E1.04 – NXP Peripheral Integration

TEXAS STATE UNIVERSITY
Ingram School of Engineering

Andrew Muegel, Matthew Coffelt, Stephen Lorenzen, Alexy Larios
Project Sponsor and Faculty Advisor: **Mr. Welker**

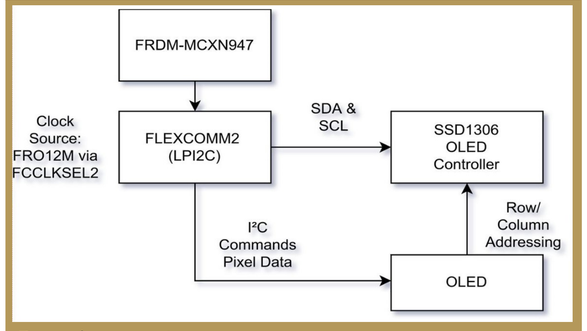
NXP

Objective

Program a low-cost replacement for the EE3420 Microprocessors course's lab equipment.

Requirements:
- Research and implement all code needed to make the FRDM board talk to the requested components.

OLED Display



Requirements:
- 3V3 supply
- Communication: I²C via FLEXCOMM2 (LPI2C)

Switches and LED's

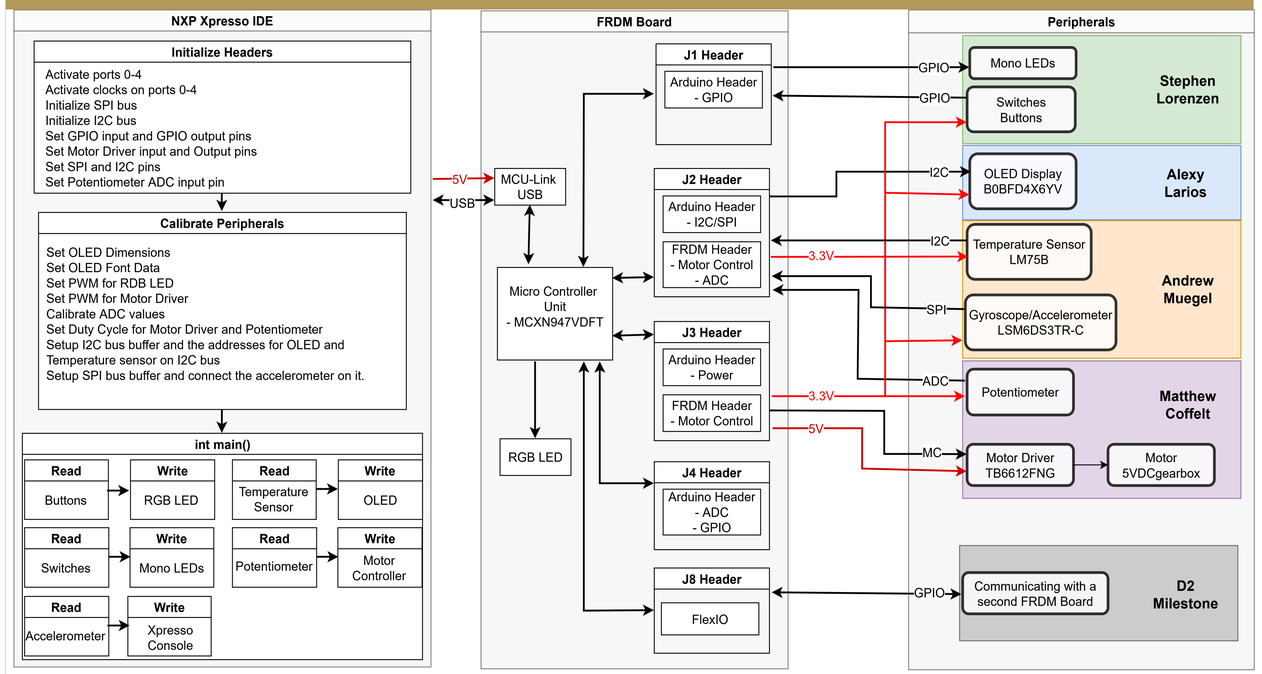
Switches, Buttons, and LEDs:
- Run with 3.3V at 20mA

RGB LED:
- Built into the FRDM Board
- Programmed with pulse width modulation

Acknowledgements

Sponsor and Advisor:
Mark Welker
Senior Design Partner Team:
E1.03: Diamond Dogs

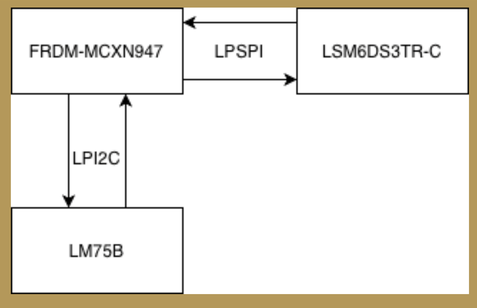
Information



IMU and Temp Sensor

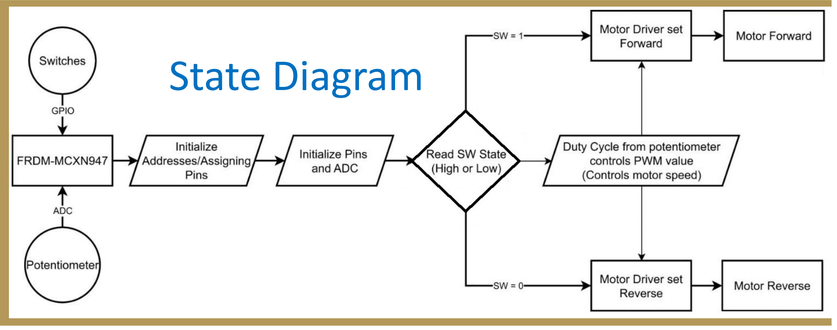
Inertia Module provides movement data:
- Runs at 3.3V
- Uses SPI for communication

LM75B provides temperature information:
- Runs at 3.3V
- Communicates over the I2C Bus



Motor Driver

Requirements:
- Drive Voltage (VM): 4.5V – 10V
- Logic Level (VCC): 2.7V – 5.5V
- Working current: 1.2A
- Duty cycle 0-255

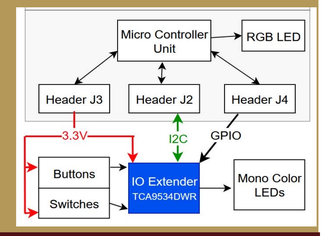


The Team

Alexy Larios | Stephen Lorenzen | Andrew Muegel | Matthew Coffelt

D2 Goals

- Test code with Team #1.03 PCB
- Write a lab manual for future students
- Implement an IO Extender to free up pins.



D1 Accomplishments

- Researched and experimented with MCUXpresso to become familiar with it
- All subsections created and/or found the necessary libraries to make the peripherals functional
- Port/bus layout has been established with the NXP #1.03 Peripheral Shield Team
- Documentation in progress to guide and allow the Microprocessors course to thrive without encountering hardware issues.

FRDM Layout