DEMO AGENDA

Section Number: 3

Group Number: 73

Names of group members: Venkata Meghana Reddy Vusirika & Koral Kulacoglu

Date of Implementation Demo: 20 November, 2023

Name of grading TA: Yijing Feng

One line description of the project: Heart Rate Monitor aims at measuring accurate heart rate of individuals.

SAFETY:

- No high electrical voltages or currents (resistors are used to ensure this, testing was also performed beforehand).
- No batteries or battery packs.
- No form of combustion, flames, or fast oxidation/reduction reactions.
- No large mechanical devices (e.g., heavy weights, large springs, large motors).
- No tests performed on human test subjects.

DESIGN REVISION SUMMARY:

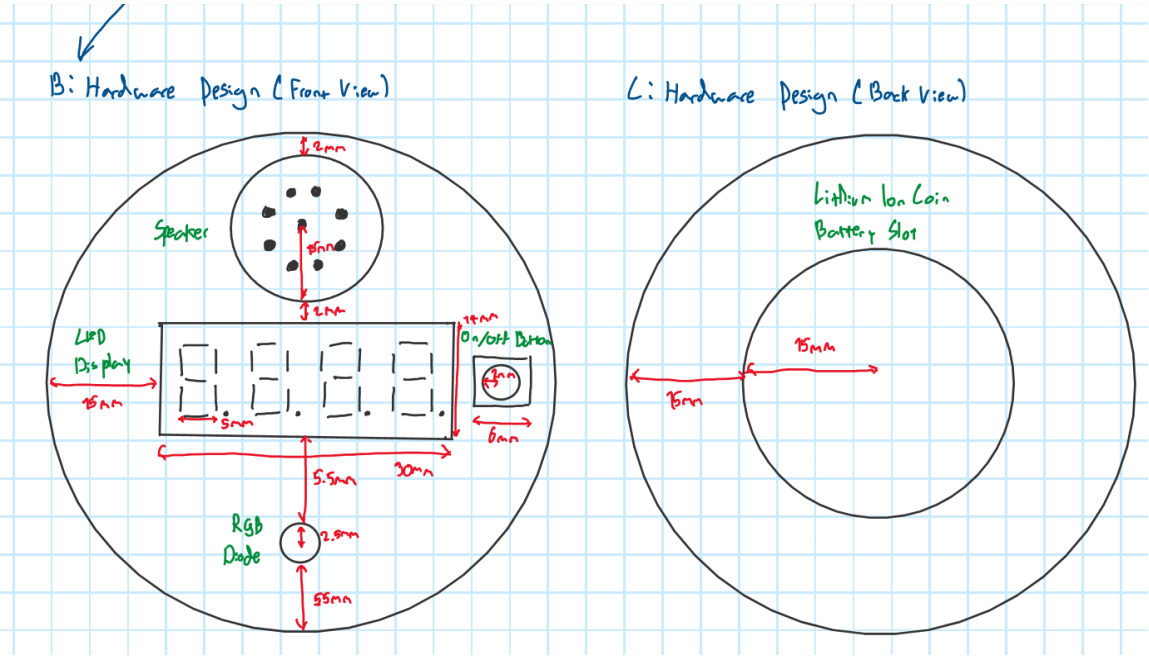
- Electrical schematic (Assigning specific pins)
- Electrical schematic (Buzzer)
- Electrical schematic (LED)
- Electrical schematic (Button)
- Electrical schematic (Display)
- Workspace file folder snapshot

DESIGN REVISION:

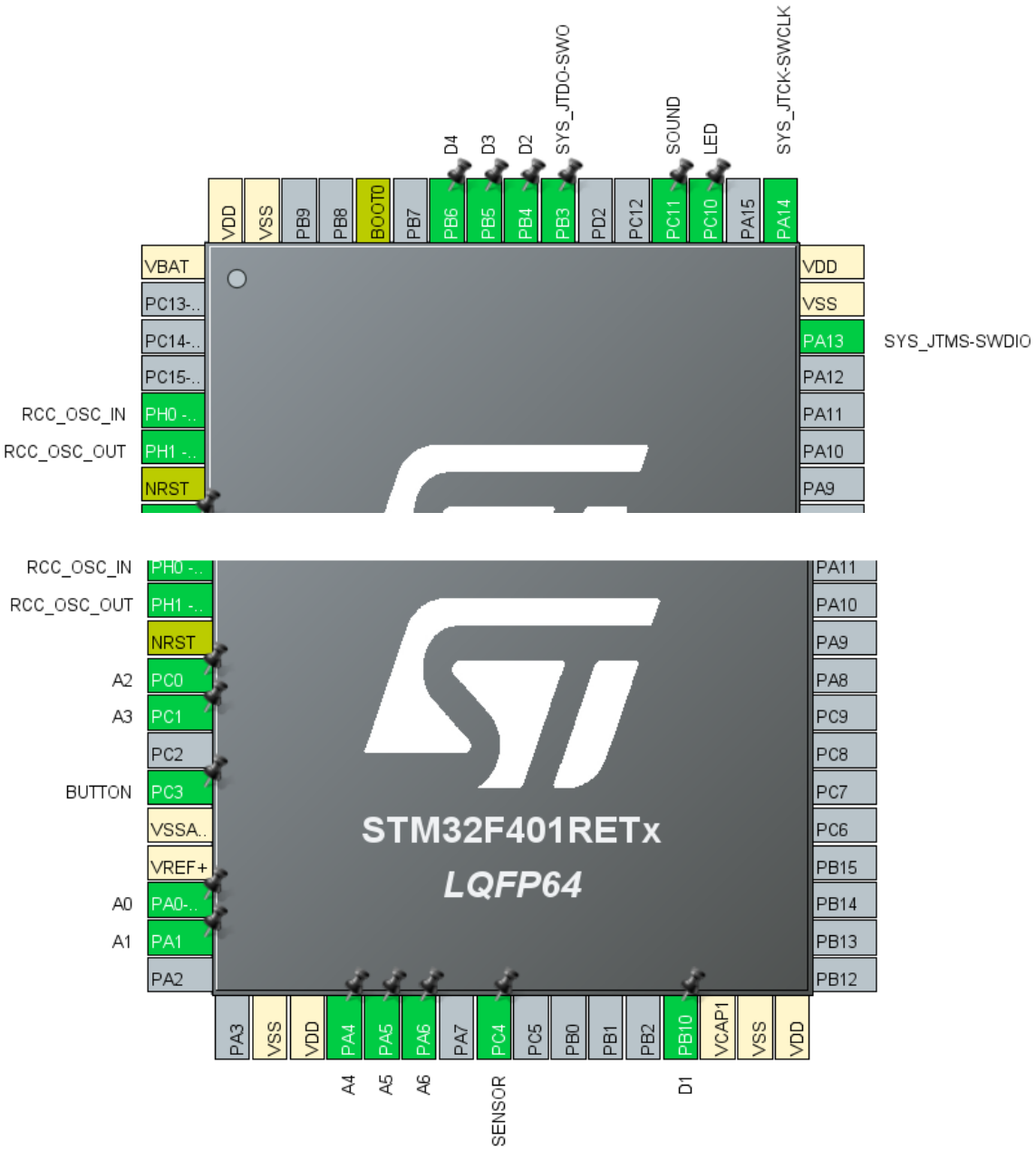
- **ELECTRICAL SCHEMATIC (PINS)**

  Revision Number: 2
  Date: 18 November, 2023
  Changes: Allocated specific pins for specific components. Before, the specific pins on the STM32 allocated to components were not specific. Now, they are.

  BEFORE:



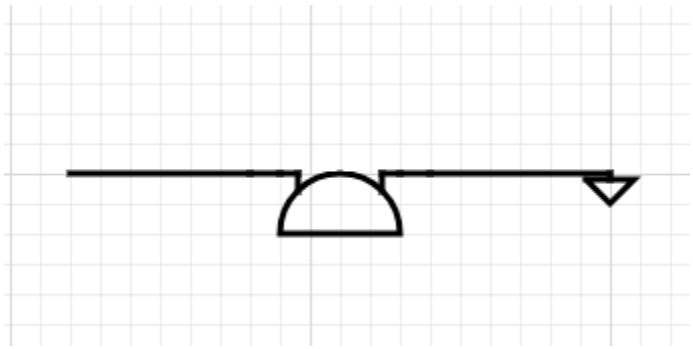
AFTER:


D4
D3
D2
SYS_JTDO-SWO
SOUND
LED
SYS_JTCK-SWCLK
VDD
VSS
PB9
PB8
BOOT0
PB7
PB6
PB5
PB4
PB3
PD2
PC12
PC11
PC10
PA15
PA14
VBAT
PC13-..
PC14-..
PC15-..
RCC_OSC_IN
PH0 -..
RCC_OSC_OUT
PH1 -..
NRST
VDD
VSS
PA13
SYS_JTMS-SWDIO
PA12
PA11
PA10
PA9
RCC_OSC_IN
PH0 -..
RCC_OSC_OUT
PH1 -..
NRST
A2
PC0
A3
PC1
PC2
BUTTON
PC3
VSSA..
VREF+
A0
PA0-..
A1
PA1
PA2
PA11
PA10
PA9
PA8
PC9
PC8
PC7
PC6
PB15
PB14
PB13
PB12
STM32F401RETx
LQFP64
PA3
VSS
VDD
PA4
PA5
PA6
PA7
PC4
PC5
PB0
PB1
PB2
PB10
VCAP1
VSS
VDD
A4
A5
A6
SENSOR
D1

- **ELECTRICAL SCHEMATIC (BUZZER)**

  Revision Number: 2
  Date: 18 November, 2023
  Changes: Before, the circuit was not specified.

  AFTER:

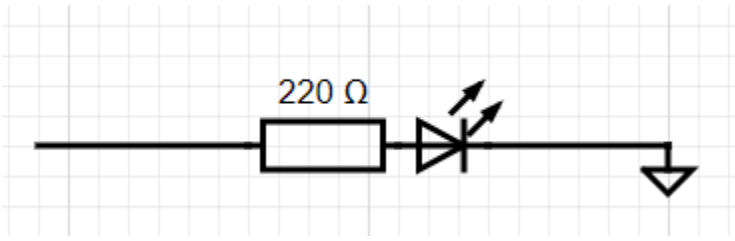


  Note: the leftmost wire is connected to the STM32 According to the System Architecture Drawings above.

- **ELECTRICAL SCHEMATIC (LED)**

  Revision Number: 2
  Date: 18 November, 2023
  Changes: Before, the circuit and the resistance was not specified.

  AFTER:

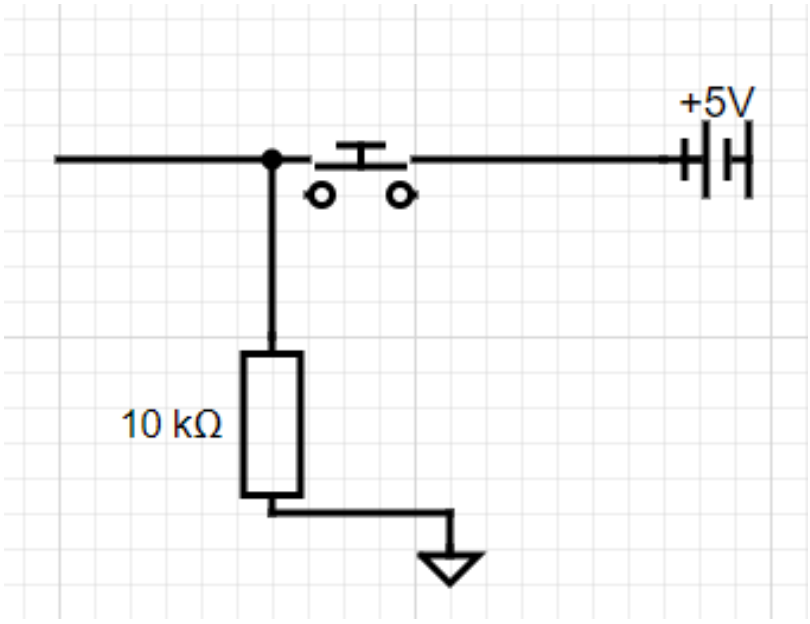


  Note: the leftmost wire is connected to the STM32 According to the System Architecture Drawings above.

- **ELECTRICAL SCHEMATIC (BUTTON)**

  Revision Number: 3
  Date: 18 November, 2023
  Changes: In the previous version, the button did not work. Connecting it to the ground and the 5V pin in the STM32 as shown below fixed this issue.

  AFTER:

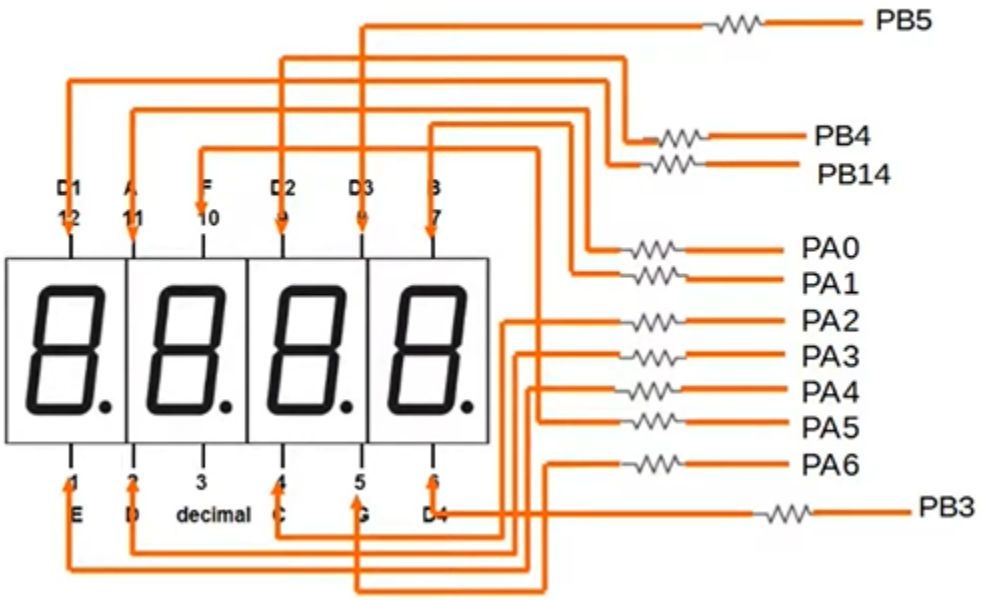


  Note: the leftmost wire is connected to the STM32 According to the System Architecture Drawings above.

- **ELECTRICAL SCHEMATIC (DISPLAY)**

  Revision Number: 3
  Date: 18 November, 2023
  Changes: Added a circuit diagram and selected the corresponding pins.

AFTER:

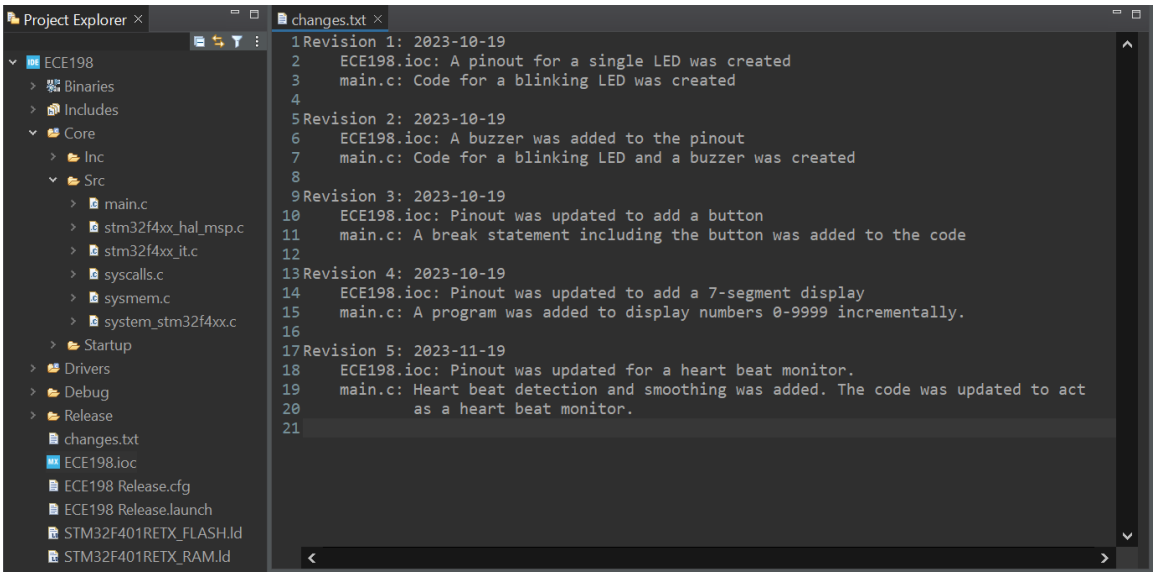


Note: All resistors are 220 ohms.

- **WORKSPACE FILE FOLDER SNAPSHOT**

Revision Number: 5
Date: 2023-11-19

WORKSPACE SNAPSHOT:



TESTS (UPDATED):

- **LED TESTS:**
    - An LED will be blinked, simulating a high/low heartbeat.
    - The PC10 pin will be activated and deactivated with 3.3V every second.
    - The LED lights up for 1 second and turns off for 1 second for 60 seconds. It must be visible to the human eye.
- **BUZZER TESTS:**
    - A buzzer will be blinked, simulating a high/low heartbeat.
    - The PC11 pin will be activated and deactivated with 3.3V every second.
    - The buzzer is audible for 1 second and turns off for 1 second for 60 seconds. It must be audible.
- **BUTTON TEST:**
    - The button will be pressed. This will send voltage to the PC3 pin.
    - Voltage will be sent to the PC3 pin.
    - The buzzer and LED turn off.

VERSION 1.2 OF THE DESIGN DOCUMENT:

TESTING AND VALIDATION:

TEST 1: LED

- **<u>Environmental Parameters:</u>**
    - Temperature must be under 95°C.
    - The environment must be dry (no rain or water)
    - On a sturdy base (something like a table)
- **<u>Test Setup:</u>**
    - Put the device on a sturdy base.
    - Load up and run the LED test program on the STM32 IDE.

- **Test Inputs:**
    - The PC10 pin will be activated and deactivated with 3.3V every second.
- **Quantifiable Measurement Standard:**
    - It must be visible to the human eye in a light environment.
- **Pass Criteria:**
    - The LED lights up for 1 second and turns off for 1 second for 60 seconds. It must be visible to the human eye.

TEST 2: Buzzer

- **Environmental Parameters:**
    - Temperature must be under 95°C.
    - The environment must be dry (no rain or water)
    - On a sturdy base (something like a table)
- **Test Setup:**
    - Put the device on a sturdy base.
    - Load up and run the Buzzer test program on the STM32 IDE.
- **Test Inputs:**
    - The PC11 pin will be activated and deactivated with 3.3V every second.
- **Quantifiable Measurement Standard:**
    - It must be audible to a human standing 6m away.
- **Pass Criteria:**
    - The buzzer is audible for 1 second and turns off for 1 second for 60 seconds. It must be audible.

TEST 3: Button

- **Environmental Parameters:**
    - Temperature must be under 95°C.
    - The environment must be dry (no rain or water)
    - On a sturdy base (something like a table)
- **Test Setup:**
    - Put the device on a sturdy base.
    - Load up and run the Button test program on the STM32 IDE.
- **Test Inputs:**
    - The button will be pressed. This will send voltage to the PC3 pin.
- **Quantifiable Measurement Standard:**
    - The buzzer is not audible and the LED is turned off.
- **Pass Criteria:**
    - The buzzer and LED turn off.