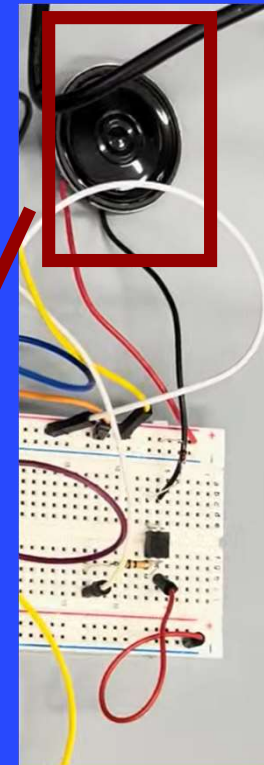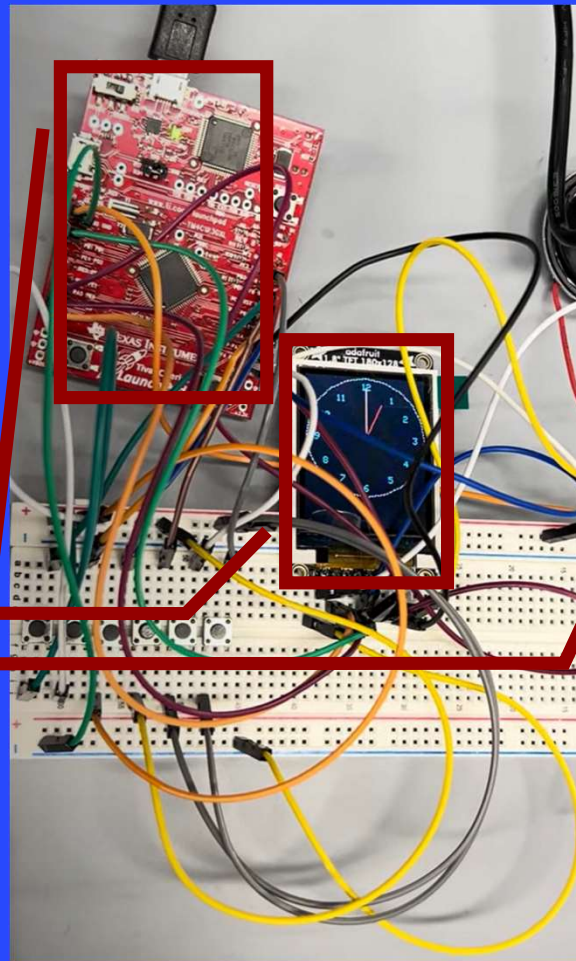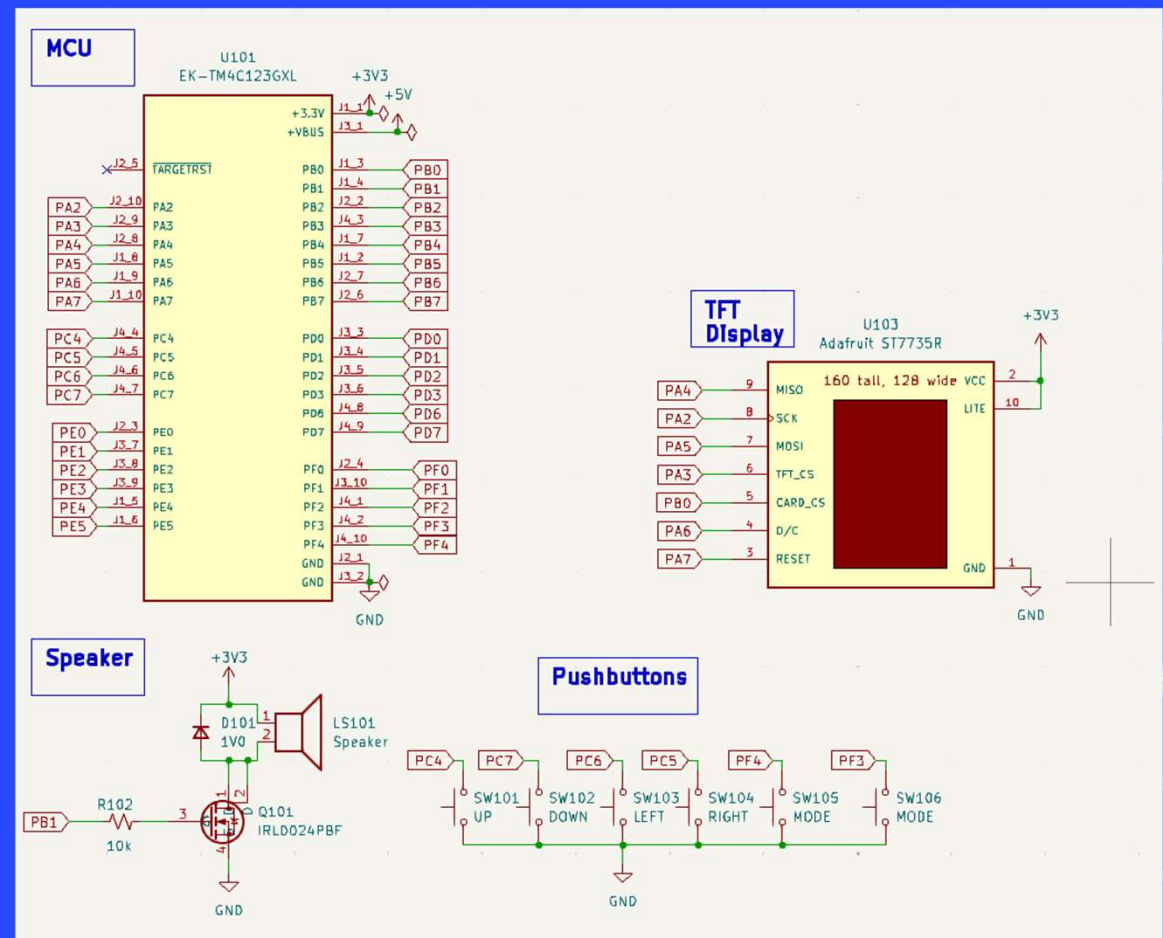# Alarm Clock

High Level Overview
- **Goal**
  - Create an alarm clock embedded system

- Major Components
  - TI Development Board
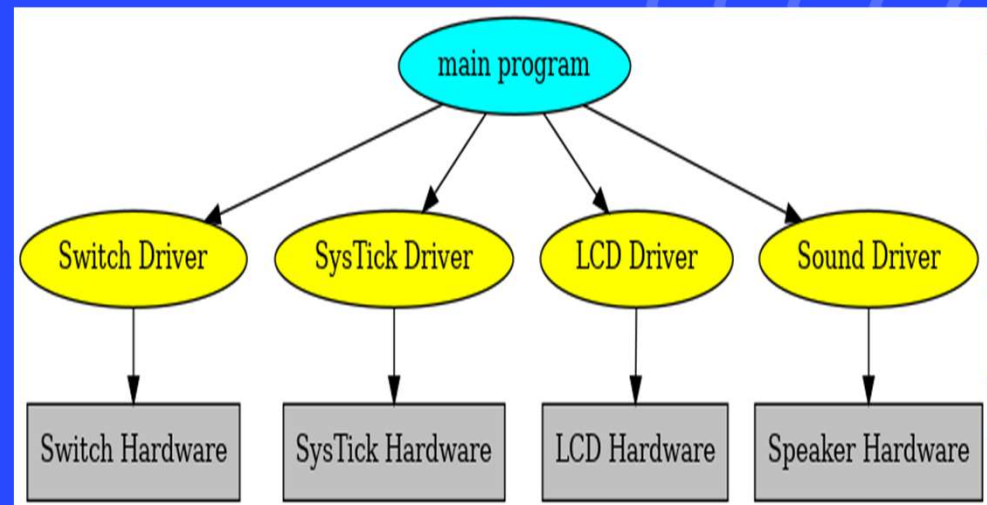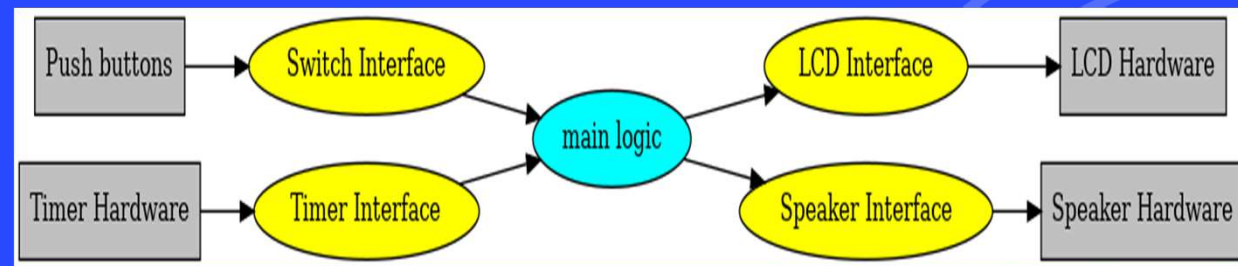 - Adafruit LCD Display
  - 32 Ω Speaker

Hardware:
Schematic

- Development Board
  - Datasheet for Pin configuration
- Speaker
  - MOSFET
  - Diode
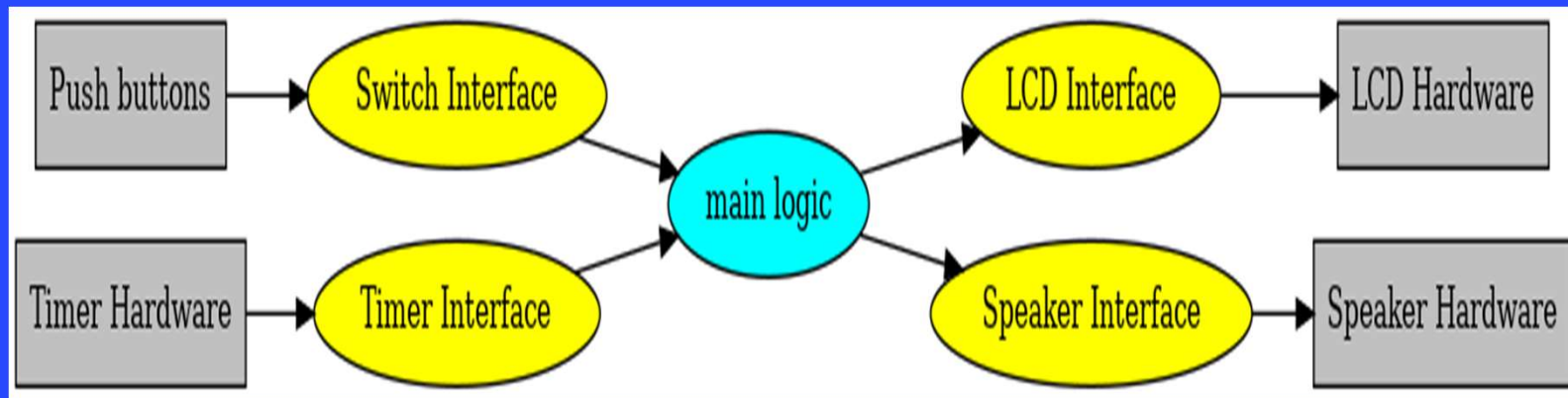- Buttons
  - Interacting with system

Firmware:
Main Program

- Hardware Interfacing
- Main logic
  - Waiting for button presses
    - Toggles analog/digital display
    - Main menu
    - Alarm off

Alarm Clock

Timer Interrupts

- In the background
    1. Hours, minutes, and seconds
    2. Minutes, seconds, and milliseconds

Software:
Display

- Analog
    - Hours, minutes, seconds hand
    - Trigonometry for pixel placement
- Digital
    - 7-segment numbers
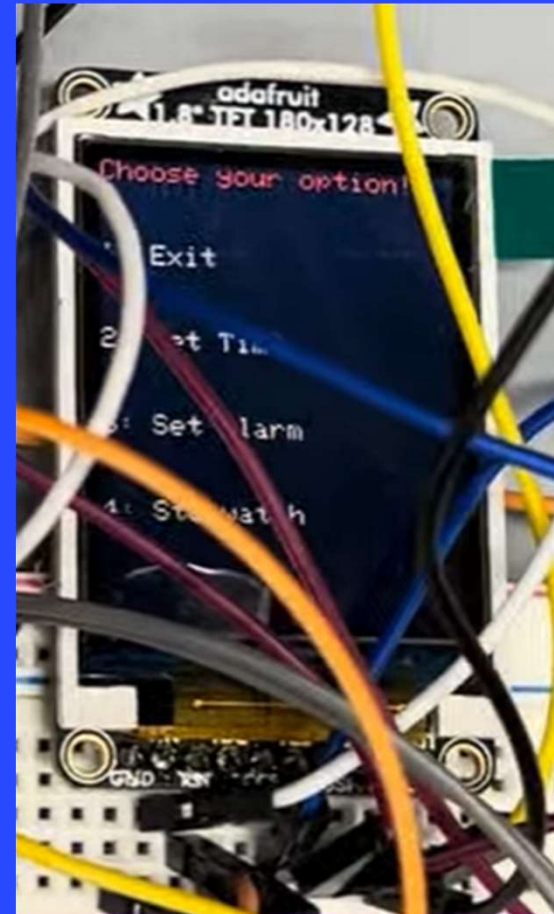- Constant Pixel Update

Software:
Menu

- Accessed from analog/digital display
    1. Exit
    2. Set Time
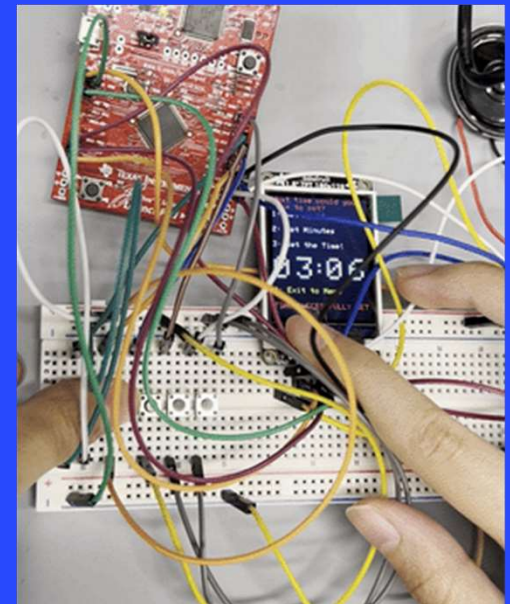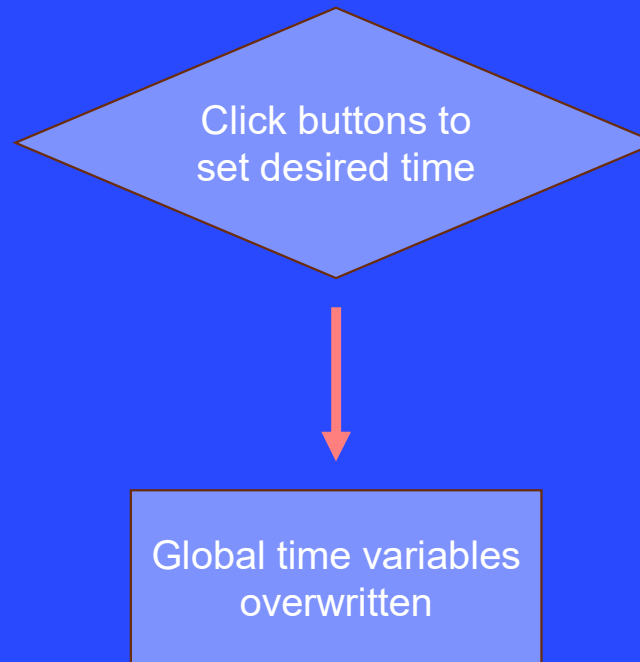   3. Set Alarm
    4. Stopwatch

Software:
Set Time

- Accessed from Menu
  1. Set Hours
  2. Set Minutes
  3. Set the Time!
  4. Exit to Menu
- Overrides stored time
- 24-hour clock

Time matches!

Alarm Clock

Software:
Set Time

- Accessed from Menu
  1. Set Hours
  2. Set Minutes
  3. Set the Time!
  4. Exit to Menu

- Overrides stored time

- 24-hour clock

Click buttons to set desired time

Global time variables overwritten

Software:
Set Alarm

- Accessed from Menu
  1. Select Alarm Slot
  2. Confirm Selection
  3. Exit to Menu
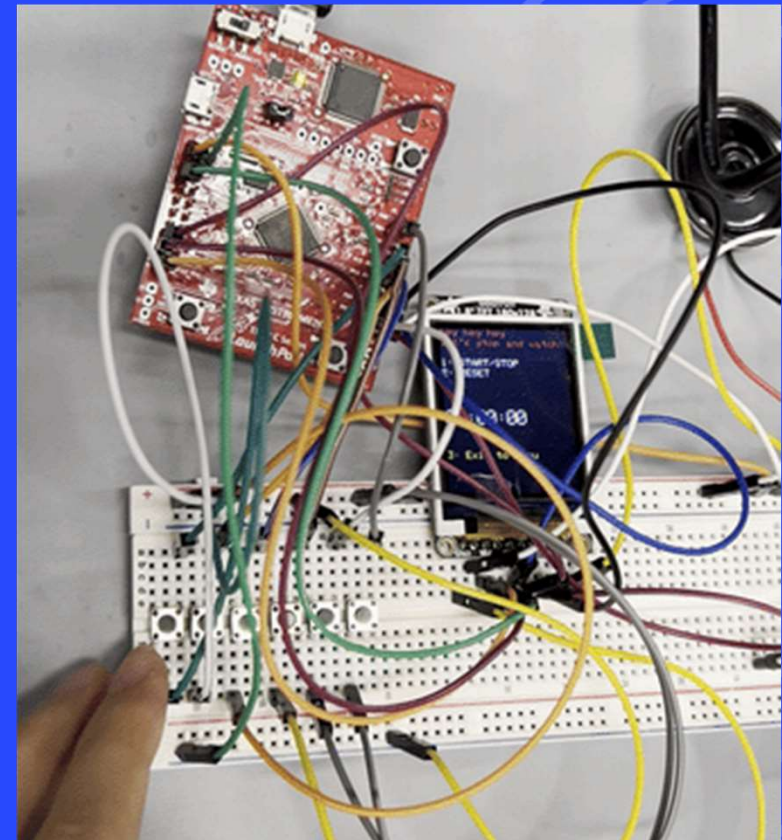- Slot for each alarm
  - Each with their own menu

Alarm Clock

Software: Stopwatch

- Accessed from Menu
    1. START/STOP
    2. RESET
    3. Exit to Menu

- Introduced new timer interrupt for milliseconds

Software:
Stopwatch

- Accessed from Menu
  1. START/STOP
  2. RESET
  3. Exit to Menu

- Introduced new timer interrupt for milliseconds

Start stopwatch

Timer Interface

LCD display global variables

Alarm Clock