

## 1. Description

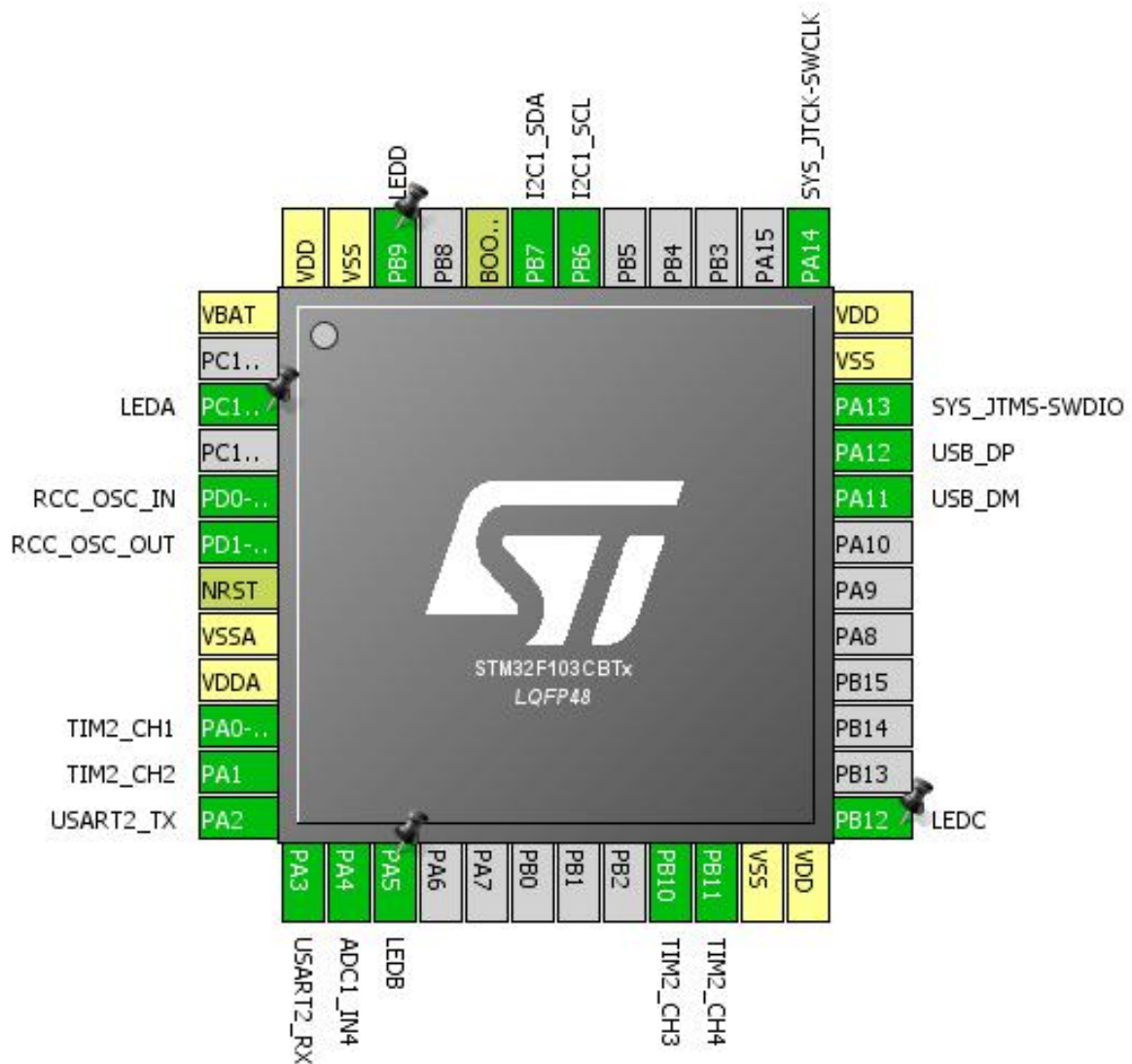
### 1.1. Project

Project Name	flying_spirit_freeRTOS
Board Name	flying_spirit_freeRTOS
Generated with:	STM32CubeMX 4.20.0
Date	04/13/2017

### 1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103CBTx
MCU Package	LQFP48
MCU Pin number	48

## 2. Pinout Configuration

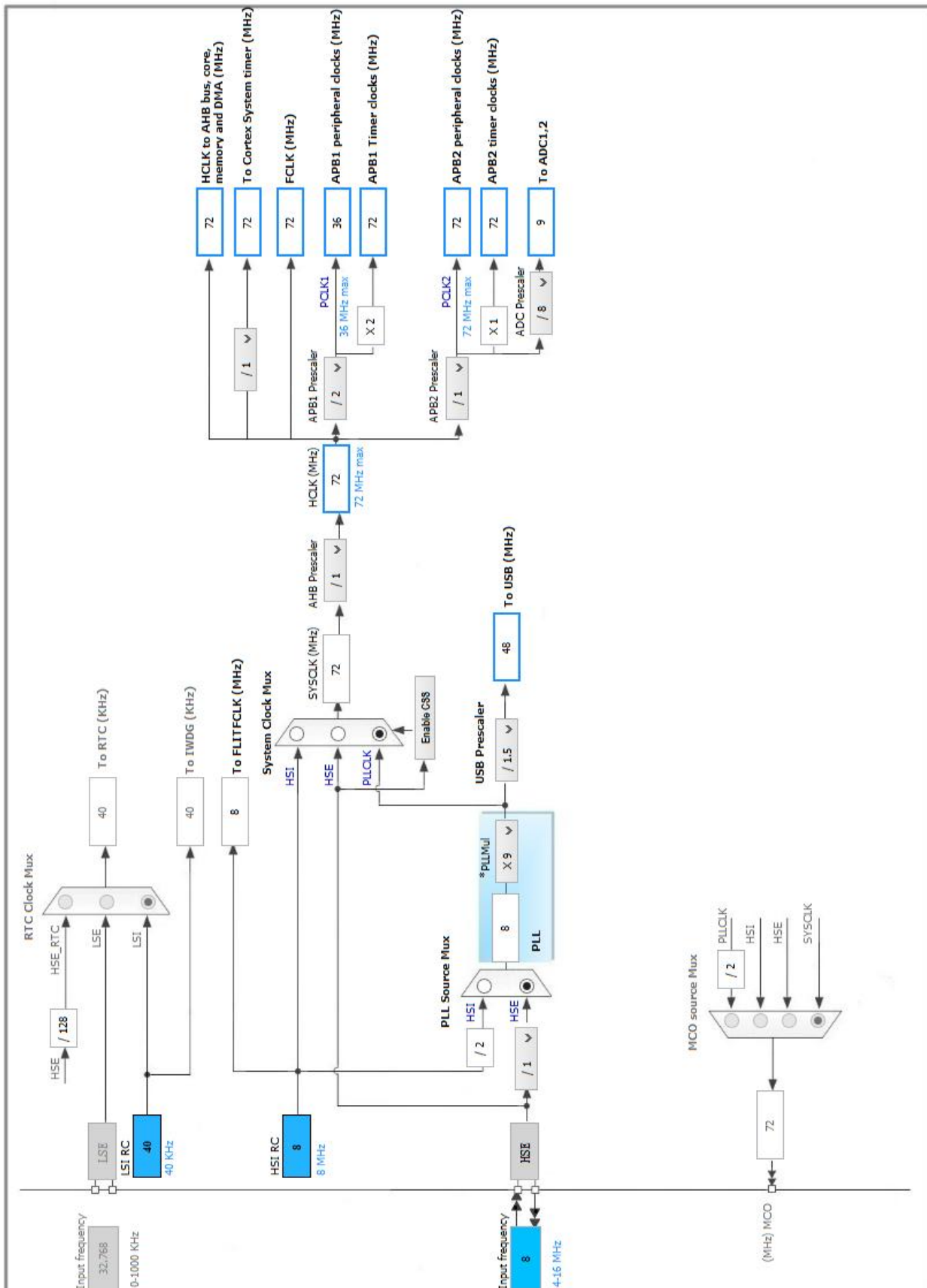


### 3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
3	PC14-OSC32_IN *	I/O	GPIO_Output	LEDA
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0-WKUP	I/O	TIM2_CH1	
11	PA1	I/O	TIM2_CH2	
12	PA2	I/O	USART2_TX	
13	PA3	I/O	USART2_RX	
14	PA4	I/O	ADC1_IN4	
15	PA5 *	I/O	GPIO_Output	LEDB
21	PB10	I/O	TIM2_CH3	
22	PB11	I/O	TIM2_CH4	
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	LEDC
32	PA11	I/O	USB_DM	
33	PA12	I/O	USB_DP	
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
42	PB6	I/O	I2C1_SCL	
43	PB7	I/O	I2C1_SDA	
44	BOOT0	Boot		
46	PB9 *	I/O	GPIO_Output	LEDD
47	VSS	Power		
48	VDD	Power		

\* The pin is affected with an I/O function

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. ADC1

mode: IN4

#### 5.1.1. Parameter Settings:

##### ADCs\_Common\_Settings:

Mode Independent mode

##### ADC\_Settings:

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

##### ADC\_Regular\_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 4

Sampling Time 1.5 Cycles

##### ADC\_Injected\_ConversionMode:

Number Of Conversions 0

##### WatchDog:

Enable Analog WatchDog Mode false

### 5.2. I2C1

I2C: I2C

#### 5.2.1. Parameter Settings:

##### Master Features:

I2C Speed Mode Standard Mode

I2C Clock Speed (Hz) 100000

##### Slave Features:

Clock No Stretch Mode Disabled

Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

### 5.3. RCC

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

##### 5.3.1. Parameter Settings:

###### System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

###### RCC Parameters:

HSI Calibration Value	16
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

### 5.4. SYS

#### Debug: Serial Wire

#### Timebase Source: TIM4

### 5.5. TIM2

#### Channel1: PWM Generation CH1

#### Channel2: PWM Generation CH2

#### Channel3: PWM Generation CH3

#### Channel4: PWM Generation CH4

##### 5.5.1. Parameter Settings:

###### Counter Settings:

Prescaler (PSC - 16 bits value)	3-1 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	1000-1 *

Internal Clock Division (CKD)	No Division
<b>Trigger Output (TRGO) Parameters:</b>	
Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)
<b>PWM Generation Channel 1:</b>	
Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High
<b>PWM Generation Channel 2:</b>	
Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High
<b>PWM Generation Channel 3:</b>	
Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High
<b>PWM Generation Channel 4:</b>	
Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

## 5.6. TIM3

### mode: Clock Source

#### 5.6.1. Parameter Settings:

##### Counter Settings:

Prescaler (PSC - 16 bits value)	<b>72-1 *</b>
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	<b>1000-1 *</b>
Internal Clock Division (CKD)	No Division

##### Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

## 5.7. USART2

Mode: Asynchronous

### 5.7.1. 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

## 5.8. USB

mode: Device (FS)

### 5.8.1. Parameter Settings:

#### Basic Parameters:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	8 Bytes

#### Power Parameters:

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

## 5.9. FREERTOS

mode: Enabled

### 5.9.1. Config parameters:

Versions:



FreeRTOS version	8.2.3
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
USE_ALTERNATIVE_API	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

**Memory management settings:**

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
CHECK_FOR_STACK_OVERFLOW	Disabled

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

USE_TRACE_FACILITY	Enabled
GENERATE_RUN_TIME_STATS	Disabled

**Co-routine related definitions:**

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

**Software timer definitions:**

USE_TIMERS	Disabled
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**Interrupt nesting behaviour configuration:**

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

### 5.9.2. 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

## 5.10. USB\_DEVICE

### Class For FS IP: Communication Device Class (Virtual Port Com)

#### 5.10.1. Parameter Settings:

##### Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

##### Class Parameters:

USBD_CDC_INTERVAL (Number of micro-frames interval)	1000
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#### 5.10.2. Device Descriptor:



## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PA4	ADC1_IN4	Analog mode	n/a	n/a	
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	n/a	High *	
	PB7	I2C1_SDA	Alternate Function Open Drain	n/a	High *	
RCC	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM2	PA0-WKUP	TIM2_CH1	Alternate Function Push Pull	n/a	Low	
	PA1	TIM2_CH2	Alternate Function Push Pull	n/a	Low	
	PB10	TIM2_CH3	Alternate Function Push Pull	n/a	Low	
	PB11	TIM2_CH4	Alternate Function Push Pull	n/a	Low	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	High *	
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	n/a	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PC14-OSC32_IN	GPIO_Output	Output Push Pull	n/a	Low	LEDA
	PA5	GPIO_Output	Output Push Pull	n/a	Low	LEDB
	PB12	GPIO_Output	Output Push Pull	n/a	Low	LEDC
	PB9	GPIO_Output	Output Push Pull	n/a	Low	LEDD

### 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
Memory management fault	true	0	0
Prefetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	15	0
System tick timer	true	15	0
USB low priority or CAN RX0 interrupts	true	5	0
TIM3 global interrupt	true	5	0
TIM4 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
USB high priority or CAN TX interrupts	unused		
TIM2 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
USART2 global interrupt	unused		

\* User modified value

## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103CBTx
Datasheet	13587_Rev17

### 7.2. Parameter Selection

Temperature	25
Vdd	3.3

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	flying_spirit_freeRTOS
Project Folder	C:\Users\ALEX.DON.SCOFIELD\Desktop\quadcopter\flying_spirit\flying_spirit_fre
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F1 V1.4.0

### 8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Copy only the necessary library files
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