# 1. Description

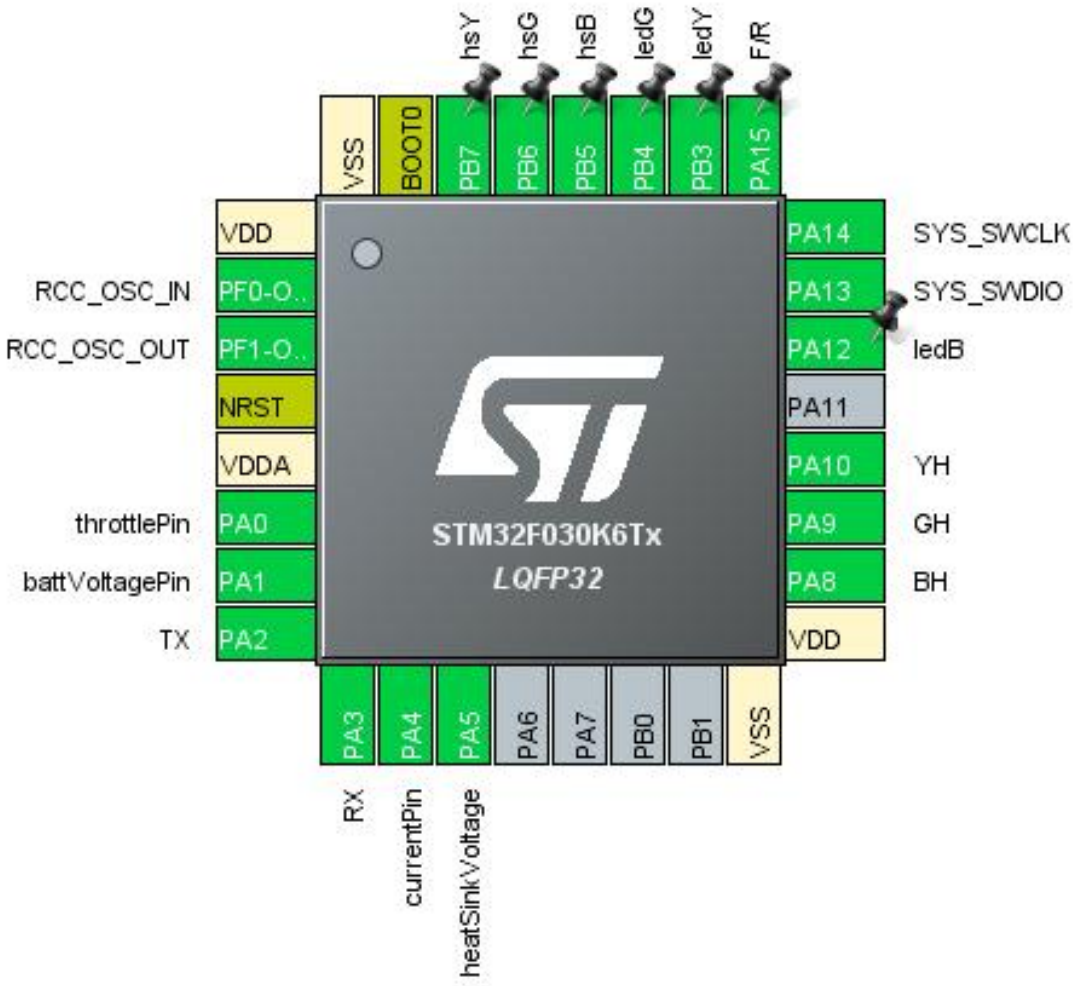
## 1.1. Project

| | |
|---|---|
| Project Name | TIM1andUSART1 |
| Board Name | custom |
| Generated with: | STM32CubeMX 5.4.0 |
| Date | 11/30/2020 |

## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F0 |
| MCU Line | STM32F0x0 Value Line |
| MCU name | STM32F030K6Tx |
| MCU Package | LQFP32 |
| MCU Pin number | 32 |

## 2. Pinout Configuration

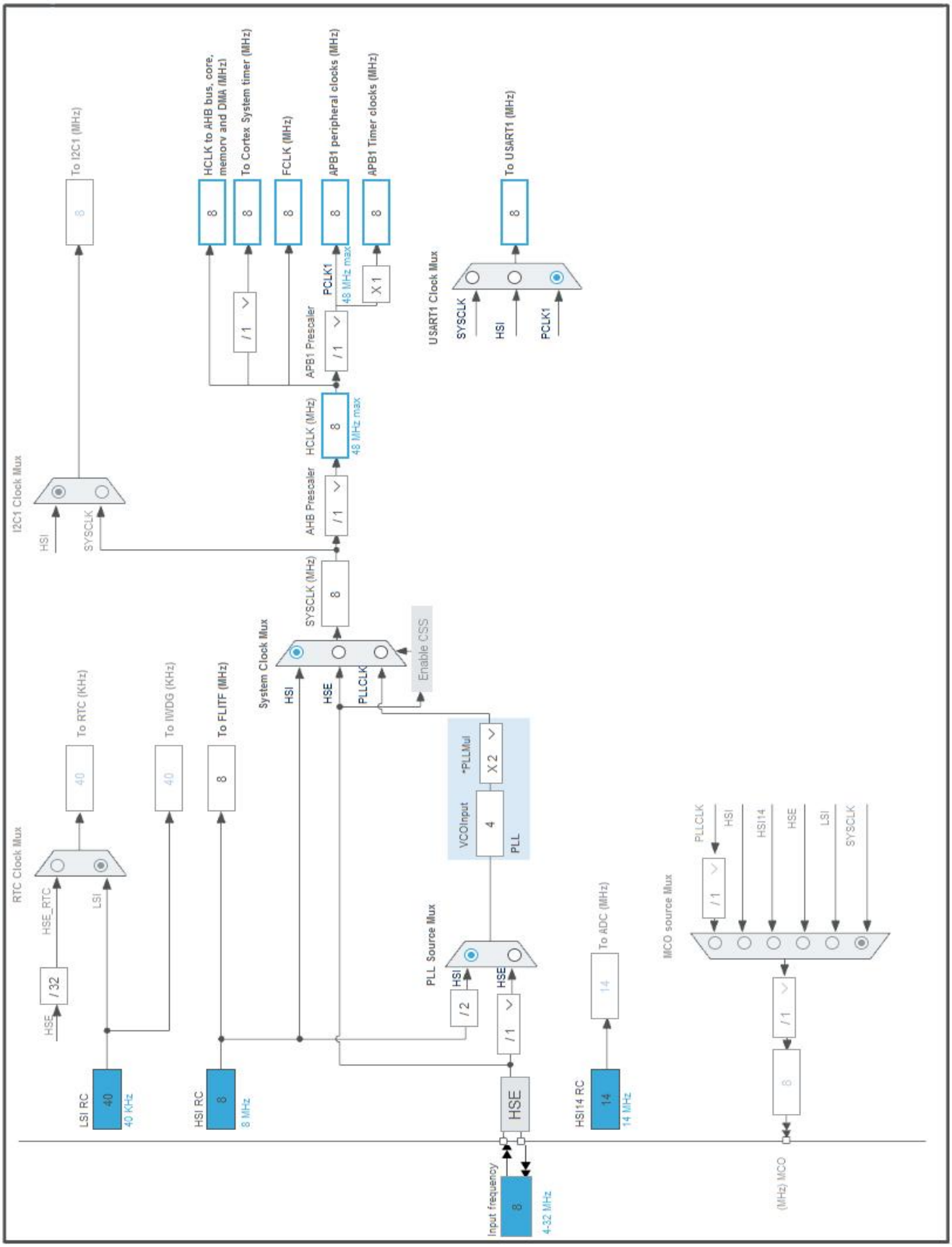


# 3. Pins Configuration

| Pin Number LQFP32 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | VDD | Power | | |
| 2 | PF0-OSC_IN | I/O | RCC_OSC_IN | |
| 3 | PF1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 4 | NRST | Reset | | |
| 5 | VDDA | Power | | |
| 6 | PA0 | I/O | ADC_IN0 | throttlePin |
| 7 | PA1 | I/O | ADC_IN1 | battVoltagePin |
| 8 | PA2 | I/O | USART1_TX | TX |
| 9 | PA3 | I/O | USART1_RX | RX |
| 10 | PA4 | I/O | ADC_IN4 | currentPin |
| 11 | PA5 | I/O | ADC_IN5 | heatSinkVoltage |
| 16 | VSS | Power | | |
| 17 | VDD | Power | | |
| 18 | PA8 | I/O | TIM1_CH1 | BH |
| 19 | PA9 | I/O | TIM1_CH2 | GH |
| 20 | PA10 | I/O | TIM1_CH3 | YH |
| 22 | PA12 * | I/O | GPIO_Output | ledB |
| 23 | PA13 | I/O | SYS_SWDIO | |
| 24 | PA14 | I/O | SYS_SWCLK | |
| 25 | PA15 * | I/O | GPIO_Input | F/R |
| 26 | PB3 * | I/O | GPIO_Output | ledY |
| 27 | PB4 * | I/O | GPIO_Output | ledG |
| 28 | PB5 | I/O | GPIO_EXTI5 | hsB |
| 29 | PB6 | I/O | GPIO_EXTI6 | hsG |
| 30 | PB7 | I/O | GPIO_EXTI7 | hsY |
| 31 | BOOT0 | Boot | | |
| 32 | VSS | Power | | |

* The pin is affected with an I/O function

# 4. Clock Tree Configuration



# 5. Software Project

## 5.1. Project Settings

| Name | Value |
|---|---|
| Project Name | TIM1andUSART1 |
| Project Folder | D:\Desktop from D drive\ARM codes\TIM1andUSART1 |
| Toolchain / IDE | MDK-ARM V5.27 |
| Firmware Package Name and Version | STM32Cube FW_F0 V1.11.2 |

## 5.2. Code Generation Settings

| Name | Value |
|---|---|
| STM32Cube MCU packages and embedded software | Copy all used libraries into the project folder |
| Generate peripheral initialization as a pair of '.c/.h' files | Yes |
| 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 |

# 6. Power Consumption Calculator report

6.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F0 |
| Line | STM32F0x0 Value Line |
| MCU | STM32F030K6Tx |
| Datasheet | 024849_Rev2 |

6.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.6 |

# 7. IPs and Middleware Configuration

## 7.1. ADC

**mode: IN0**

**mode: IN1**

**mode: IN4**

**mode: IN5**

**mode: Temperature Sensor Channel**

**mode: Vrefint Channel**

### 7.1.1. Parameter Settings:

**ADC_Settings:**

| | |
|---|---|
| Clock Prescaler | **Synchronous clock mode divided by 2 *** |
| Resolution | ADC 12-bit resolution |
| Data Alignment | Right alignment |
| Scan Conversion Mode | Forward |
| Continuous Conversion Mode | **Enabled *** |
| Discontinuous Conversion Mode | Disabled |
| DMA Continuous Requests | **Enabled *** |
| End Of Conversion Selection | **End of sequence of conversion *** |
| Overrun behaviour | Overrun data preserved |
| Low Power Auto Wait | Disabled |
| Low Power Auto Power Off | Disabled |

**ADC_Regular_ConversionMode:**

| | |
|---|---|
| Sampling Time | **13.5 Cycles *** |
| External Trigger Conversion Source | Regular Conversion launched by software |
| External Trigger Conversion Edge | None |

**WatchDog:**

| | |
|---|---|
| Enable Analog WatchDog Mode | false |

## 7.2. GPIO

## 7.3. RCC

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

### 7.3.1. Parameter Settings:

**System Parameters:**

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

**RCC Parameters:**

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

## *7.4. SYS*

**mode: Debug Serial Wire**

**Timebase Source: SysTick**

## *7.5. TIM1*

**Clock Source : Internal Clock**

**Channel1: PWM Generation CH1**

**Channel2: PWM Generation CH2**

**Channel3: PWM Generation CH3**

### 7.5.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | **480 *** |
| Internal Clock Division (CKD) | No Division |
| Repetition Counter (RCR - 8 bits value) | 0 |
| auto-reload preload | Disable |

**Trigger Output (TRGO) Parameters:**

| | |
|---|---|
| Master/Slave Mode (MSM bit) | Disable (Trigger input effect not delayed) |
| Trigger Event Selection | Reset (UG bit from TIMx_EGR) |

**Break And Dead Time management - BRK Configuration:**

| | |
|---|---|
| BRK State | Disable |
| BRK Polarity | High |

**Break And Dead Time management - Output Configuration:**

| | |
|---|---|
| Automatic Output State | Disable |
| Off State Selection for Run Mode (OSSR) | Disable |

| | |
|---|---|
| Off State Selection for Idle Mode (OSSI) | Disable |
| Lock Configuration | Off |

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | **50 *** |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

**PWM Generation Channel 2:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | **100 *** |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

**PWM Generation Channel 3:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | **200 *** |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

## *7.6. USART1*

### Mode: Asynchronous

### 7.6.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | **115200 *** |
| Word Length | 8 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 |

*** User modified value**

# 8. System Configuration

## 8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| ADC | PA0 | ADC_IN0 | Analog mode | No pull-up and no pull-down | n/a | throttlePin |
| | PA1 | ADC_IN1 | Analog mode | No pull-up and no pull-down | n/a | battVoltagePin |
| | PA4 | ADC_IN4 | Analog mode | No pull-up and no pull-down | n/a | currentPin |
| | PA5 | ADC_IN5 | Analog mode | No pull-up and no pull-down | n/a | heatSinkVoltage |
| RCC | PF0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PF1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SYS | PA13 | SYS_SWDIO | n/a | n/a | n/a | |
| | PA14 | SYS_SWCLK | n/a | n/a | n/a | |
| TIM1 | PA8 | TIM1_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | **High *** | BH |
| | PA9 | TIM1_CH2 | Alternate Function Push Pull | No pull-up and no pull-down | **High *** | GH |
| | PA10 | TIM1_CH3 | Alternate Function Push Pull | No pull-up and no pull-down | **High *** | YH |
| USART1 | PA2 | USART1_TX | Alternate Function Push Pull | No pull-up and no pull-down | **High *** | TX |
| | PA3 | USART1_RX | Alternate Function Push Pull | No pull-up and no pull-down | **High *** | RX |
| GPIO | PA12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ledB |
| | PA15 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | F/R |
| | PB3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ledY |
| | PB4 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ledG |
| | PB5 | GPIO_EXTI5 | **External Interrupt Mode with Rising/Falling edge** | **Pull-up *** | n/a | hsB |
| | PB6 | GPIO_EXTI6 | **External Interrupt Mode with Rising/Falling edge** | **Pull-up *** | n/a | hsG |
| | PB7 | GPIO_EXTI7 | **External Interrupt Mode with Rising/Falling edge** | **Pull-up *** | n/a | hsY |

## 8.2. DMA configuration

| DMA request | Stream | Direction | Priority |
|---|---|---|---|
| ADC | DMA1_Channel1 | Peripheral To Memory | Low |

*ADC: DMA1_Channel1 DMA request Settings:*

| | |
|---|---|
| Mode: | **Circular *** |
| Peripheral Increment: | Disable |
| Memory Increment: | **Enable *** |
| Peripheral Data Width: | Half Word |
| Memory Data Width: | Half Word |

## 8.3. 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 | 0 | 0 |
| System tick timer | true | 0 | 0 |
| EXTI line 4 to 15 interrupts | true | 0 | 0 |
| DMA1 channel 1 interrupt | true | 0 | 0 |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| ADC interrupt | unused | | |
| TIM1 break, update, trigger and commutation interrupts | unused | | |
| TIM1 capture compare interrupt | unused | | |
| USART1 global interrupt | unused | | |

*** User modified value**

# 9. Software Pack Report