1. Description

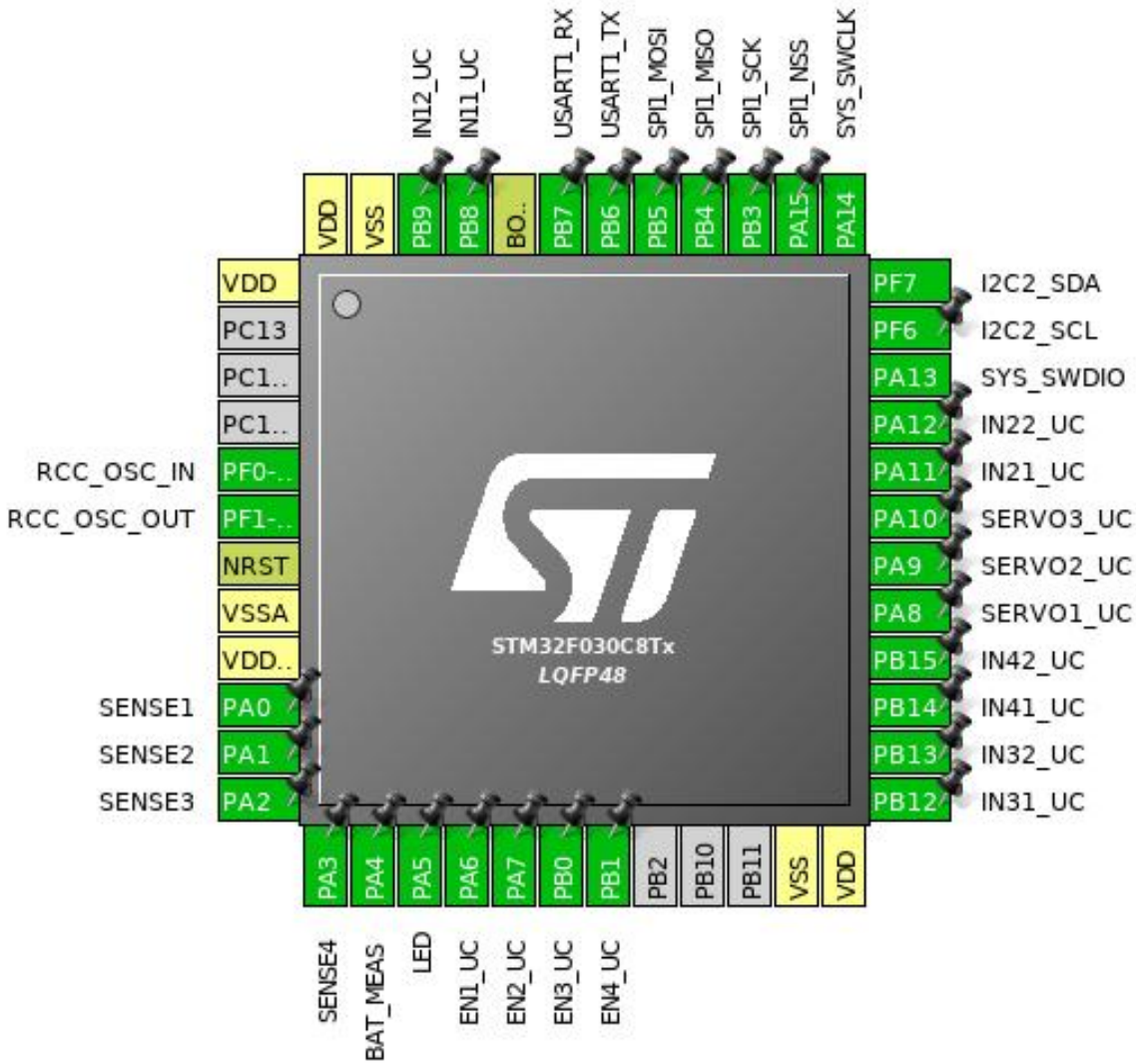
1.1. Project

Project Name	firmware-shield
Board Name	cubemx
Generated with:	STM32CubeMX 4.26.1
Date	08/02/2018

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x0 Value Line
MCU name	STM32F030C8Tx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration



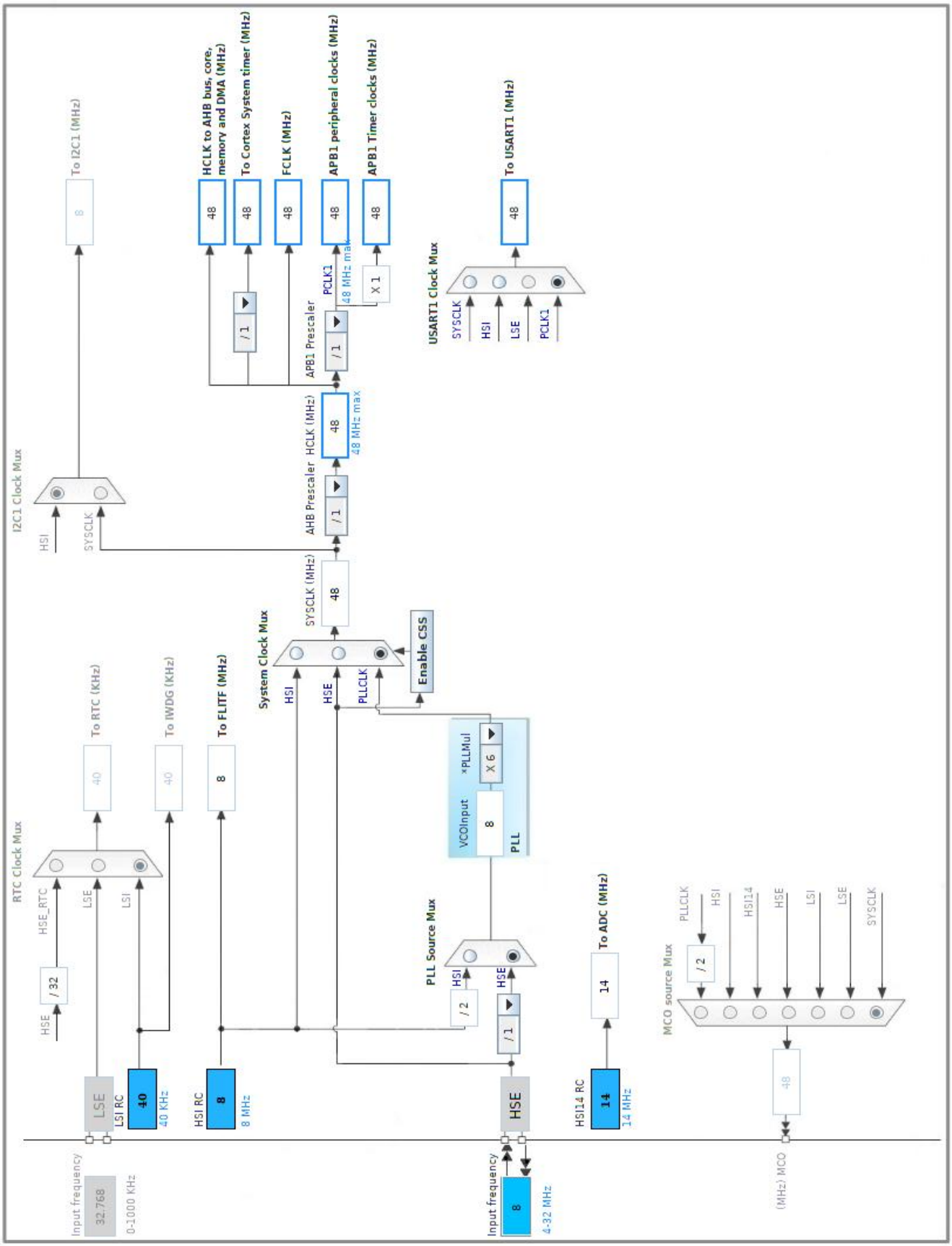
3. Pins Configuration

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	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0	I/O	ADC_IN0	SENSE1
11	PA1	I/O	ADC_IN1	SENSE2
12	PA2	I/O	ADC_IN2	SENSE3
13	PA3	I/O	ADC_IN3	SENSE4
14	PA4	I/O	ADC_IN4	BAT_MEAS
15	PA5 *	I/O	GPIO_Output	LED
16	PA6	I/O	TIM3_CH1	EN1_UC
17	PA7	I/O	TIM3_CH2	EN2_UC
18	PB0	I/O	TIM3_CH3	EN3_UC
19	PB1	I/O	TIM3_CH4	EN4_UC
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	IN31_UC
26	PB13 *	I/O	GPIO_Output	IN32_UC
27	PB14 *	I/O	GPIO_Output	IN41_UC
28	PB15 *	I/O	GPIO_Output	IN42_UC
29	PA8	I/O	TIM1_CH1	SERVO1_UC
30	PA9	I/O	TIM1_CH2	SERVO2_UC
31	PA10	I/O	TIM1_CH3	SERVO3_UC
32	PA11 *	I/O	GPIO_Output	IN21_UC
33	PA12 *	I/O	GPIO_Output	IN22_UC
34	PA13	I/O	SYS_SWDIO	
35	PF6	I/O	I2C2_SCL	
36	PF7	I/O	I2C2_SDA	
37	PA14	I/O	SYS_SWCLK	
38	PA15	I/O	SPI1_NSS	
39	PB3	I/O	SPI1_SCK	
40	PB4	I/O	SPI1_MISO	
41	PB5	I/O	SPI1_MOSI	
42	PB6	I/O	USART1_TX	

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
43	PB7	I/O	USART1_RX	
44	BOOT0	Boot		
45	PB8 *	I/O	GPIO_Output	IN11_UC
46	PB9 *	I/O	GPIO_Output	IN12_UC
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. ADC

mode: IN0

mode: IN1

mode: IN2

mode: IN3

mode: IN4

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	**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	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. I2C2

mode: I2C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0

Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x20303E5D ***

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	0

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)	1 WS (2 CPU cycle)

RCC Parameters:

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

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**15 ***
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	**Enable ***

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

PWM Generation Channel 3:

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

5.7. TIM3

mode: Clock Source

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

5.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**19 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**127 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

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

PWM Generation Channel 1:

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

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0

Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 3:

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

PWM Generation Channel 4:

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

5.8. USART1

Mode: Asynchronous

5.8.1. 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**

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	SENSE1
	PA1	ADC_IN1	Analog mode	No pull-up and no pull-down	n/a	SENSE2
	PA2	ADC_IN2	Analog mode	No pull-up and no pull-down	n/a	SENSE3
	PA3	ADC_IN3	Analog mode	No pull-up and no pull-down	n/a	SENSE4
	PA4	ADC_IN4	Analog mode	No pull-up and no pull-down	n/a	BAT_MEAS
I2C2	PF6	I2C2_SCL	Alternate Function Open Drain	Pull-up	**High ***	
	PF7	I2C2_SDA	Alternate Function Open Drain	Pull-up	**High ***	
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	
SPI1	PA15	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB3	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB4	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB5	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	SERVO1_UC
	PA9	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	SERVO2_UC
	PA10	TIM1_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	SERVO3_UC
TIM3	PA6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	EN1_UC
	PA7	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	EN2_UC
	PB0	TIM3_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	EN3_UC
	PB1	TIM3_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	EN4_UC
USART1	PB6	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB7	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
GPIO	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN31_UC
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN32_UC
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN41_UC
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN42_UC
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN21_UC
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN22_UC
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN11_UC

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IN12_UC

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	Low
USART1_RX	DMA1_Channel3	Peripheral To Memory	Low
USART1_TX	DMA1_Channel2	Memory To Peripheral	Low

ADC: DMA1_Channel1 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Half Word
Memory Data Width:	Half Word

USART1_RX: DMA1_Channel3 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART1_TX: DMA1_Channel2 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

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
DMA1 channel 1 interrupt	true	2	0
DMA1 channel 2 and 3 interrupts	true	0	0
I2C2 global interrupt	true	1	0
SPI1 global interrupt	true	1	0
USART1 global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC global interrupt	unused		
TIM1 break, update, trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
TIM3 global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x0 Value Line
MCU	STM32F030C8Tx
Datasheet	024849_Rev2

7.2. Parameter Selection

Temperature	25
Vdd	3.6

8. Software Project

8.1. Project Settings

Name	Value
Project Name	firmware-shield
Project Folder	/home/frozen/firmware-shield
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F0 V1.9.0

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	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

9. Software Pack Report