

## Project 4

Generated by Doxygen 1.8.16



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# Chapter 1

## README

### 1.0.1 What is this repository for?

- To read infrared radiation from an IR sensor and estimate the temprature from that. Then display it on an LCD
- Version 1.0

### 1.0.2 How do I get set up?

- Built on FreeRTOSv202104.00 with limited markup for Tracealyzer and Doxygen. Only modules with documentation were extracted!

### 1.0.3 Who do I talk to?

- Owen Blair about the specific project and Dr. J for more accurate details about what the program is actually supposed to do



## Chapter 2

# File Index

### 2.1 File List

Here is a list of all documented files with brief descriptions:

C:/Users/blai4544/ECE443/FreeRTOSv202104.00/FreeRTOSv202104.00/Projects/blai4544_443_↵ p4/ <b>CerebotMX7cK.h</b> . . . . .	??
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## Chapter 3

# File Documentation

### 3.1 C:/Users/blai4544/ECE443/FreeRTOSv202104.00/FreeRTOSv202104.00/Projects/blai4544\_443\_p4/LCDlib.h File Reference

Lib for using the LCD attached to the Cerabot board.

```
#include <plib.h>
#include "CerebotMX7cK.h"
```

#### Functions

- void **LCDInit** (void)
- void **LCDWriteChar** (int, char)
- void **LCDDelay** (unsigned int)
- void **LCD\_clear** (void)

#### 3.1.1 Detailed Description

Lib for using the LCD attached to the Cerabot board.

#### Author

Owen Blair

## 3.2 C:/Users/blai4544/ECE443/FreeRTOSv202104.00/FreeRTOSv202104.00/Projects/blai4544\_443\_p4/main.c File Reference

Fourth Project for ECE443.

```
#include "FreeRTOS.h"
#include "task.h"
#include "queue.h"
#include "semphr.h"
#include "message_buffer.h"
#include "CerebotMX7cK.h"
#include "comm.h"
#include "I2C_EEPROM_lib.h"
#include "LCDlib.h"
#include <plib.h>
#include "string.h"
#include "main.h"
```

### Functions

- void **\_\_attribute\_\_**((interrupt(ipl2), vector(\_CHANGE\_NOTICE\_VECTOR)))
- int **main** (void)
- unsigned int **read\_buttons** (void)  
*Function to read buttons 1 and 2.*
- void **hw\_msDelay** (unsigned int mS)  
*Hardware assisted delay function from ECE341 w/ Dr.J.*
- void **CN\_ISR\_Handler** (void)  
*Change notice ISR that gives direct task notification.*
- void **vApplicationMallocFailedHook** (void)
- void **vApplicationIdleHook** (void)
- void **vApplicationStackOverflowHook** (TaskHandle\_t pxTask, char \*pcTaskName)
- void **vApplicationTickHook** (void)
- void **\_general\_exception\_handler** (unsigned long ulCause, unsigned long ulStatus)
- void **vAssertCalled** (const char \*pcFile, unsigned long ulLine)

### 3.2.1 Detailed Description

Fourth Project for ECE443.

Demonstrates the use of FreeRTOS in accordance to the directions given for the fourth ECE443 project with Dr.J. This project uses I2C to read data from an IR sensor and determines temperature from IR radiation

#### Author

Owen Blair

#### Date

09/30/22

## 3.2.2 Function Documentation

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### 3.2.2.1 CN\_ISR\_Handler()

```
void CN_ISR_Handler (
    void )
```

Change notice ISR that gives direct task notification.

CHANGE NOTICE ISR

#### Parameters

in	No	input
----	----	-------

#### Returns

None

### 3.2.2.2 hw\_msDelay()

```
void hw_msDelay (
    unsigned int mS )
```

Hardware assisted delay function from ECE341 w/ Dr.J.

HARDWARE ASSISTED DELAY function

#### Parameters

in	<i>mS,Unsigned</i>	int of how many milliseconds to wait
----	--------------------	--------------------------------------

#### Returns

None

### 3.2.2.3 read\_buttons()

```
unsigned int read_buttons (
    void )
```

Function to read buttons 1 and 2.

READ BUTONS function!

**Parameters**

in	<i>No</i>	input
----	-----------	-------

**Returns**

Unsigned int indicating button 1 and 2's state Return --> [Btn 2 bit, Btn 1 bit] btn 1 on, btn 2 off = 01 (1) btn 1 off, btn 2 on = 10 (2) btn 1 on, btn 2 on = 11 (3)

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