1. Description

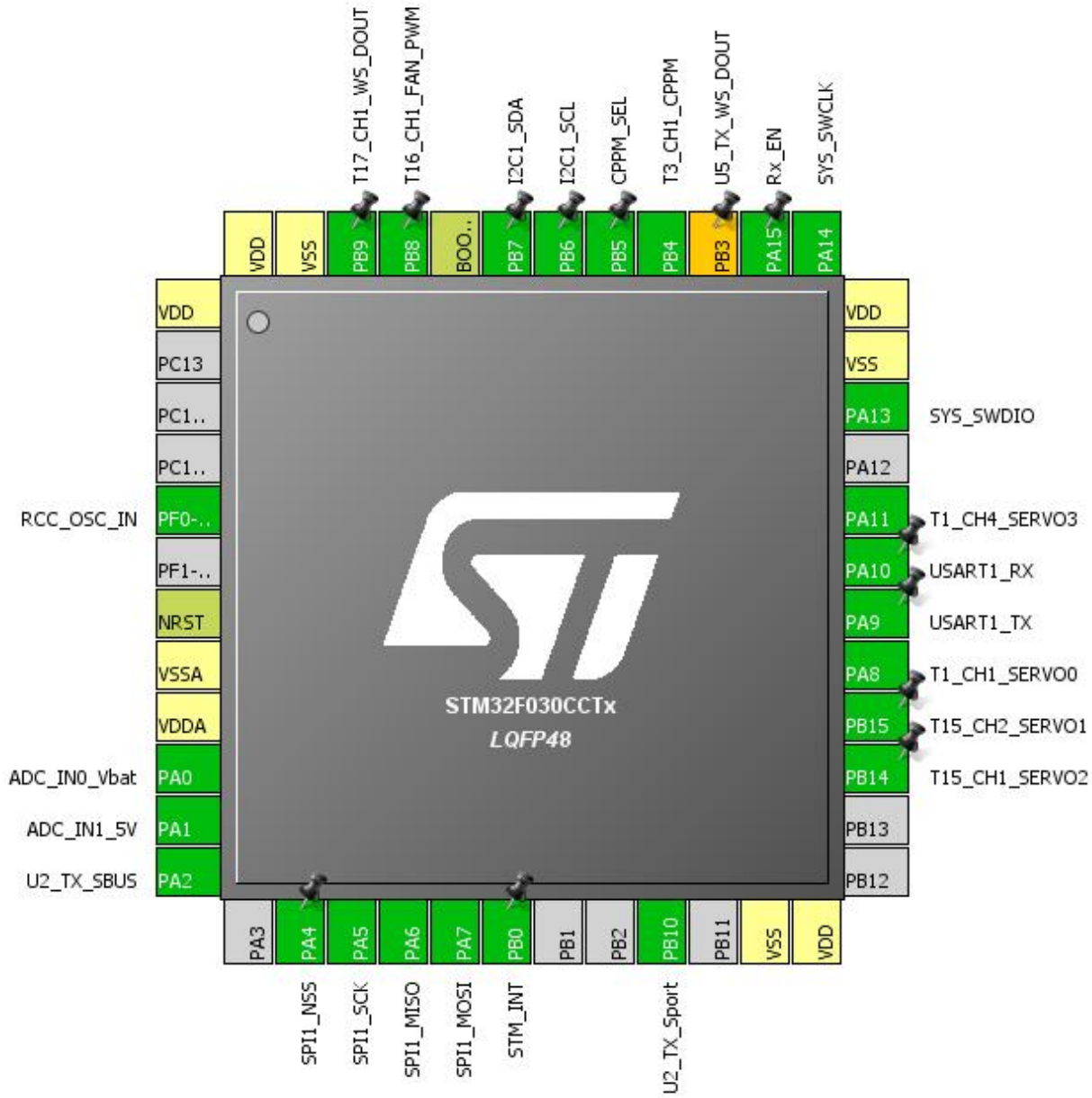
1.1. Project

Project Name	drone-hat-io
Board Name	No information
Generated with:	STM32CubeMX 4.25.0
Date	04/01/2018

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x0 Value Line
MCU name	STM32F030CCTx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration



3. Pins Configuration

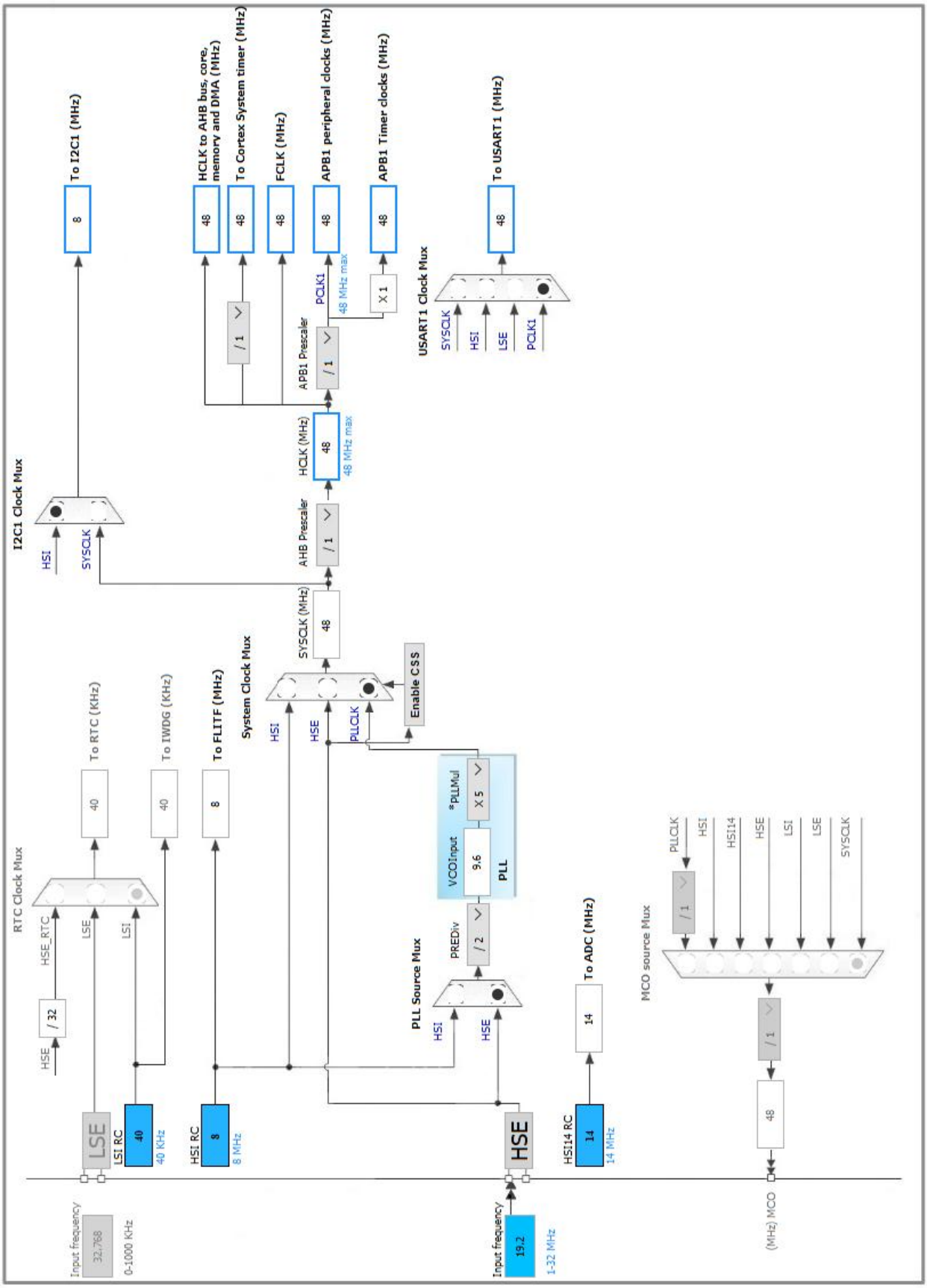
Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0	I/O	ADC_IN0	ADC_IN0_Vbat
11	PA1	I/O	ADC_IN1	ADC_IN1_5V
12	PA2	I/O	USART2_TX	U2_TX_SBUS
14	PA4	I/O	SPI1_NSS	
15	PA5	I/O	SPI1_SCK	
16	PA6	I/O	SPI1_MISO	
17	PA7	I/O	SPI1_MOSI	
18	PB0 *	I/O	GPIO_Output	STM_INT
21	PB10	I/O	USART3_TX	U2_TX_Sport
23	VSS	Power		
24	VDD	Power		
27	PB14	I/O	TIM15_CH1	T15_CH1_SERVO2
28	PB15	I/O	TIM15_CH2	T15_CH2_SERVO1
29	PA8	I/O	TIM1_CH1	T1_CH1_SERVO0
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
32	PA11	I/O	TIM1_CH4	T1_CH4_SERVO3
34	PA13	I/O	SYS_SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_SWCLK	
38	PA15 *	I/O	GPIO_Output	Rx_EN
39	PB3 **	I/O	USART5_TX	U5_TX_WS_DOUT
40	PB4	I/O	TIM3_CH1	T3_CH1_CPPM
41	PB5 *	I/O	GPIO_Output	CPPM_SEL
42	PB6	I/O	I2C1_SCL	
43	PB7	I/O	I2C1_SDA	
44	BOOT0	Boot		
45	PB8	I/O	TIM16_CH1	T16_CH1_FAN_PWM
46	PB9	I/O	TIM17_CH1	T17_CH1_WS_DOUT
47	VSS	Power		

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
48	VDD	Power		

* The pin is affected with an I/O function

** The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC

mode: IN0

mode: IN1

mode: Temperature Sensor Channel

mode: Vrefint Channel

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Forward
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Power Auto Power Off	Disabled

ADC_Regular_ConversionMode:

Sampling Time	1.5 Cycles
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None

WatchDog:

Enable Analog WatchDog Mode	false

5.2. I2C1

I2C: I2C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	**Fast Mode ***

I2C Speed Frequency (KHz)	400
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0000020B ***

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	**90 ***

5.3. RCC

High Speed Clock (HSE): BYPASS Clock Source

5.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
HSI14 Calibration Value	16
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.4. SPI1

Mode: Full-Duplex Slave
Hardware NSS Signal: Hardware NSS Input Signal

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola

Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Input Hardware

5.5. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

5.6. TIM1

Channel1: PWM Generation CH1

Channel4: PWM Generation CH4

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
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)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

PWM Generation Channel 4:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

5.7. TIM3

Channel1: Output Compare CH1

5.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
Internal Clock Division (CKD)	No Division
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)

Output Compare Channel 1:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
CH Polarity	High

5.8. TIM15

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

5.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
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)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

5.9. TIM16

mode: Activated

Channel1: PWM Generation CH1

5.9.1. Parameter Settings:

Counter Settings:

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

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)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

5.10. TIM17

mode: Activated

Channel1: PWM Generation CH1

5.10.1. Parameter Settings:

Counter Settings:

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

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)	0
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

5.11. USART1

Mode: Asynchronous

5.11.1. 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

5.12. USART2

Mode: Single Wire (Half-Duplex)

5.12.1. Parameter Settings:

Basic Parameters:

Baud Rate	**100000 ***
Word Length	**9 Bits (including Parity) ***
Parity	**Even ***
Stop Bits	**2 ***

Advanced Parameters:

Data Direction	**Receive Only ***
Over Sampling	16 Samples
Single Sample	Disable

Advanced Features:

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

5.13. USART3

Mode: Single Wire (Half-Duplex)

5.13.1. Parameter Settings:

Basic Parameters:

Baud Rate	**57600 ***
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	**Enable ***
RX Pin Active Level Inversion	**Enable ***
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

6. System Configuration

6.1. 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	ADC_IN0_Vbat
	PA1	ADC_IN1	Analog mode	No pull-up and no pull-down	n/a	ADC_IN1_5V
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	**High ***	
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
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	Low	T1_CH1_SERVO0
	PA11	TIM1_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	T1_CH4_SERVO3
TIM3	PB4	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	T3_CH1_CPPM
TIM15	PB14	TIM15_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	T15_CH1_SERVO2
	PB15	TIM15_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	T15_CH2_SERVO1
TIM16	PB8	TIM16_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	T16_CH1_FAN_PWM
TIM17	PB9	TIM17_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	T17_CH1_WS_DOUT
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
USART2	PA2	USART2_TX	Alternate Function Open Drain	No pull-up and no pull-down	**High ***	U2_TX_SBUS
USART3	PB10	USART3_TX	Alternate Function Open Drain	No pull-up and no pull-down	**High ***	U2_TX_Sport
Single Mapped Signals	PB3	USART5_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	U5_TX_WS_DOUT
GPIO	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STM_INT
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Rx_EN
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CPPM_SEL

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	0	0
System tick timer	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		
TIM3 global interrupt	unused		
TIM15 global interrupt	unused		
TIM16 global interrupt	unused		
TIM17 global interrupt	unused		
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	unused		
SPI1 global interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
USART3 to USART6 global interrupts	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x0 Value Line
MCU	STM32F030CCTx
Datasheet	024849_Rev2

7.2. Parameter Selection

Temperature	25
Vdd	3.6

8. Software Pack Report