# 1. Description

## 1.1. Project

| | |
|---|---|
| Project Name | EINK_THING_ATTEMPT1 |
| Board Name | STM32L0538-DISCO |
| Generated with: | STM32CubeMX 4.22.0 |
| Date | 08/17/2017 |

## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32L0 |
| MCU Line | STM32L0x3 |
| MCU name | STM32L053C8Tx |
| MCU Package | LQFP48 |
| MCU Pin number | 48 |

# 2. Pinout Configuration
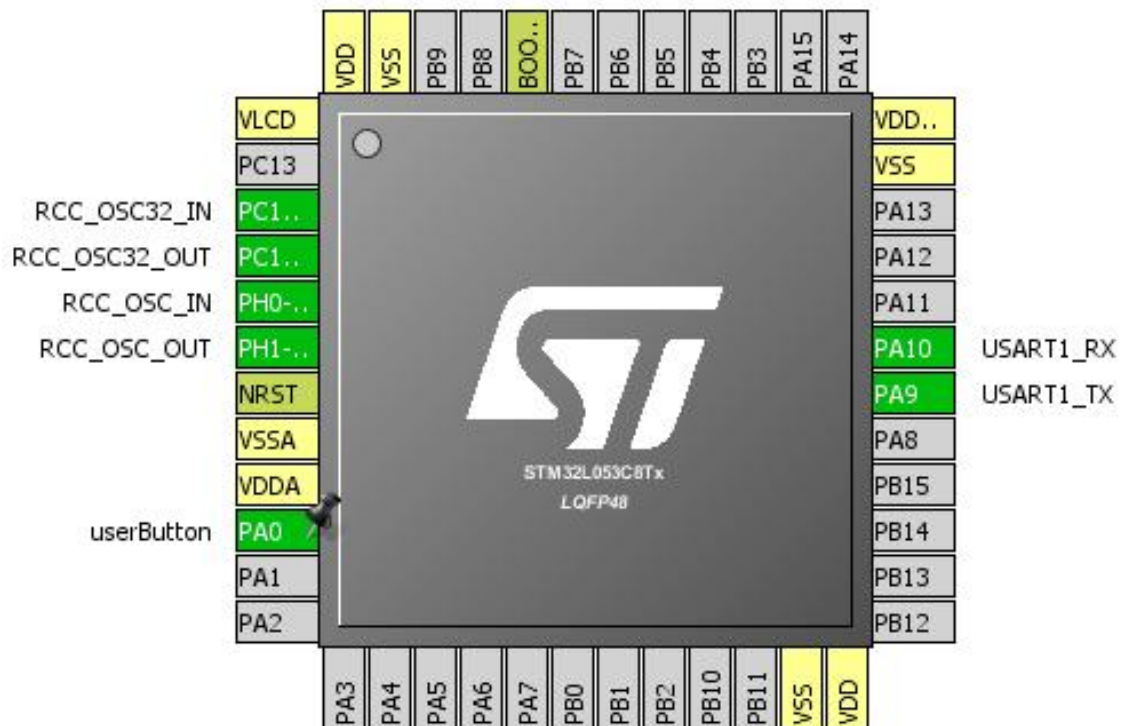
# 3. Pins Configuration

| Pin Number LQFP48 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | VLCD | Power | | |
| 3 | PC14-OSC32_IN | I/O | RCC_OSC32_IN | |
| 4 | PC15-OSC32_OUT | I/O | RCC_OSC32_OUT | |
| 5 | PH0-OSC_IN | I/O | RCC_OSC_IN | |
| 6 | PH1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 7 | NRST | Reset | | |
| 8 | VSSA | Power | | |
| 9 | VDDA | Power | | |
| 10 | PA0 | I/O | GPIO_EXTI0 | userButton |
| 23 | VSS | Power | | |
| 24 | VDD | Power | | |
| 30 | PA9 | I/O | USART1_TX | |
| 31 | PA10 | I/O | USART1_RX | |
| 35 | VSS | Power | | |
| 36 | VDD_USB | Power | | |
| 44 | BOOT0 | Boot | | |
| 47 | VSS | Power | | |
| 48 | VDD | Power | | |

# 4. Clock Tree Configuration
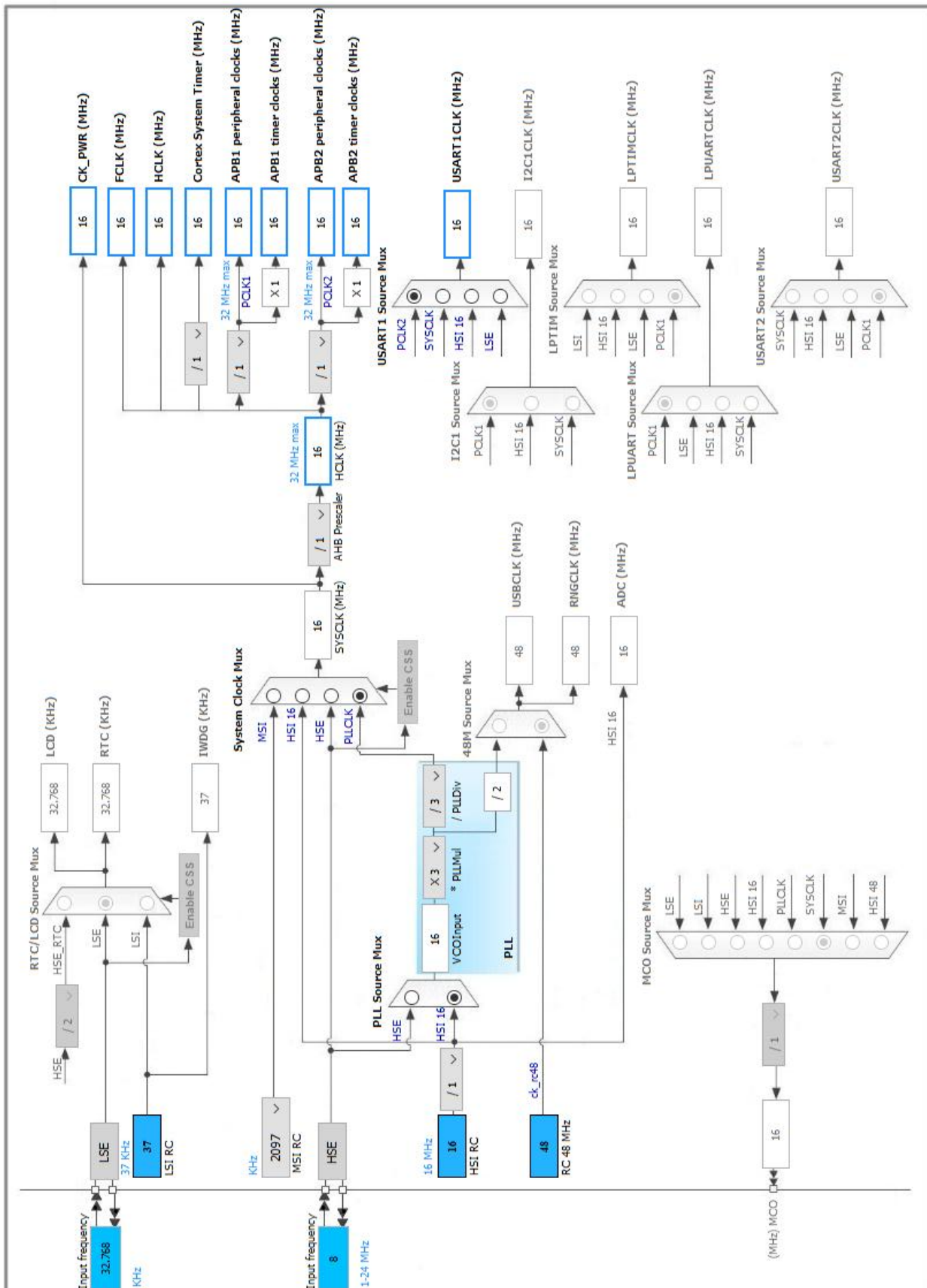
# 5. IPs and Middleware Configuration

## 5.1. RCC

**High Speed Clock (HSE): Crystal/Ceramic Resonator**
**Low Speed Clock (LSE) : Crystal/Ceramic Resonator**

### 5.1.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Buffer Cache | Enabled |
| Prefetch | Disabled |
| Preread | Enabled |
| Flash Latency(WS) | 0 WS (1 CPU cycle) |

**RCC Parameters:**

| | |
|---|---|
| HSI Calibration Value | 16 |
| MSI Calibration Value | 0 |
| HSE Startup Timout Value (ms) | 100 |
| LSE Startup Timout Value (ms) | 5000 |

**Power Parameters:**

| | |
|---|---|
| Power Regulator Voltage Scale | Power Regulator Voltage Scale 1 |

## 5.2. SYS

**Timebase Source: TIM2**

## 5.3. USART1

**Mode: Asynchronous**

### 5.3.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | 115200 |
| Word Length | 7 Bits (including Parity) |
| Parity | None |
| Stop Bits | 1 |

**Advanced Parameters:**

| Data Direction | Receive and Transmit |
|---|---|
| Over Sampling | 16 Samples |
| Single Sample | Disable |

**Advanced Features:**

| Auto Baudrate | Disable |
|---|---|
| TX Pin Active Level Inversion | Disable |
| RX Pin Active Level Inversion | Disable |
| Data Inversion | Disable |
| TX and RX Pins Swapping | Disable |
| Overrun | Enable |
| DMA on RX Error | Enable |
| MSB First | Disable |

## *5.4. FREERTOS*

**mode: Enabled**

### 5.4.1. Config parameters:

**Versions:**

| FreeRTOS version | 9.0.0 |
|---|---|
| CMSIS-RTOS version | 1.02 |

**Kernel settings:**

| USE_PREEMPTION | Enabled |
|---|---|
| CPU_CLOCK_HZ | SystemCoreClock |
| TICK_RATE_HZ | 1000 |
| MAX_PRIORITIES | 7 |
| MINIMAL_STACK_SIZE | 128 |
| MAX_TASK_NAME_LEN | 16 |
| USE_16_BIT_TICKS | Disabled |
| IDLE_SHOULD_YIELD | Enabled |
| USE_MUTEXES | Enabled |
| USE_RECURSIVE_MUTEXES | Disabled |
| USE_COUNTING_SEMAPHORES | Disabled |
| QUEUE_REGISTRY_SIZE | 8 |
| USE_APPLICATION_TASK_TAG | Disabled |
| ENABLE_BACKWARD_COMPATIBILITY | Enabled |
| USE_PORT_OPTIMISED_TASK_SELECTION | Disabled |
| USE_TICKLESS_IDLE | Disabled |
| USE_TASK_NOTIFICATIONS | Enabled |

**Memory management settings:**

| | |
|---|---|
| Memory Allocation | Dynamic |
| TOTAL_HEAP_SIZE | 3072 |
| Memory Management scheme | heap_4 |

**Hook function related definitions:**

| | |
|---|---|
| USE_IDLE_HOOK | Disabled |
| USE_TICK_HOOK | Disabled |
| USE_MALLOC_FAILED_HOOK | Disabled |
| USE_DAEMON_TASK_STARTUP_HOOK | Disabled |
| CHECK_FOR_STACK_OVERFLOW | Disabled |

**Run time and task stats gathering related definitions:**

| | |
|---|---|
| GENERATE_RUN_TIME_STATS | Disabled |
| USE_TRACE_FACILITY | Disabled |
| USE_STATS_FORMATTING_FUNCTIONS | Disabled |

**Co-routine related definitions:**

| | |
|---|---|
| USE_CO_ROUTINES | Disabled |
| MAX_CO_ROUTINE_PRIORITIES | 2 |

**Software timer definitions:**

| | |
|---|---|
| USE_TIMERS | Disabled |

**Interrupt nesting behaviour configuration:**

| | |
|---|---|
| LIBRARY_LOWEST_INTERRUPT_PRIORITY | 3 |
| LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY | 3 |

## 5.4.2. Include parameters:

**Include definitions:**

| | |
|---|---|
| vTaskPrioritySet | Enabled |
| uxTaskPriorityGet | Enabled |
| vTaskDelete | Enabled |
| vTaskCleanUpResources | Disabled |
| vTaskSuspend | Enabled |
| vTaskDelayUntil | Disabled |
| vTaskDelay | Enabled |
| xTaskGetSchedulerState | Enabled |
| xTaskResumeFromISR | Enabled |
| xQueueGetMutexHolder | Disabled |
| xSemaphoreGetMutexHolder | Disabled |
| pcTaskGetTaskName | Disabled |
| uxTaskGetStackHighWaterMark | Disabled |
| xTaskGetCurrentTaskHandle | Disabled |
| eTaskGetState | Disabled |
| xEventGroupSetBitFromISR | Disabled |

xTimerPendFunctionCall                  Disabled

xTaskAbortDelay                         Disabled

xTaskGetHandle                          Disabled

**\* User modified value**

# 6. System Configuration

## 6.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| RCC | PC14-OSC32_IN | RCC_OSC32_IN | n/a | n/a | n/a | |
| | PC15-OSC32_OUT | RCC_OSC32_OUT | n/a | n/a | n/a | |
| | PH0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PH1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | Pull-up | **Very High** * | |
| | PA10 | USART1_RX | Alternate Function Push Pull | Pull-up | **Very High** * | |
| GPIO | PA0 | GPIO_EXTI0 | **External Interrupt Mode with Rising/Falling edge** | No pull-up and no pull-down | n/a | userButton |

## 6.2. DMA configuration

nothing configured in DMA service

## 6.3. NVIC configuration

| Interrupt Table | Enable | Preenmption Priority | SubPriority |
|---|---|---|---|
| Non maskable interrupt | true | 0 | 0 |
| Hard fault interrupt | true | 0 | 0 |
| System service call via SWI instruction | true | 0 | 0 |
| Pendable request for system service | true | 3 | 0 |
| System tick timer | true | 3 | 0 |
| EXTI line 0 and line 1 interrupts | true | 0 | 0 |
| TIM2 global interrupt | true | 0 | 0 |
| USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25 | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash and EEPROM global interrupt | unused | | |
| RCC and CRS global interrupt | unused | | |

**\* User modified value**

# 7. Power Consumption Calculator report

7.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32L0 |
| Line | STM32L0x3 |
| MCU | STM32L053C8Tx |
| Datasheet | 025844_Rev6 |

7.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | null |

# 8. Software Project

## 8.1. Project Settings

| Name | Value |
|---|---|
| Project Name | EINK_THING_ATTEMPT1 |
| Project Folder | C:\Users\JON\Desktop\EINK_THING_ATTEMPT1 |
| Toolchain / IDE | MDK-ARM V5 |
| Firmware Package Name and Version | STM32Cube FW_L0 V1.9.0 |

## 8.2. Code Generation Settings

| Name | Value |
|---|---|
| STM32Cube Firmware Library Package | Copy all used libraries into the project folder |
| Generate peripheral initialization as a pair of '.c/.h' files | No |
| Backup previously generated files when re-generating | No |
| Delete previously generated files when not re-generated | Yes |
| Set all free pins as analog (to optimize the power consumption) | No |