LAB 4– "ADDING FUNCTIONALITY" REPORT

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TABLE OF CONTENTS

LIST OF FIGURES

1.0 SOFTWARE IMPLEMENTATION

We did the extra credits for the Data Logging task.

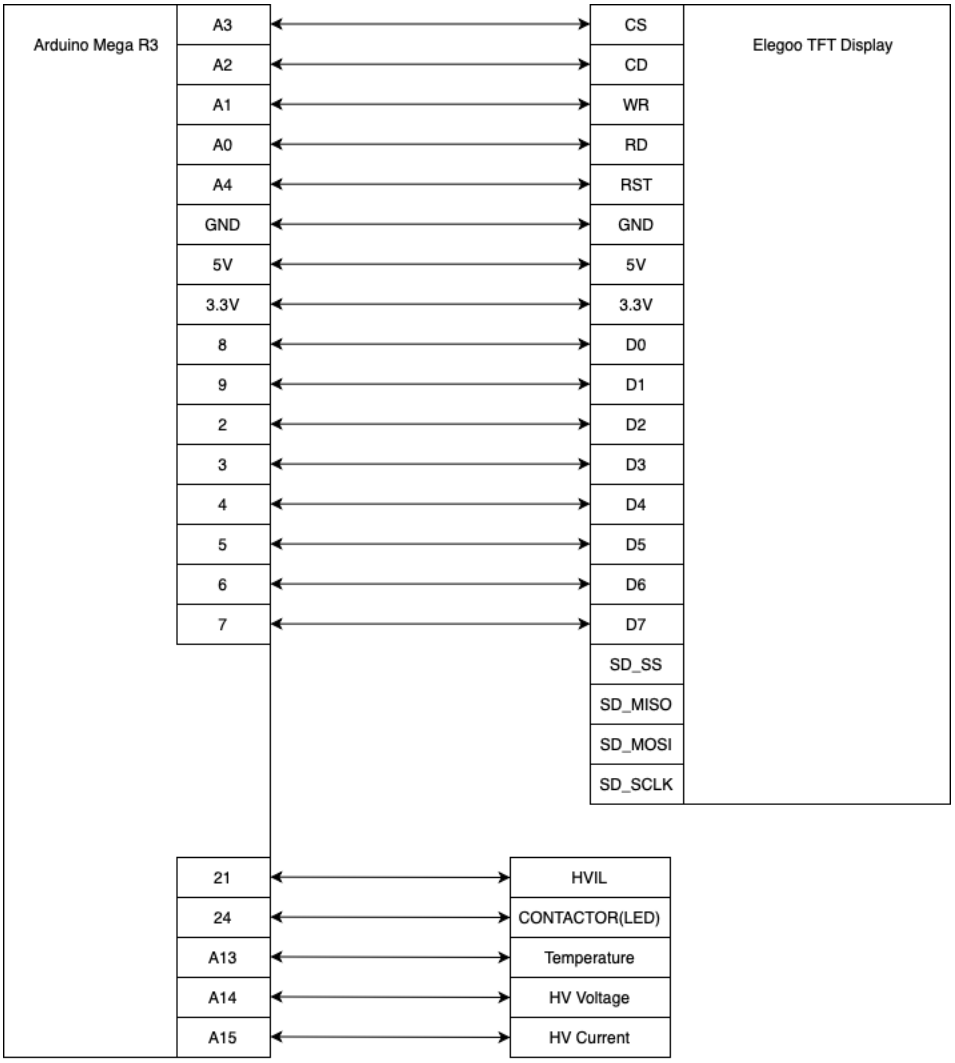


Figure 1. System Block Diagram - showing the ATMega input and output ports (and port numbers) labeled per I/O component

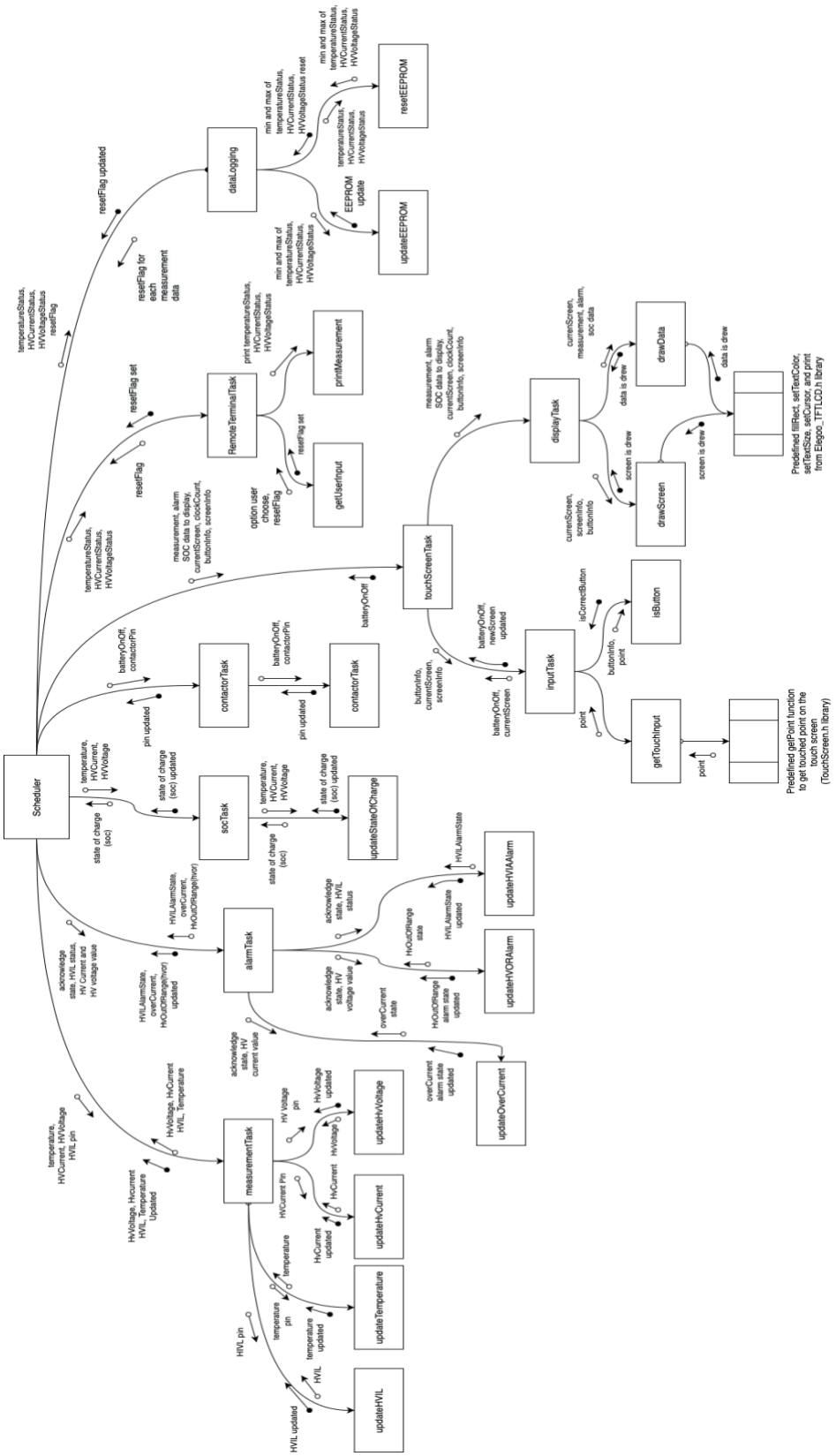


Figure 2. Structure Diagram - showing functional decomposition of tasks within the System Controller

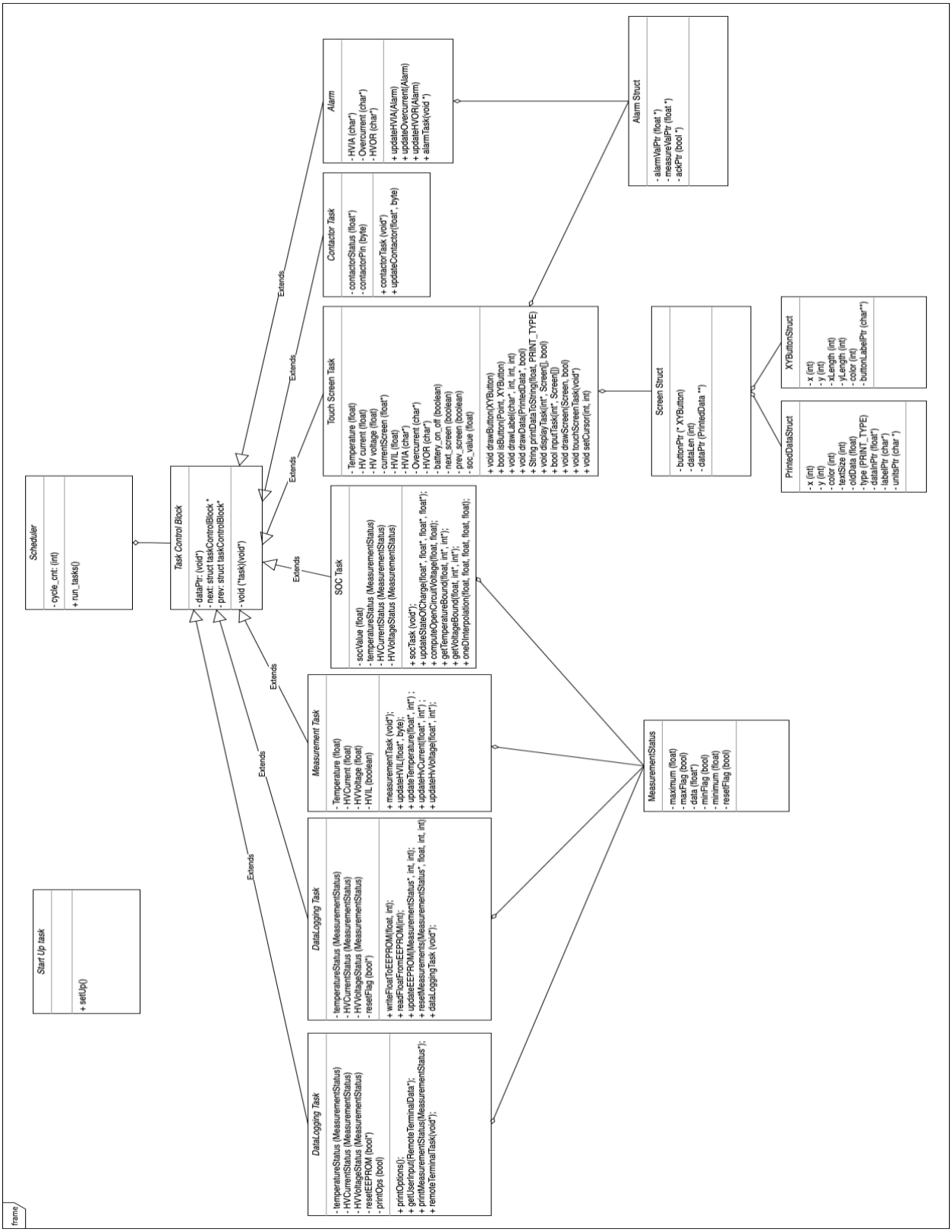


Figure 3. Class diagram - showing the structure of the tasks within the System Controller as reflected in the Structure Diagram.

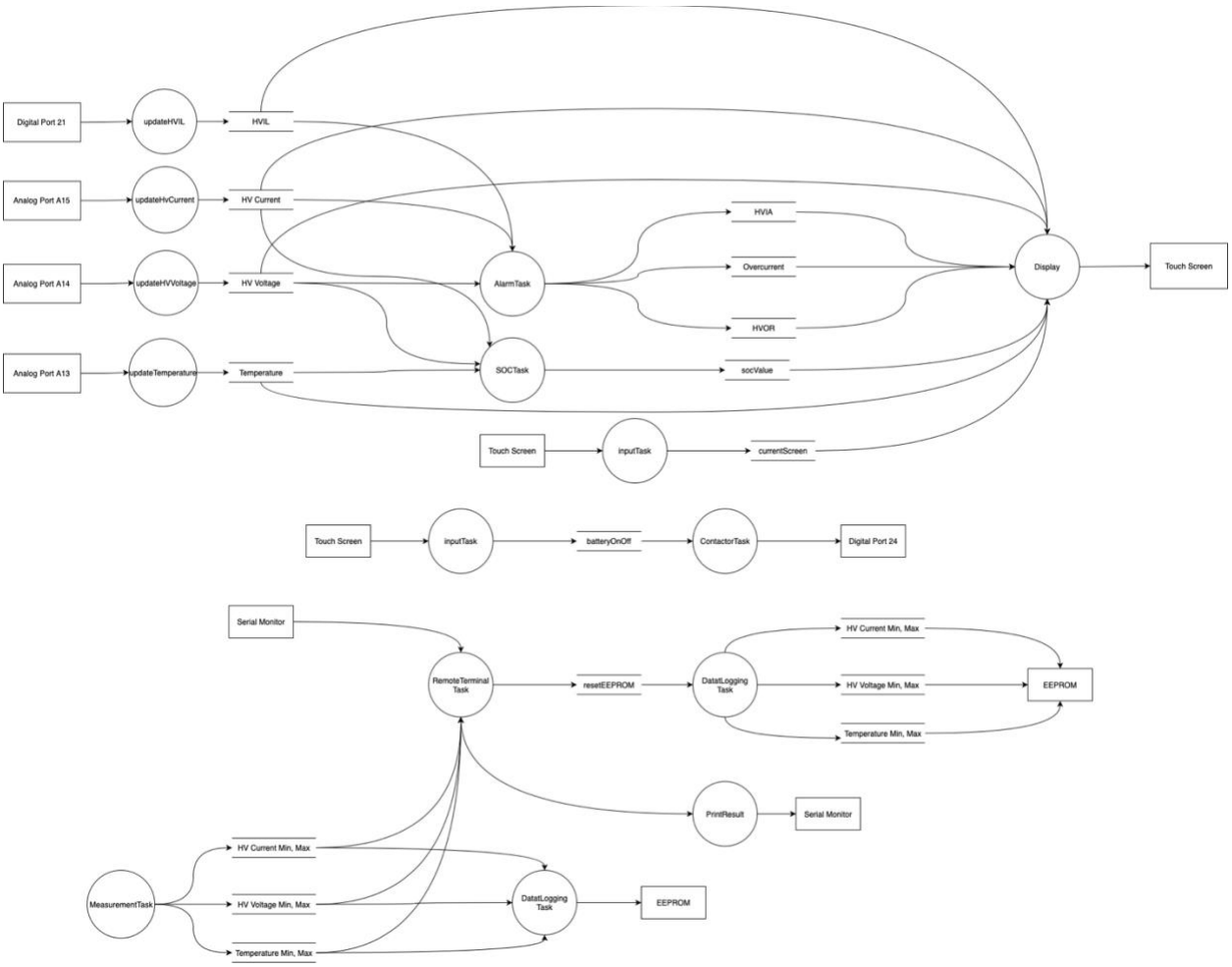


Figure 4. Data flow diagrams - shows data flow for inputs/outputs

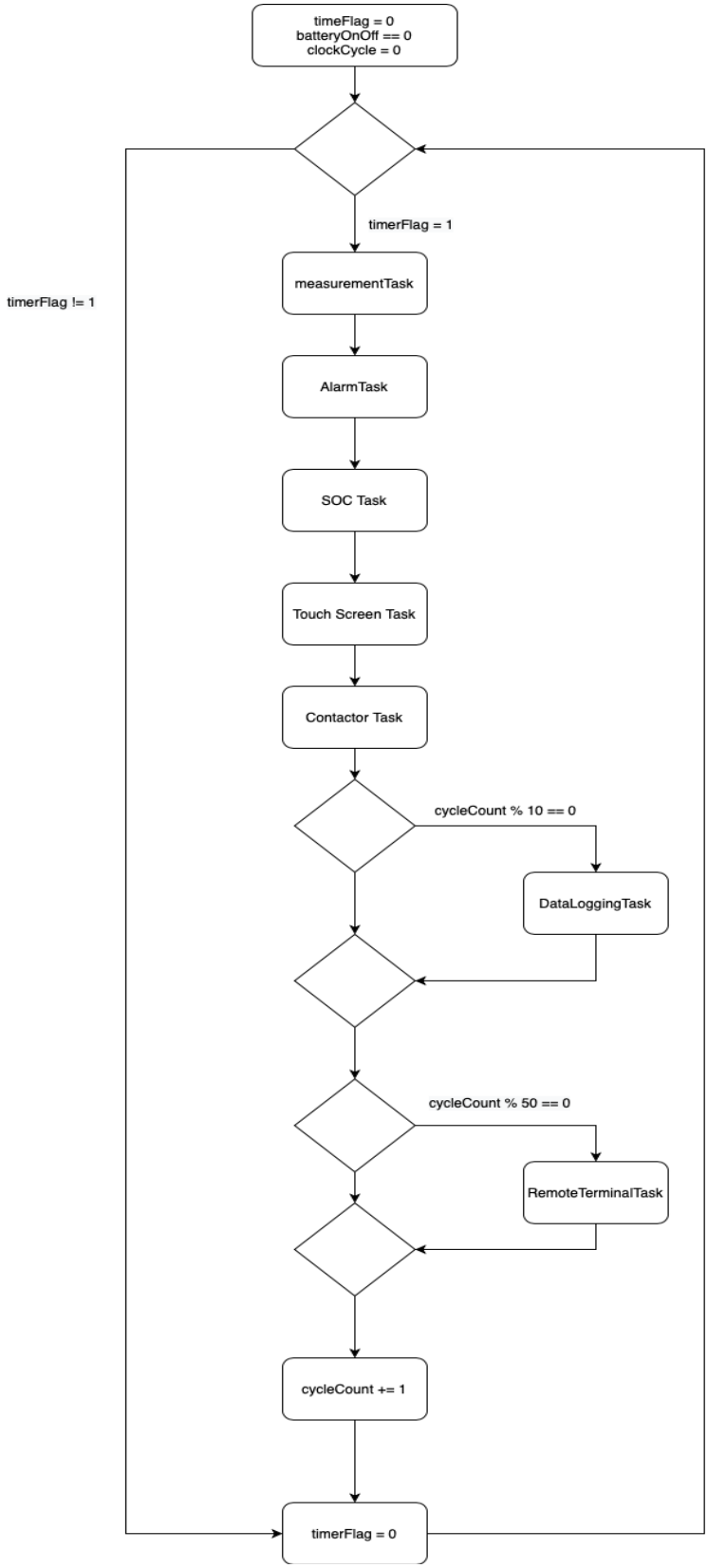


Figure 5. Activity Diagram - shows the System Controller's dynamic behavior from the initial entry in the loop() function

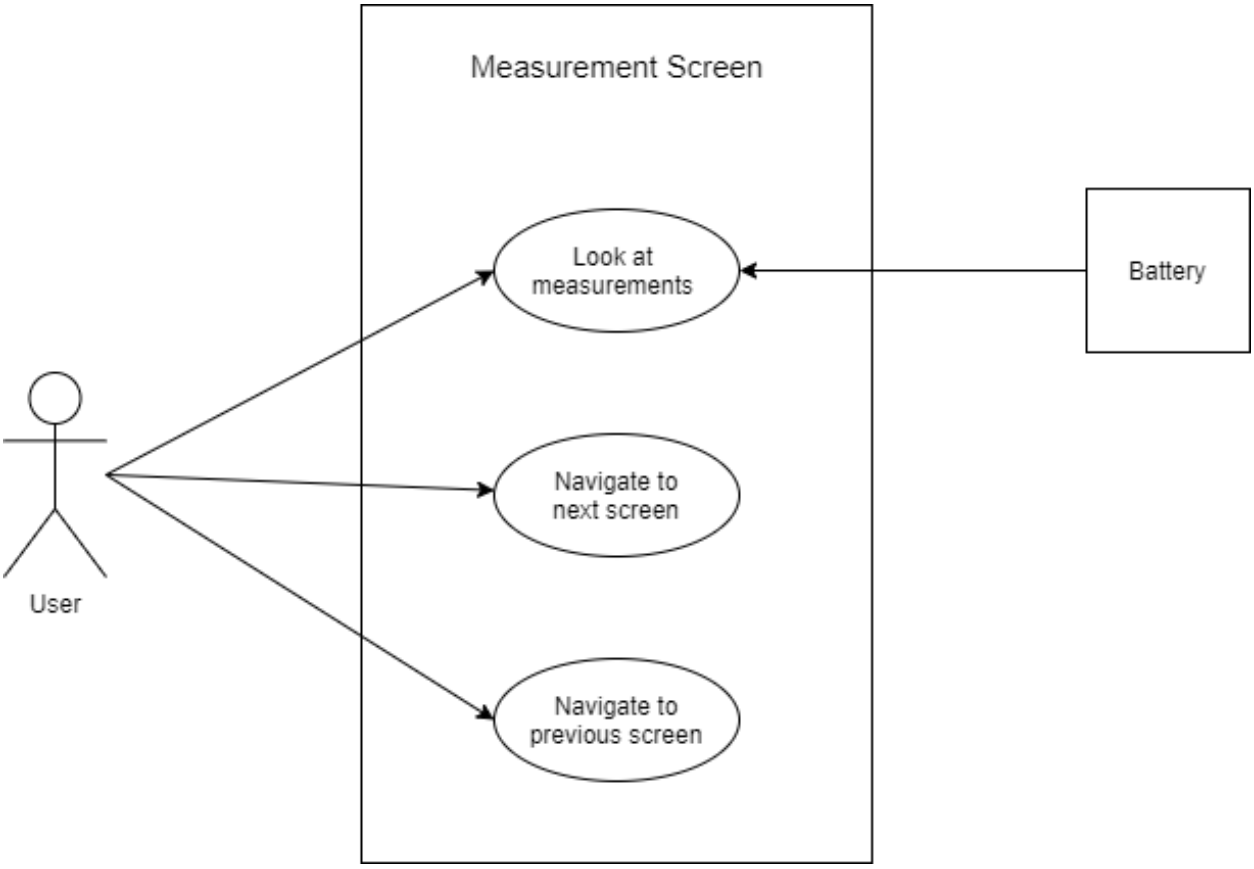


Figure 6. Use Case Diagram for Measurement Screen

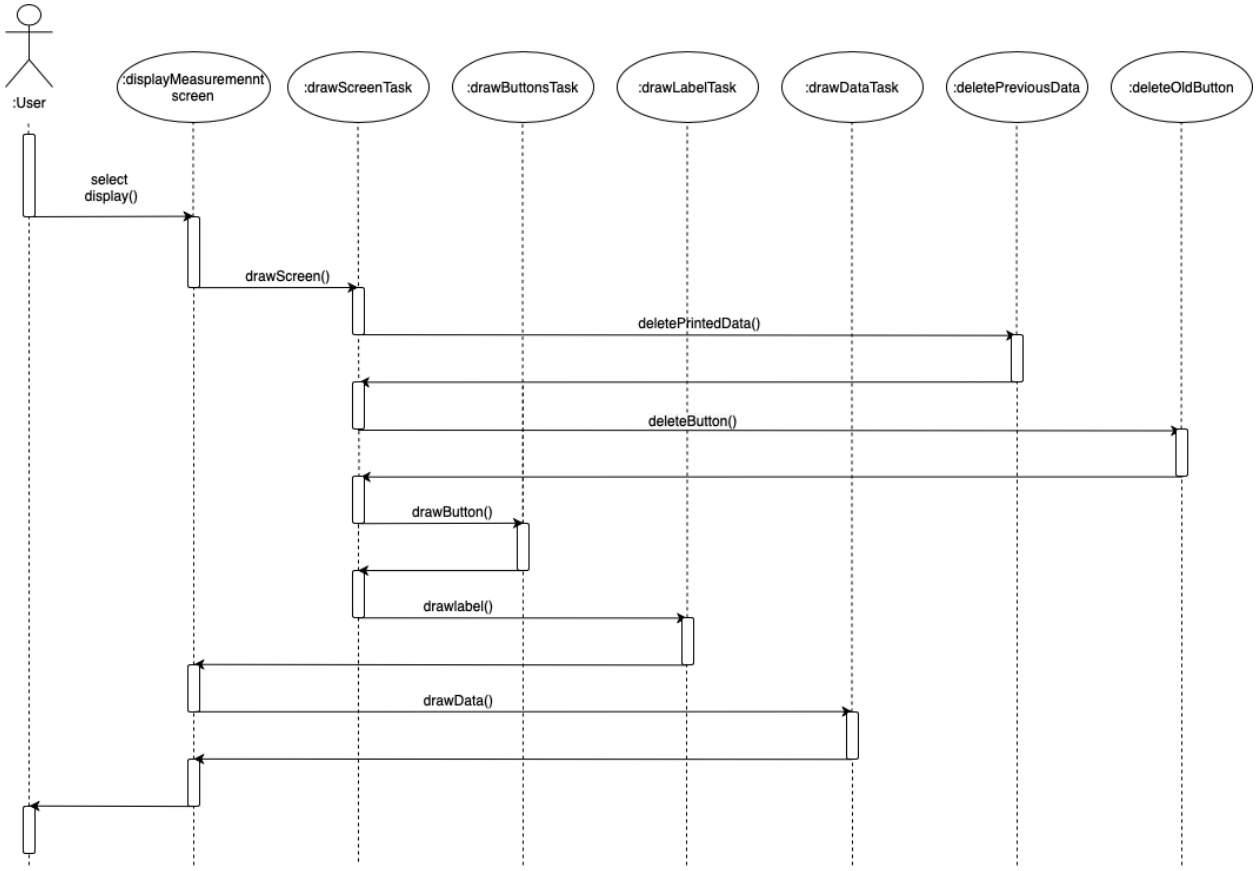


Figure 7. Sequence Diagram for Measurement Screen

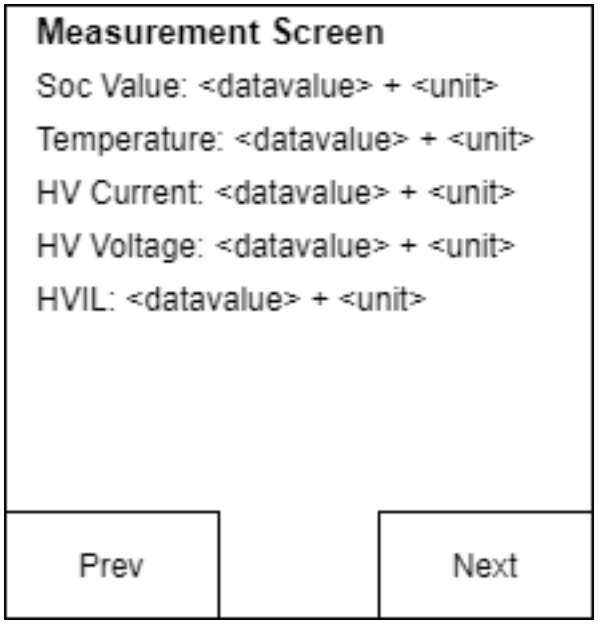


Figure 8. Front Panel Design for Measurement Screen

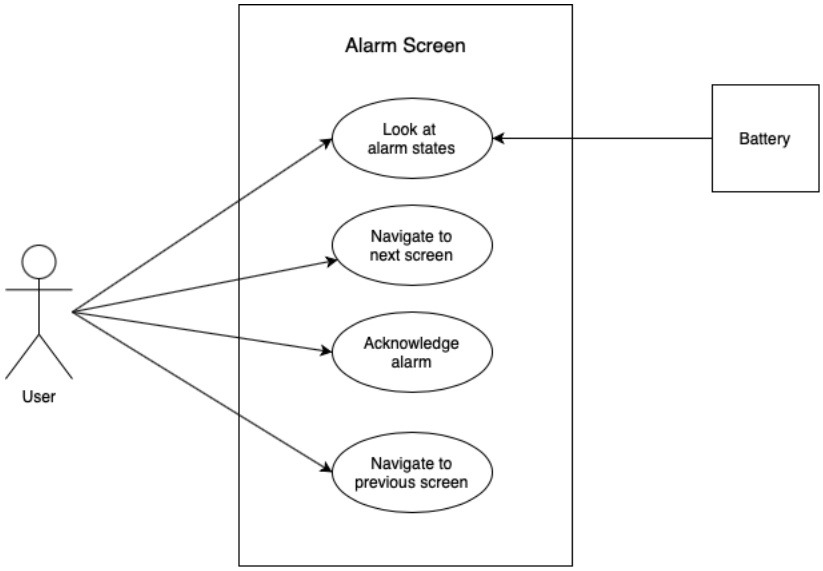


Figure 9. Use Case Diagram for Alarm Screen

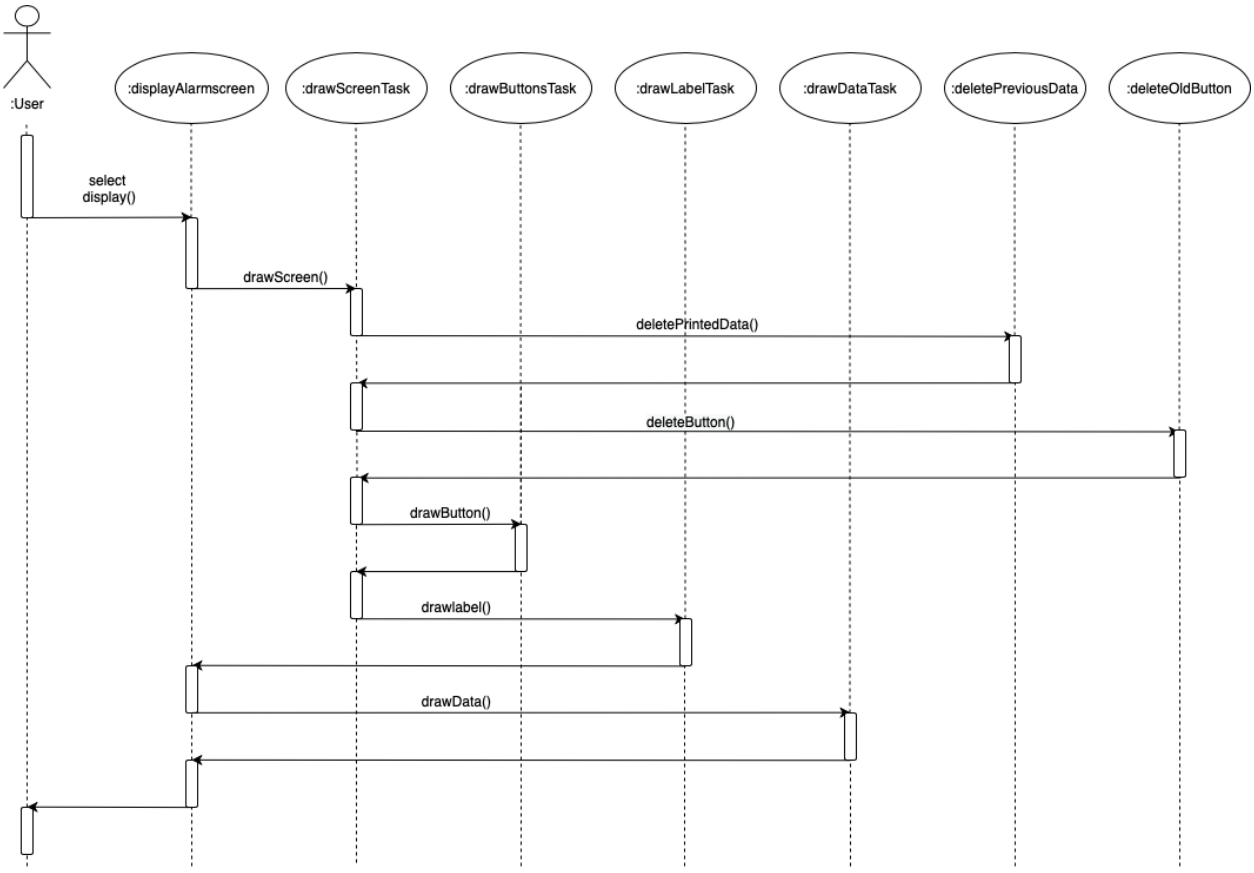
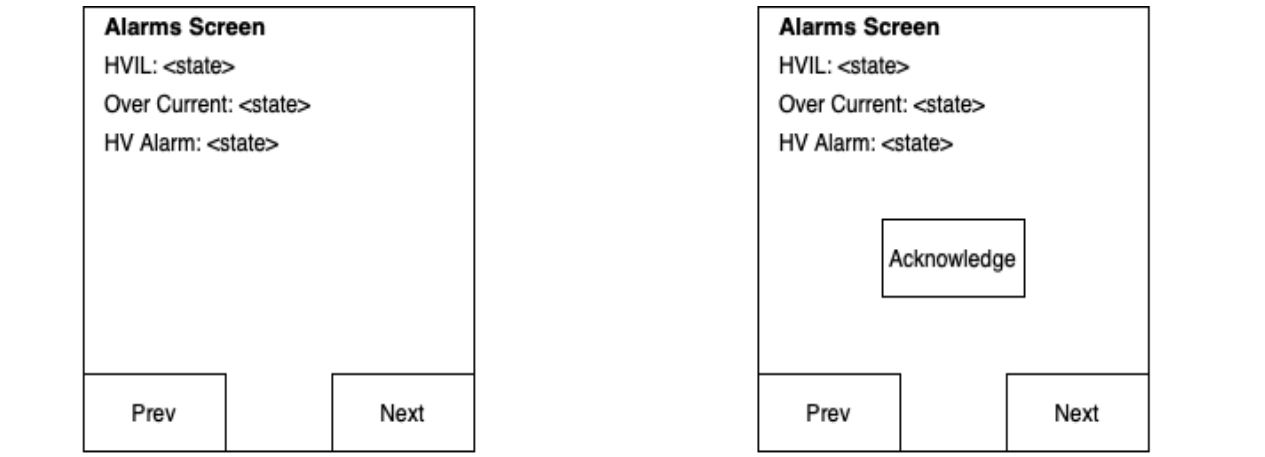


Figure 10. Sequence Diagram for Alarm Screen



14.a: Alarm Screen when no alarm active **14.b: Alarm Screen when there is an active alarm**

Figure 11. Front Panel Design for Alarm Screen

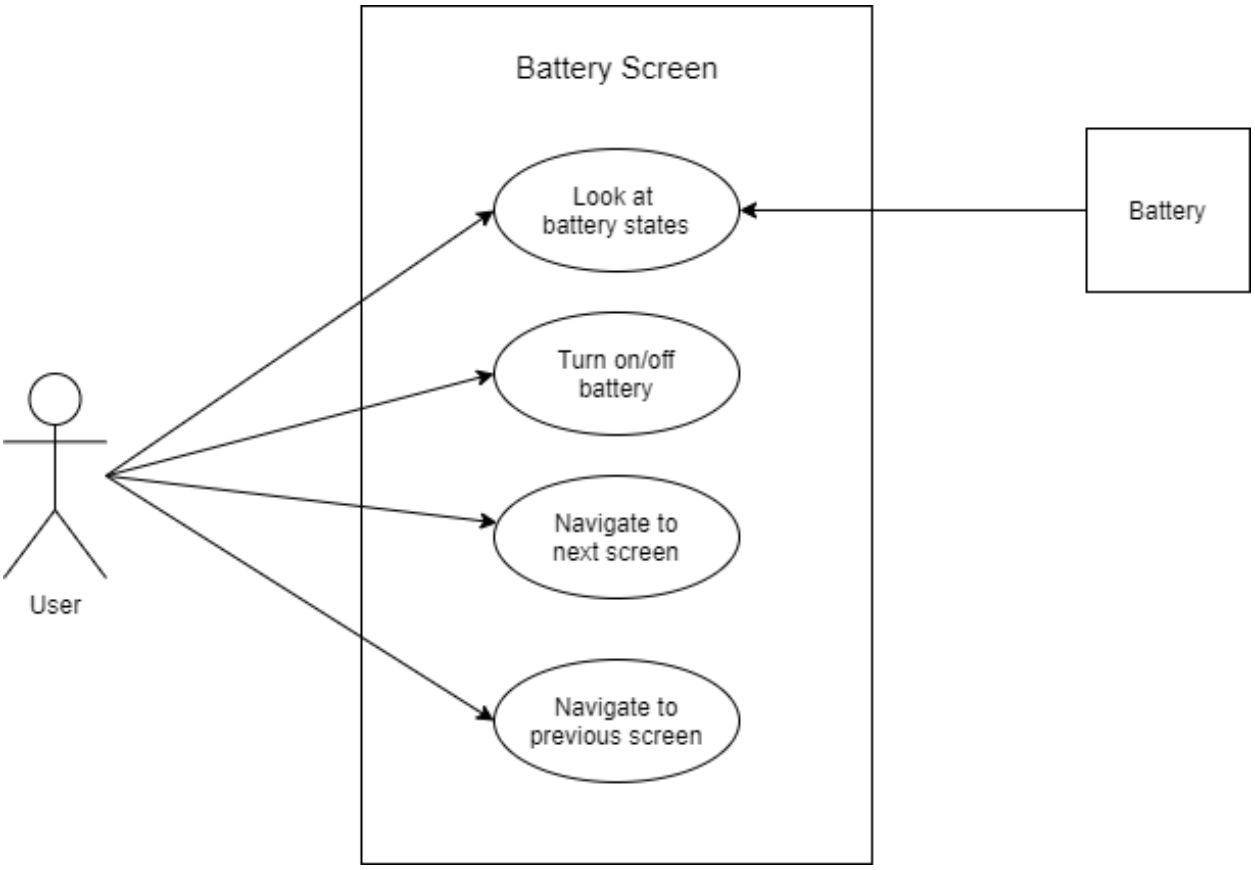


Figure 12. Use Case Diagram for Battery Screen

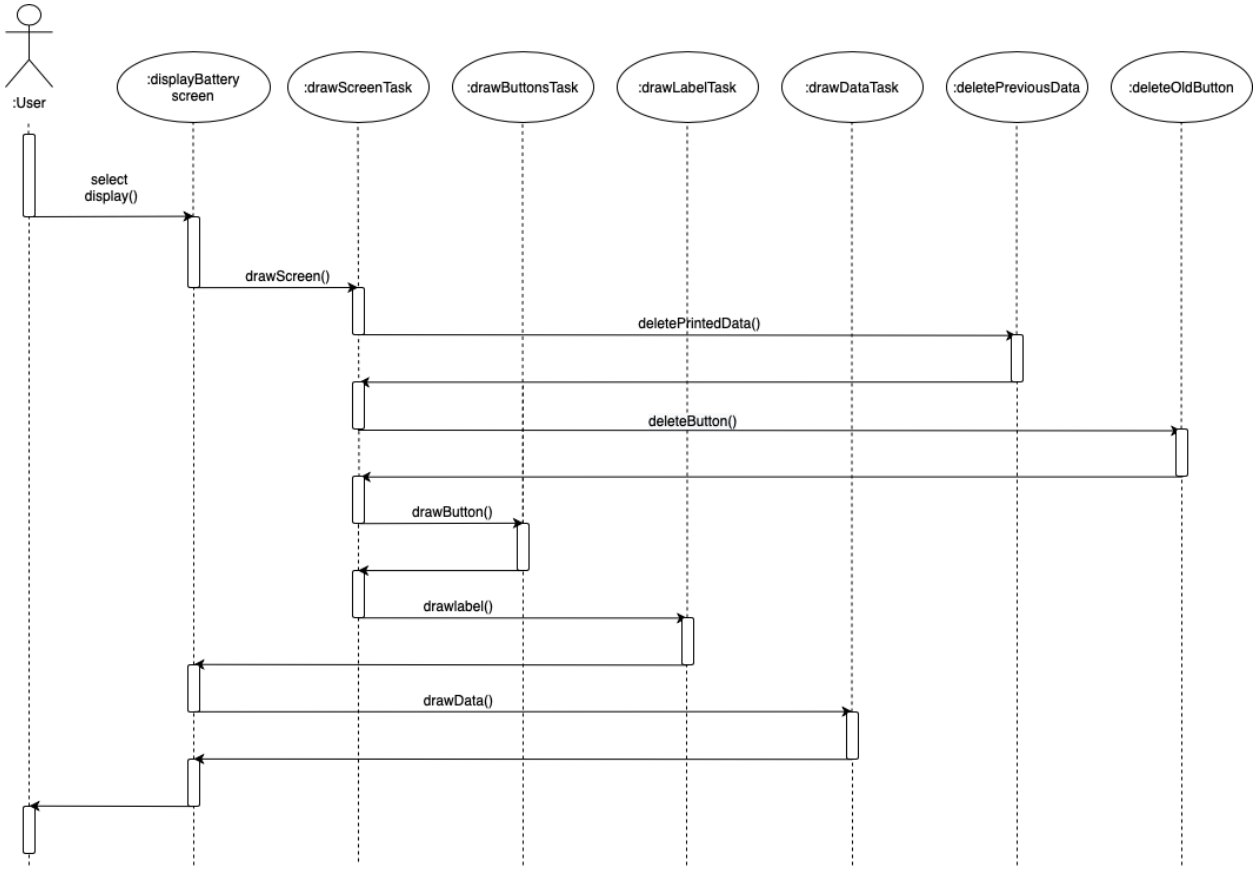


Figure 13. Sequence Diagram for Battery Screen

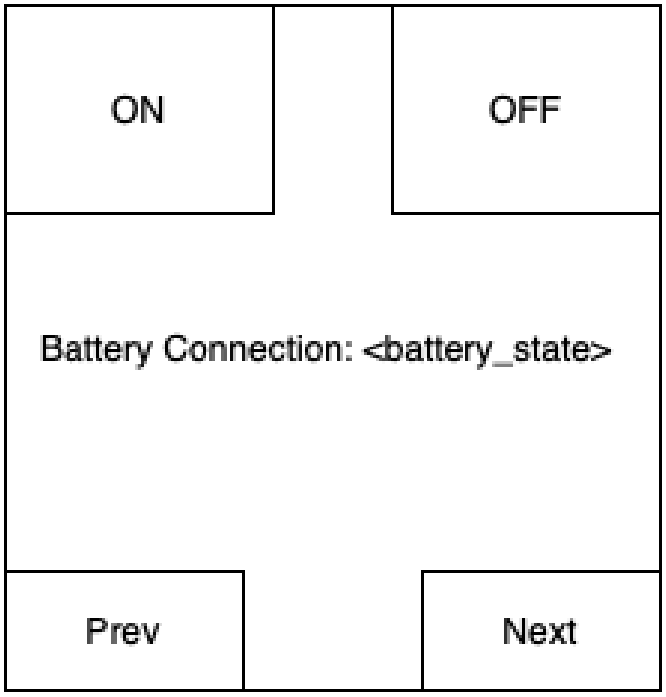


Figure 14. Front panel Design for Battery Screen

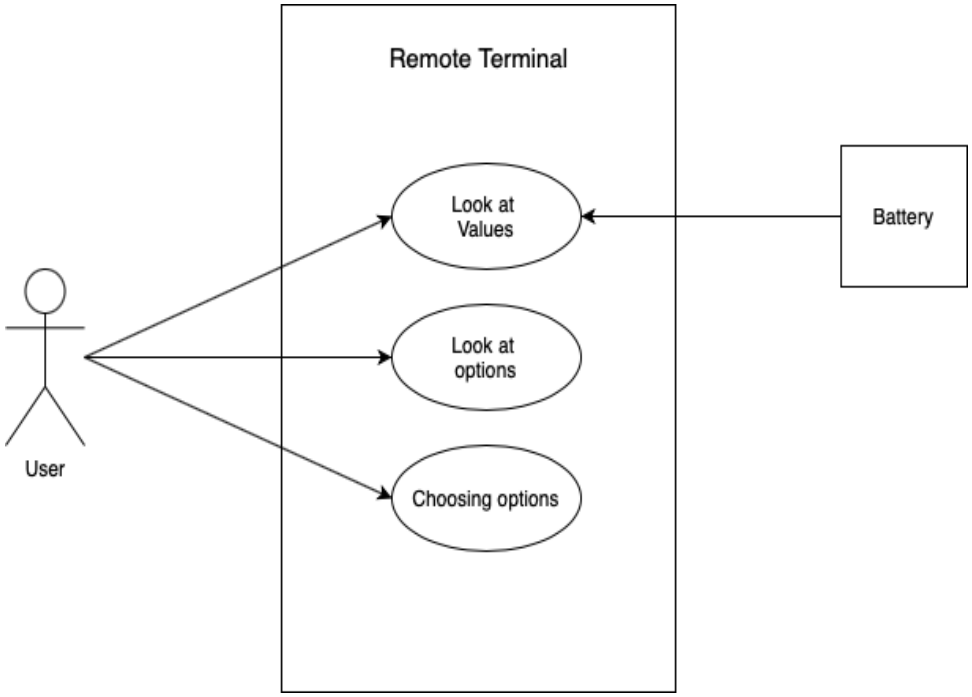


Figure 15. Use Case Diagram for Remote Terminal

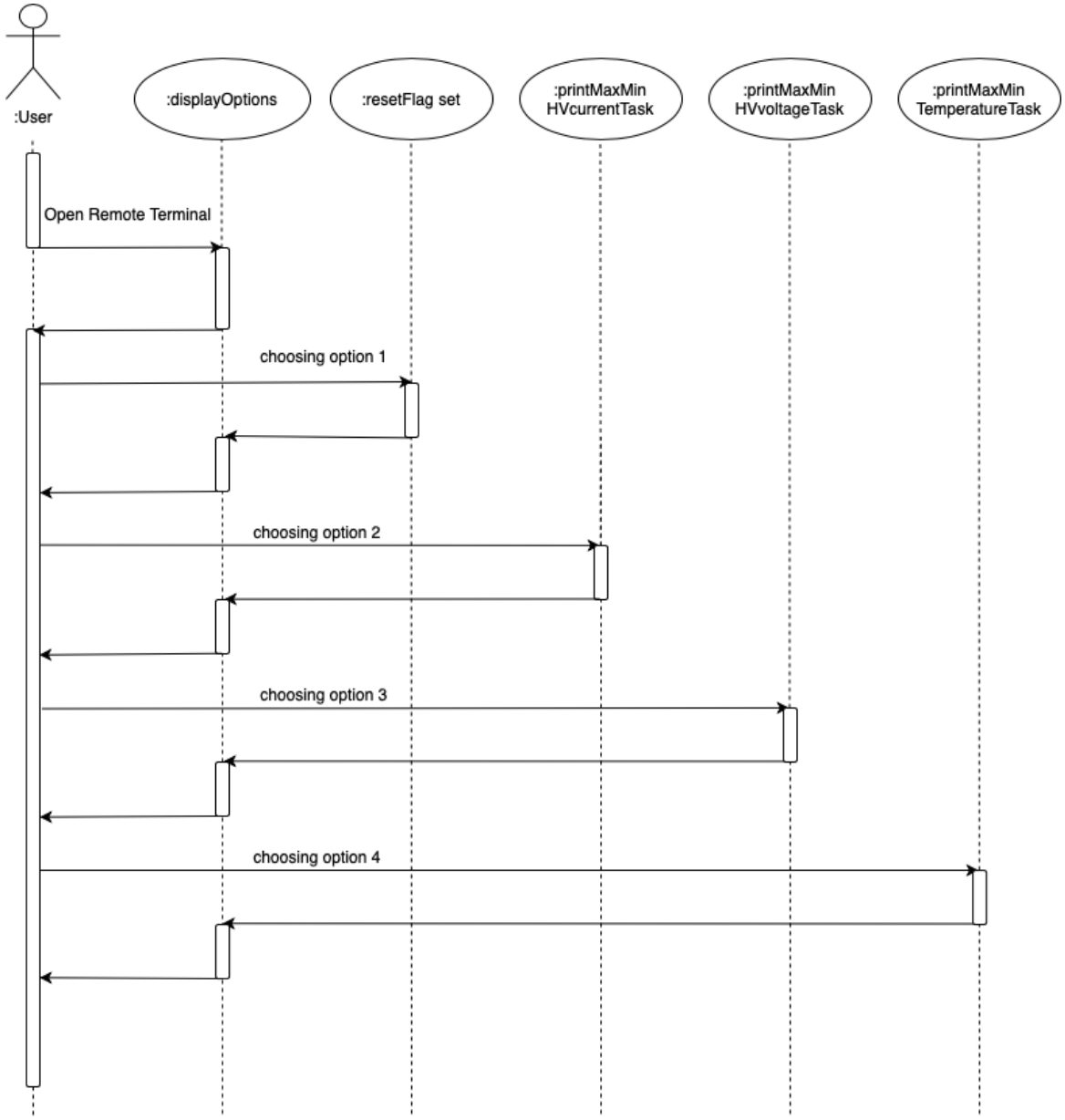


Figure 16. Sequence Diagram for Remote Terminal

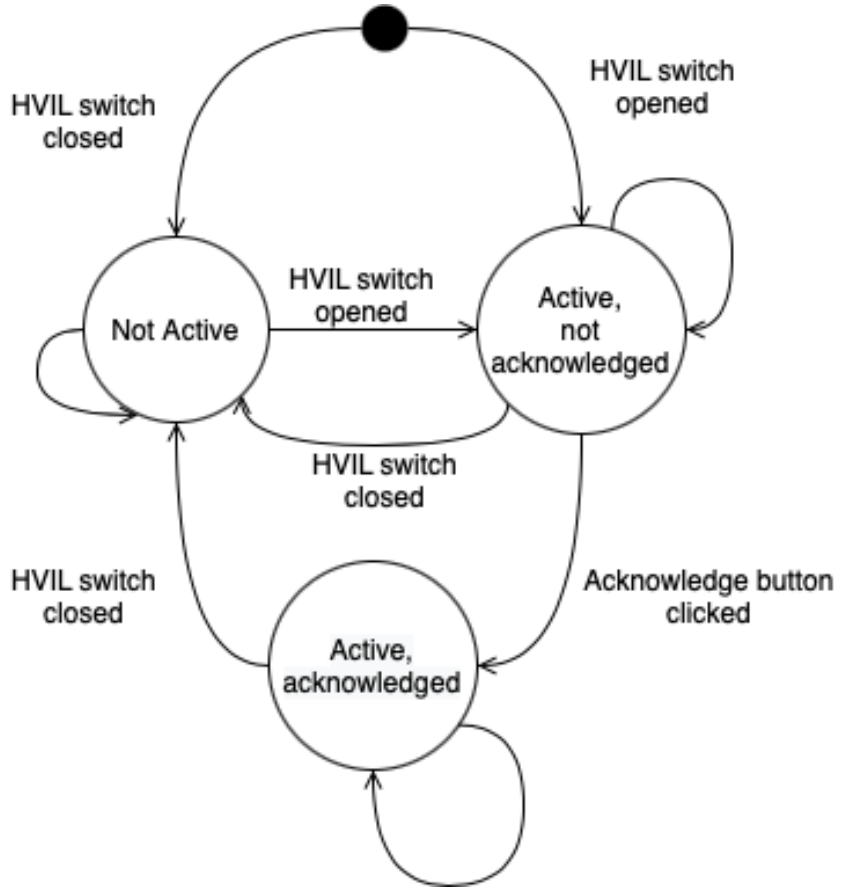


Figure 17. State Diagram for HVIL Alarm

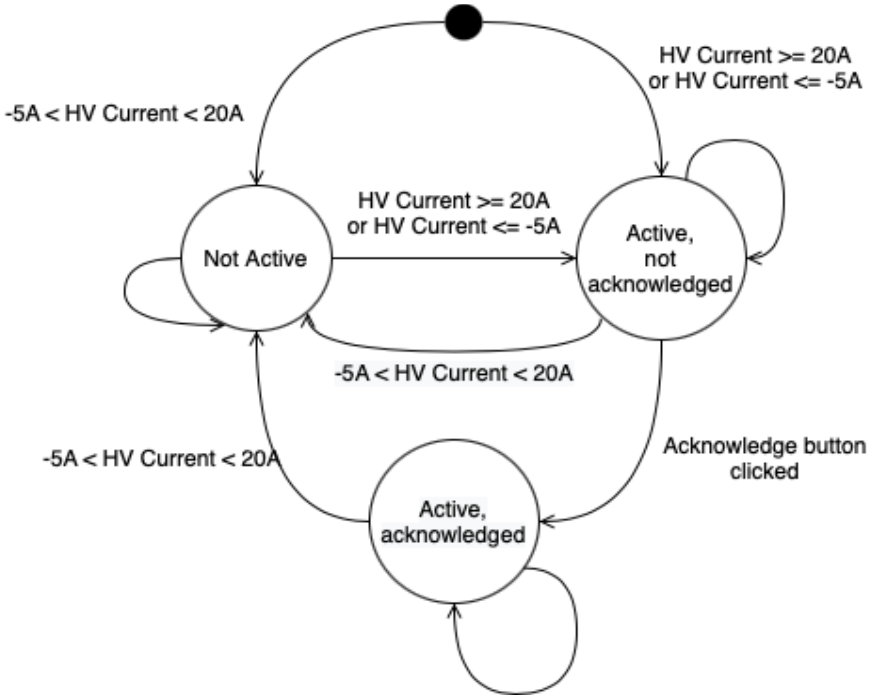


Figure 18. State Diagram for Overcurrent Alarm

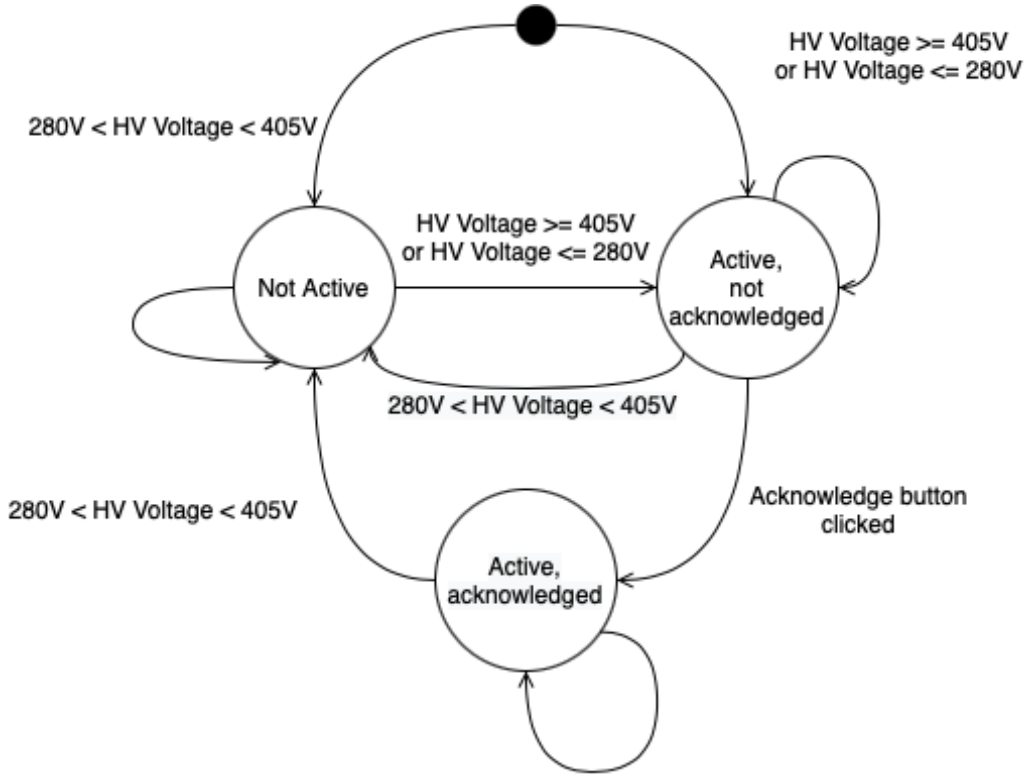


Figure 19. State Diagram for High Voltage out of Range Alarm

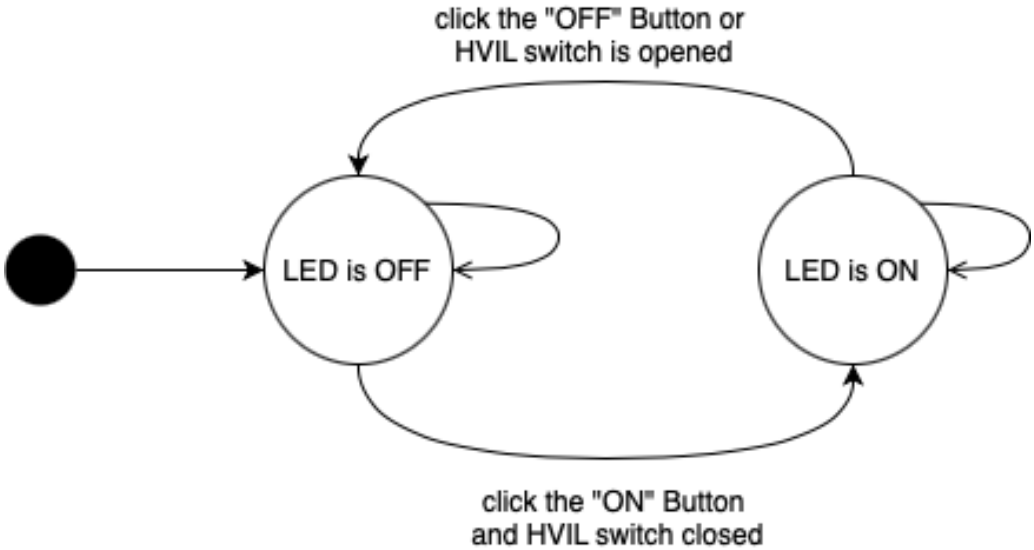


Figure 20. State Diagram for Contactor

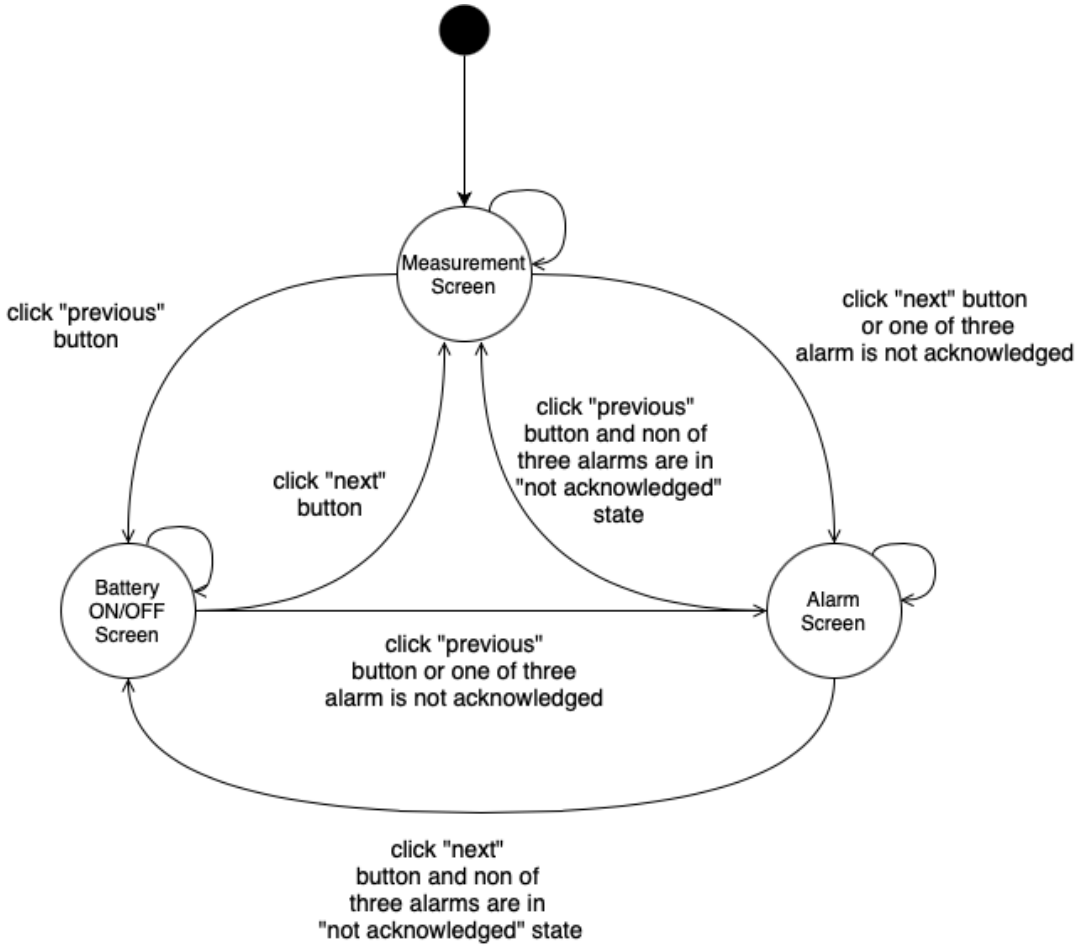


Figure 21. State Diagram for Touch Screen Display

2.0 CONTRIBUTIONS

We both worked equally on this project. Almost all of the time spent working on this project we were in a zoom call, so we were both providing the same amount of input.

3.0 APPENDICES

3.1 Code File Names

StarterFile.ino: file that the program starts in. This file includes the startUpTask and two ISR() function.
StarterFile.h: header file for StarterFile.ino

Alarm.c: code for the alarm task
Alarm.h: header file for alarm.c
Contactor.c: code for the contactor task
Contactor.h: header file for Contactor.c
Measurement.c: code file for the measurement task
Measurement.h: header file for Measurement.c
Soc.c: code file for the state of charge task
Soc.h: header file for Soc.c
Scheduler.c: code for the Scheduler task
Scheduler.h: the header file for Scheduler.c
TaskControlBlock.h: header file defining TaskControlBlock struct
TouchScreenTask.ino: code file for the touch screen task
TouchScreenTask.h: header file for TouchScreenTask.ino
DataLogging.h: header file for the data logging task
DataLogging.ino: code file for the data logging task
RemoteTerminal.h: header file for the remote termial task
RemoteTerminal.ino: code file for the data remote terminal task