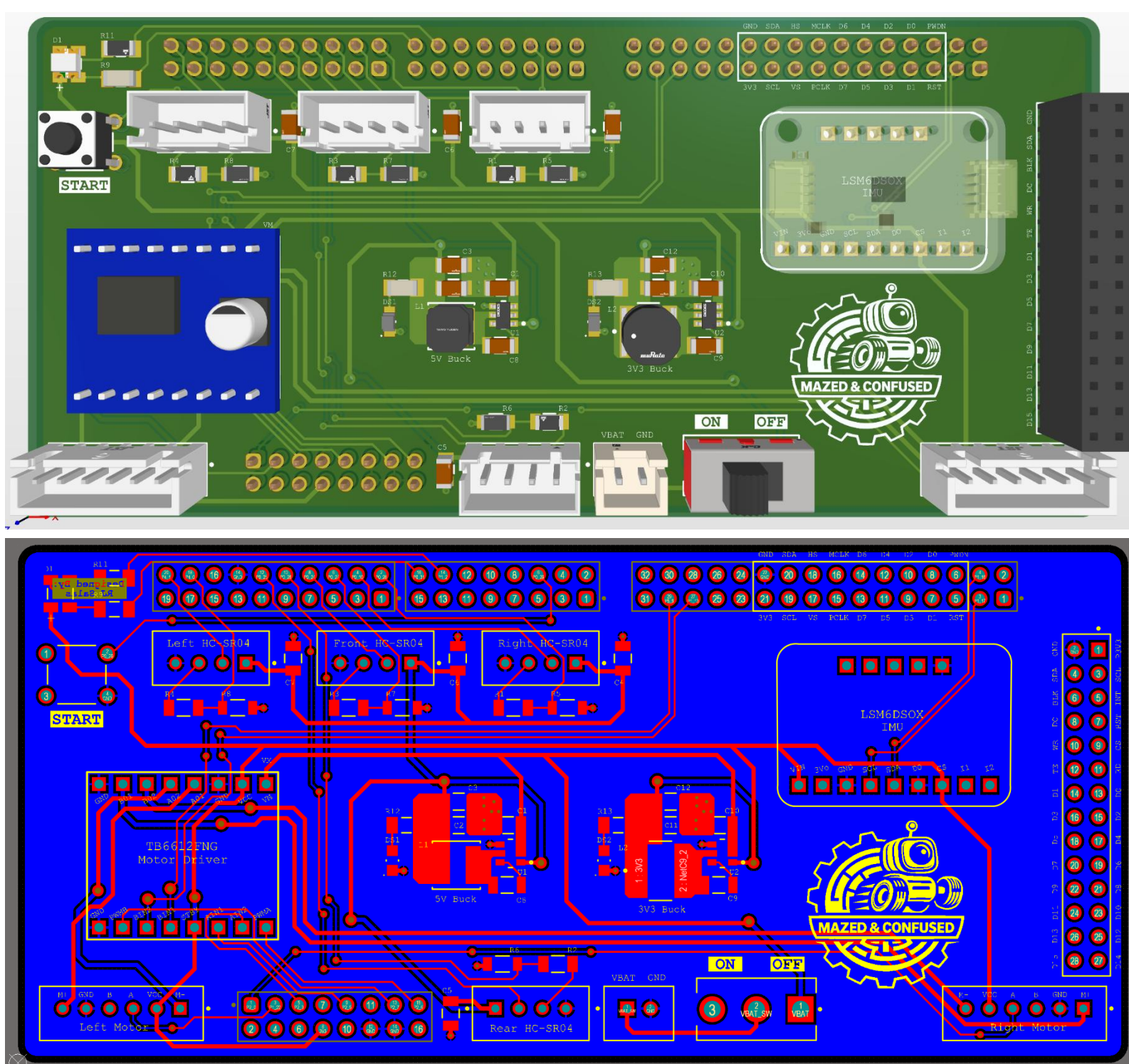
EE4390 D2 Requirements

- Functional PCB design
- A more complicated maze
- Map the maze in under 5 minutes followed by a speed run.
- Correctly interpret directional signage.
- Fit within the \$60 budget

D2 Achievements

- True PWM and encoders are implemented.
- PCB based design functions properly.
- Robot traverses' course within time allotment.
- Sensors successfully detects walls.
- Camera successfully detects signage.

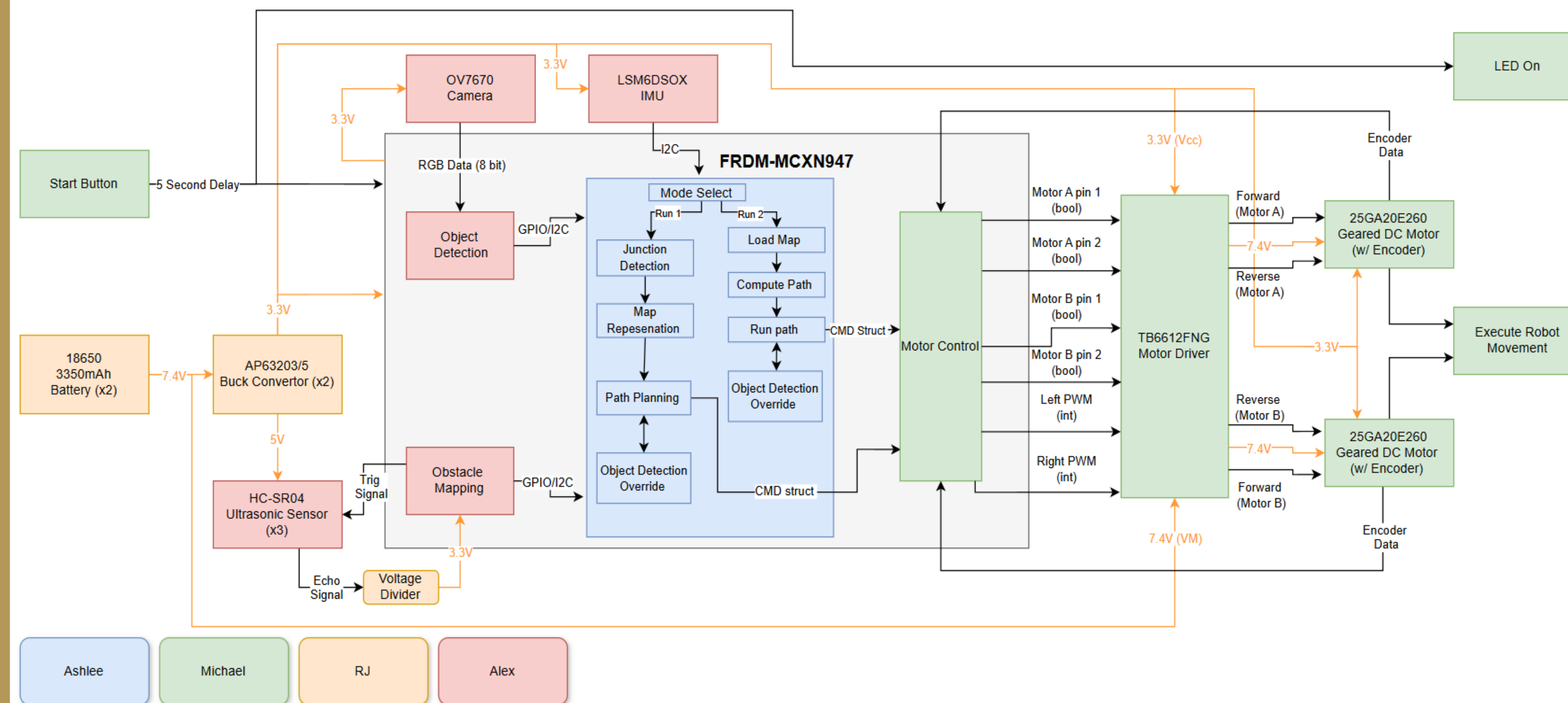
PCB



Acknowledgements

Sponsor: Avinash Naidu, Chris Brown
Faculty Advisor: Mark Welker

Top Level Hardware Block Diagram



Meet The Team

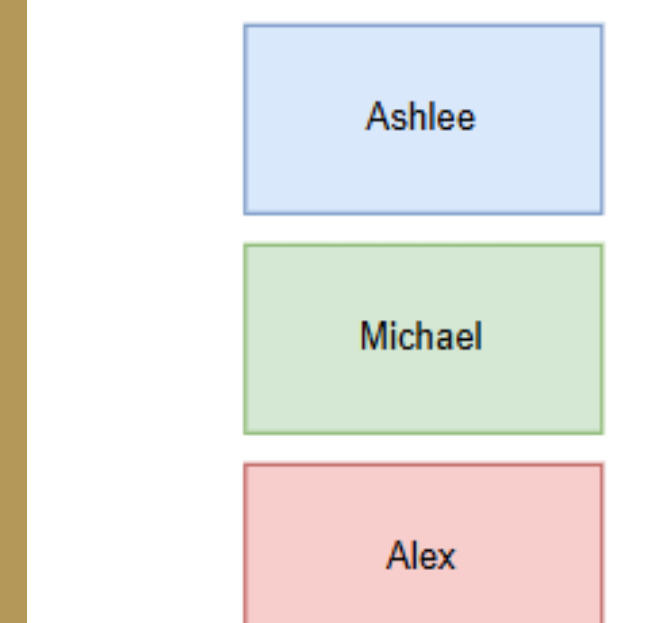
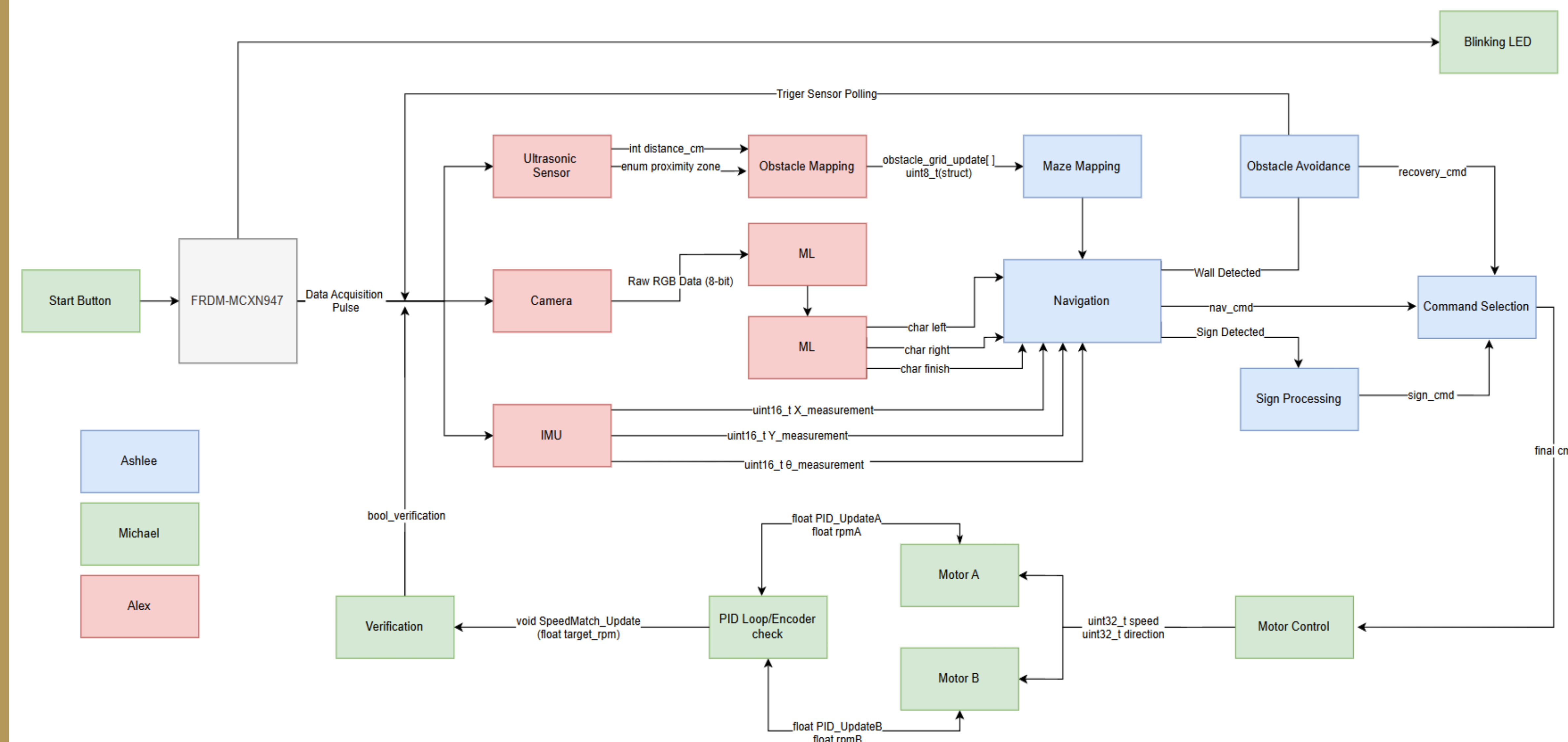


- | Ashlee | Michael | Alex | RJ |
|---|---|--|--|
| <ul style="list-style-type: none"> ▪ Mapping ▪ Navigation | <ul style="list-style-type: none"> ▪ Movement & Motor ▪ Start/LED Indicator | <ul style="list-style-type: none"> ▪ Object Detection | <ul style="list-style-type: none"> ▪ Project Manager ▪ Power ▪ PCB ▪ Chassis |

Cost & Budget

Component	Quantity	Unit Cost	Subtotal
FRDM-MCXX947 MCU	1	\$25.00	\$25.00
PCB	1	\$4.23	\$4.23
OV7670 Camera	1	\$2.30	\$2.30
LSM6DSOX IMU	1	\$11.95	\$11.95
HC-SR04 Ultra. Sensor	3	\$1.30	\$3.90
TB6612FNG Motor Driver	1	\$2.61	\$2.61
Geared DC Motor with Magnetic Encoder Outputs	2	\$13.50	\$27.00
2S 18650 Lithium-ion Pack	1	\$14.15	\$14.15
AP63203/5 Buck Converter	2	\$1.20	\$2.40
Total Cost			\$93.54

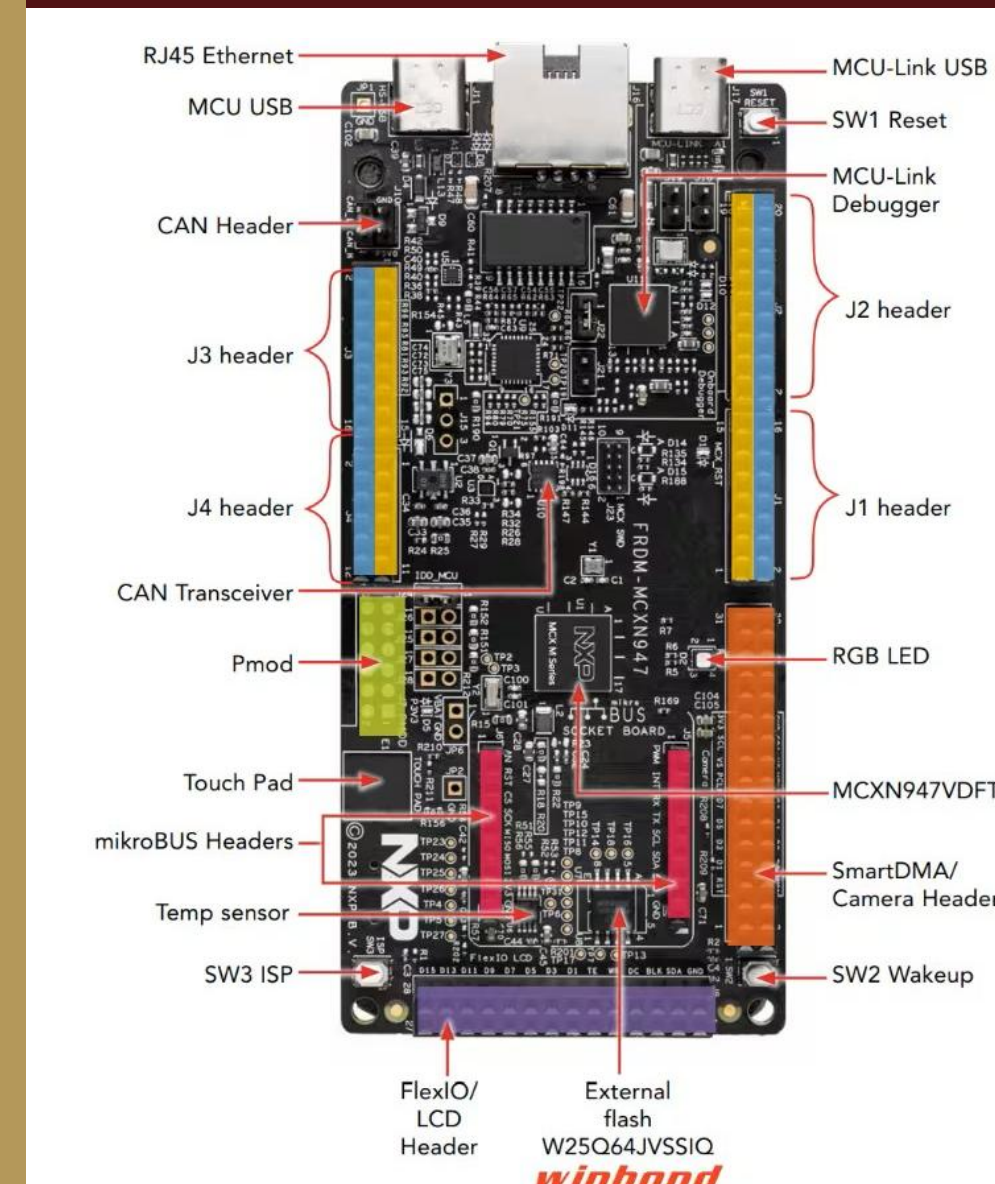
Top Level Software Block Diagram



Battery Life

Operating Condition	Battery Life (Hours)
Nominal (Typical)	6 Hours
Maximum (Worst-Case)	3.5 Hours

FRDM-MCXX947



Features:

- NPU acceleration
- ML/AI capabilities
- External storage
- WiFi module
- Stand alone IDE
- NXP community