# Alarm Clock
# Embedded Systems Project
# Report

Monday 10:00 lab

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April 3, 2022

## Devices used:

Eduboard LPC2148 v1.0

## Interfaces used:

GPIO, $I^2C$, SPI

## Devices used:

1. LCD display
2. RTC
3. Button
4. Joystick
5. Buzzer
6. Timer
7. EEPROM

# Contents



# Code Listings

# 1 Project Description

## 1.1 General description

# 2 Peripherals and interface configuration

## 2.1 LCD Display

```
62 void DisplayInit(void) {
63     IODIR1 |= (LCD_DATA | LCD_E | LCD_RS);
64     IOCLR1  = (LCD_DATA | LCD_E | LCD_RS);
65 
66     IODIR0 |= LCD_RW;
67     IOCLR0  = LCD_RW;
68 
69     IODIR0 |= LCD_BACKLIGHT;
70     IOCLR0  = LCD_BACKLIGHT;
71 
72     LcdCommand(0x30);
73     delay2ms();
74     LcdCommand(0x30);
75     delay37us();
76     LcdCommand(0x30);
77     delay37us();
78 
79     LcdCommand(0x38); // set 8-bit, 2 line mode
80     delay37us();
81 
82     LcdCommand(0x08); // display off
83     delay37us();
84 
85     clearDisplay();
86 
87     LcdCommand(0x06); // cursor direction - increment, no shift
88     delay2ms();
89 
90     LcdCommand(0x0c); // display on, cursor off
91     delay2ms();
92 
93     LcdCommand(0x02); // cursor to home position
94     delay2ms();
95 }
```

Listing 1: LCD setup function

# 3 Failure Mode and Effect Analysis

| **Component** | **Severity** |
|---|---|
| Microcontroller | Critical |
| Power Supply | Critical[1] |
| RTC | Critical |
| LCD Display | High |
| Speaker | High |
| Button | High |
| Joystick | High |

Table 1: Severity of component's failure

[1]Long-term power supply failures are of critical severity, but in case of short pause in power delivery, the system is able to recover using the RTC and the data stored in EEPROM