

# The Proposal

The proposal contains four sections whose purpose is to articulate:

- 1. Introduction**

What is your problem? Why is it important? How do you propose to solve it? What is different about your approach?

- 2. Design and Requirements**

How will you implement your proposed solution?

What are the requirements each component needs to satisfy?

What is the most difficult part?

- 3. Ethics and Safety**

- 4. References**

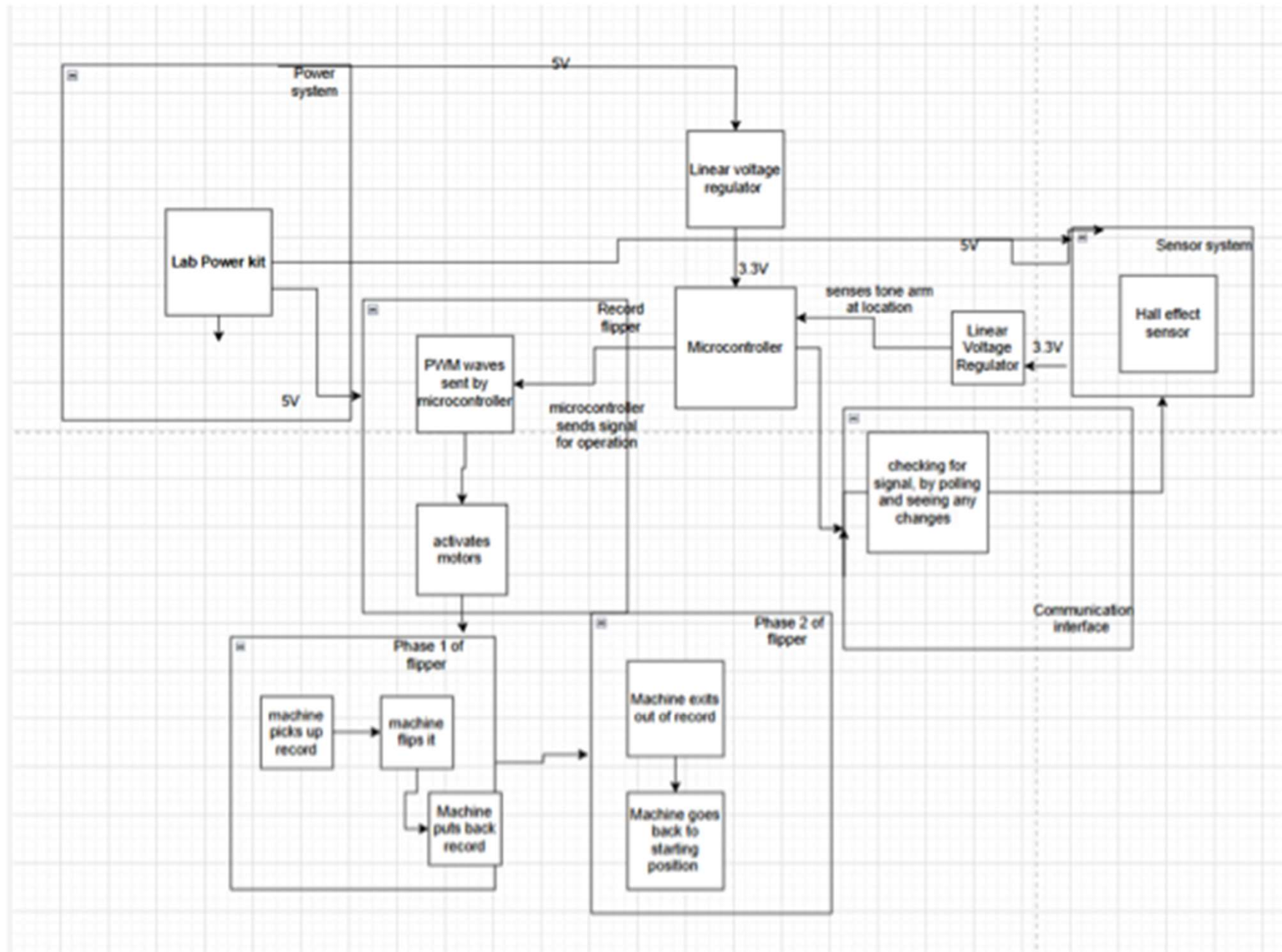
# 1. Introduction

- **Title page**
  - Project title, team number, team members, TA, Instructor, Course No.
- **Problem and background**
- **Solution with visual aid**
- **High-Level Requirements**
  - What quantitative characteristics must your project exhibit to solve the problem?
  - Maximum of 3 – in complete sentences

## 2. Design

- **Block Diagram** – How are components connected?
  - Each block is a subsystem
  - Show power connections and flow between blocks
  - Show signals and data flow between blocks
  - Modularity: each block is a self-contained subsystem with inputs and outputs
- **Subsystem Descriptions**
  - System summary
  - Description of each subsystem and how it connects to others
  - Important subsystems typically include power, controller, sensor, actuator, and display components
  - Communication methods and microprocessor needed
- **Subsystem Requirements** – quantitative and testable
  - Not from datasheets
- **Tolerance Analysis** – Which requirement will be most difficult?

# A Bad Block Diagram



# A Much Better Block Diagram

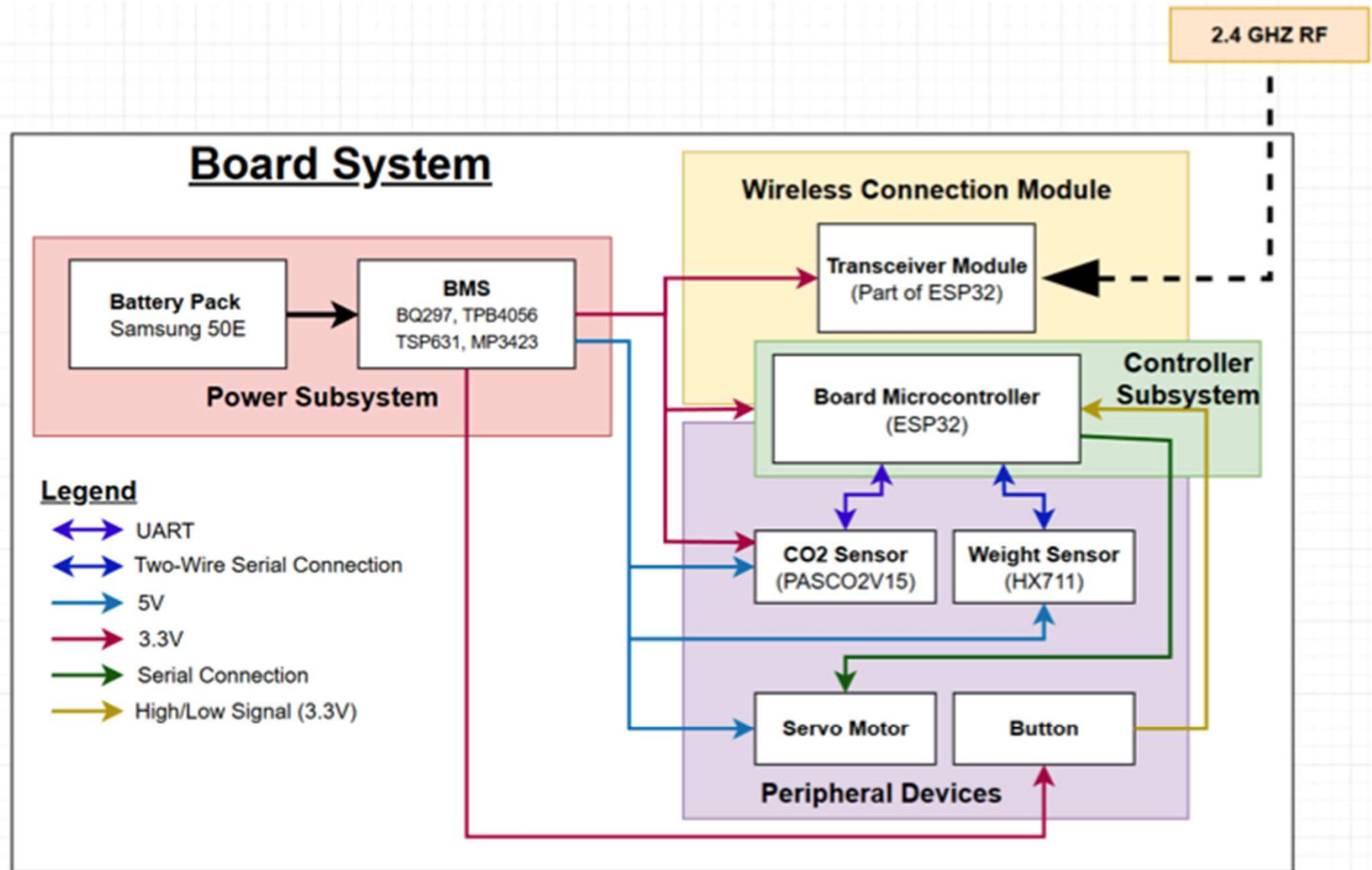


Figure 4.4 - Block Diagram of components

### 3. Ethics and Safety

- Refer to IEEE/ACM codes of ethics and course ethics guidelines
- Understand how these codes relate to your project
- Discuss ethical concerns for your project – if none justify yourself
- Refer to course safety guidelines page
- Discuss safety concerns
  - Electrical safety
  - Mechanical safety
  - Lab safety
  - Consider safety of yourselves and end users
  - If you have hazardous elements to your project, you may need special training and adopt special procedures for your project.

## 4. Citations and References

- A list of references formatted using the IEEE standard
- Should include things like
  - Textbooks or data sheets
  - Informative articles or tutorials used
  - IEEE code of Ethics
  - Internet (YouTube) links may be included but are not considered references by themselves
  - Let us know if you are carrying over projects from other places (classes, startups, student teams, ECE 445 project ...)

# The Proposal Review

- 30-min. presentation of proposal document
  - Teams will talk from proposal document
  - Discuss block diagram
  - Summarize power, controller, sensor, activator, and display subsystems.
  - Discuss choice of wi-fi, Bluetooth, other wireless communications systems
  - Microprocessor choice
  - Most challenging requirement
- Attended by instructor, two TAs, and peer reviewers
  - Look at scope and complexity
- Receive final project approval
- See Proposal Review grading rubric



# The Design Document

- The design document communicates the complete and detailed design of your project
- It consists some of the same sections as the proposal but is substantially more detailed and includes new project information
- It should reflect any changes made to the project
- The design section will be more detailed and contain new information
  - The block diagram should contain more information about voltages, currents, and signals
  - The physical diagram of the project should indicate physical dimensions, placement of sensors and actuators, and be accompanied by a descriptive paragraph

# The Design Document, continued (1)

- There should be a highly detailed and quantitative description for each subsystem
- Supporting material may include circuit schematics, simulations, calculations, measurements, flow charts, mechanical diagrams
- Requirements and Verifications Table
  - Provide verification procedure for each requirement
  - Do not include information from datasheets
- Tolerance Analysis
  - Identify most challenging requirement and show mathematically that subsystem design can be feasibly implemented and meet its requirement
- PCB Design
  - Circuit and board schematics
  - Passed audit?

# The Design Document, continued (2)

- Cost and Schedule
  - Bill of materials
  - Labor cost
  - Schedule: timetable of expected sequence of design, lab, and purchasing tasks broken down among team members
- Ethics and Safety
  - Expand on ethical and safety issues raised in your proposal
  - Document procedures to mitigate the safety concerns of your project
  - Project with high-risk factors are required to produce a Safety Manual
- Citations
  - Proposal reference list must be updated