1. Description

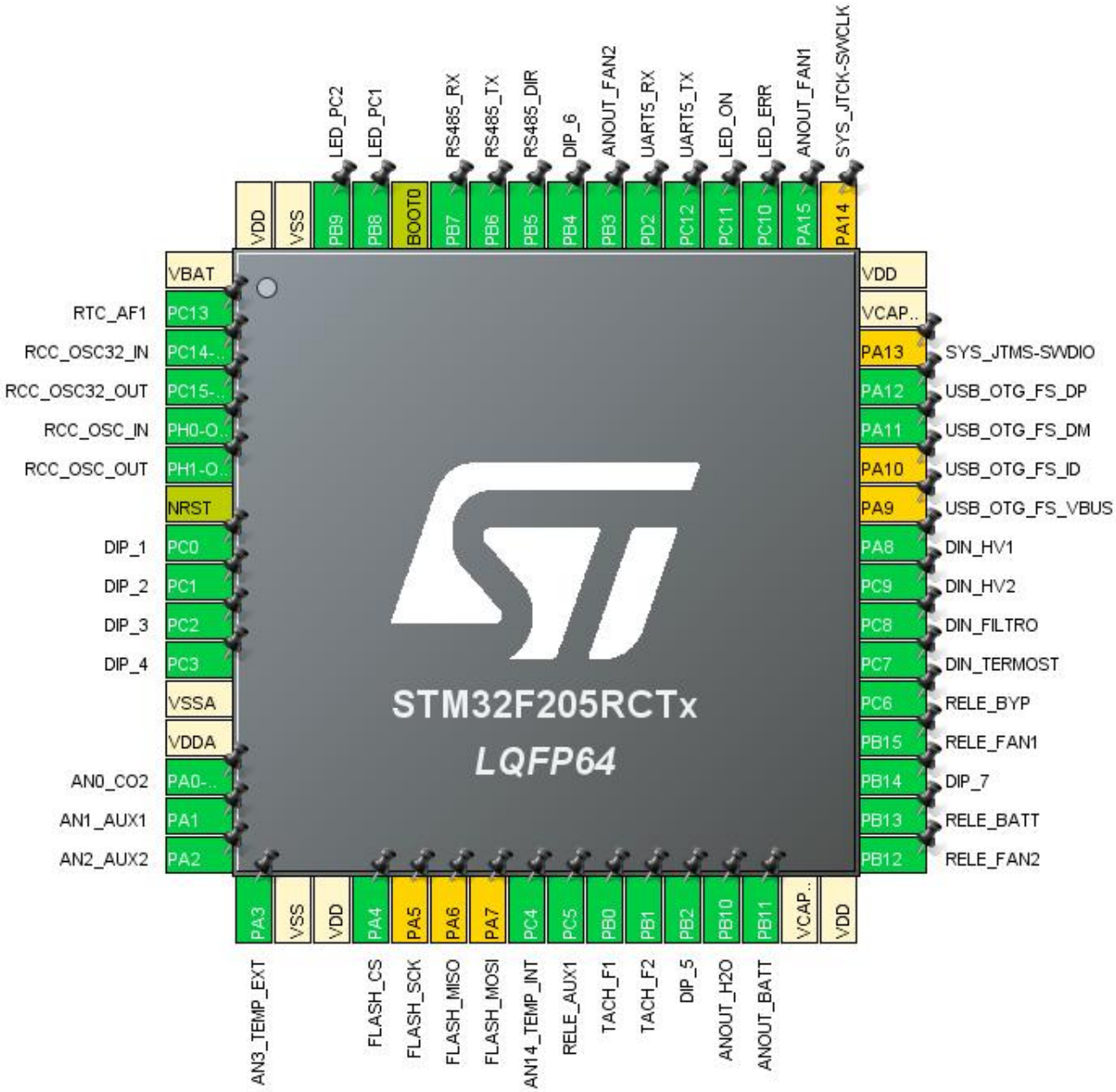
1.1. Project

Project Name	FW00055
Board Name	custom
Generated with:	STM32CubeMX 5.6.1
Date	08/06/2020

1.2. MCU

MCU Series	STM32F2
MCU Line	STM32F2x5
MCU name	STM32F205RCTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



3. Pins Configuration

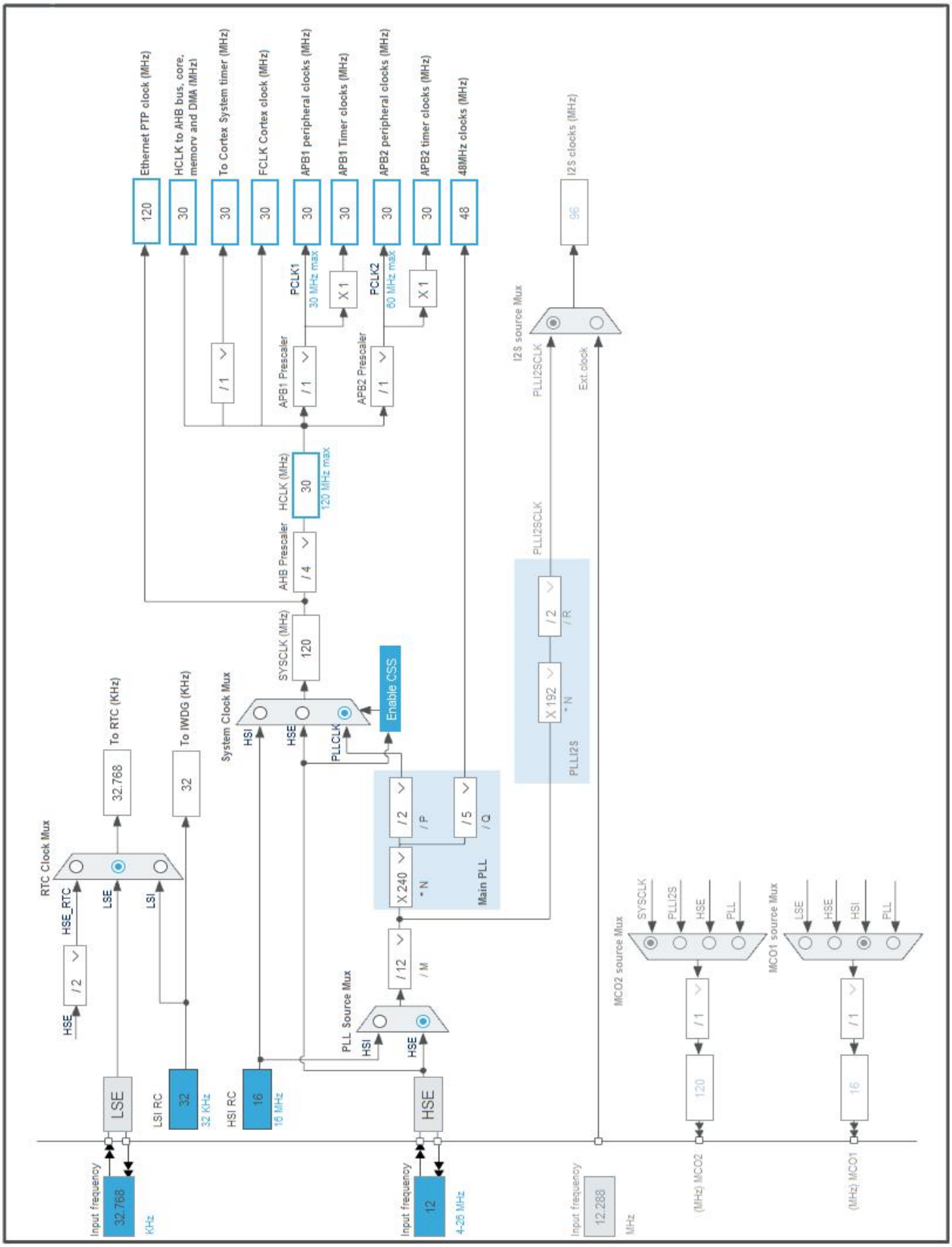
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	RTC_AF1	
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Input	DIP_1
9	PC1 *	I/O	GPIO_Input	DIP_2
10	PC2 *	I/O	GPIO_Input	DIP_3
11	PC3 *	I/O	GPIO_Input	DIP_4
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	ADC1_IN0	AN0_CO2
15	PA1	I/O	ADC1_IN1	AN1_AUX1
16	PA2	I/O	ADC1_IN2	AN2_AUX2
17	PA3	I/O	ADC1_IN3	AN3_TEMP_EXT
18	VSS	Power		
19	VDD	Power		
20	PA4 *	I/O	GPIO_Output	FLASH_CS
21	PA5 **	I/O	SPI1_SCK	FLASH_SCK
22	PA6 **	I/O	SPI1_MISO	FLASH_MISO
23	PA7 **	I/O	SPI1_MOSI	FLASH_MOSI
24	PC4	I/O	ADC1_IN14	AN14_TEMP_INT
25	PC5 *	I/O	GPIO_Output	RELE_AUX1
26	PB0	I/O	GPIO_EXTI0	TACH_F1
27	PB1	I/O	GPIO_EXTI1	TACH_F2
28	PB2 *	I/O	GPIO_Input	DIP_5
29	PB10	I/O	TIM2_CH3	ANOUT_H2O
30	PB11	I/O	TIM2_CH4	ANOUT_BATT
31	VCAP_1	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	RELE_FAN2
34	PB13 *	I/O	GPIO_Output	RELE_BATT
35	PB14 *	I/O	GPIO_Input	DIP_7
36	PB15 *	I/O	GPIO_Output	RELE_FAN1

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6 *	I/O	GPIO_Output	RELE_BYP
38	PC7 *	I/O	GPIO_Input	DIN_TERMOST
39	PC8 *	I/O	GPIO_Input	DIN_FILTRO
40	PC9 *	I/O	GPIO_Input	DIN_HV2
41	PA8 *	I/O	GPIO_Input	DIN_HV1
42	PA9 **	I/O	USB_OTG_FS_VBUS	
43	PA10 **	I/O	USB_OTG_FS_ID	
44	PA11	I/O	USB_OTG_FS_DM	
45	PA12	I/O	USB_OTG_FS_DP	
46	PA13 **	I/O	SYS_JTMS-SWDIO	
47	VCAP_2	Power		
48	VDD	Power		
49	PA14 **	I/O	SYS_JTCK-SWCLK	
50	PA15	I/O	TIM2_CH1	ANOUT_FAN1
51	PC10 *	I/O	GPIO_Output	LED_ERR
52	PC11 *	I/O	GPIO_Output	LED_ON
53	PC12 *	I/O	GPIO_Input	UART5_TX
54	PD2 *	I/O	GPIO_Input	UART5_RX
55	PB3	I/O	TIM2_CH2	ANOUT_FAN2
56	PB4 *	I/O	GPIO_Input	DIP_6
57	PB5 *	I/O	GPIO_Output	RS485_DIR
58	PB6	I/O	USART1_TX	RS485_TX
59	PB7	I/O	USART1_RX	RS485_RX
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	LED_PC1
62	PB9 *	I/O	GPIO_Output	LED_PC2
63	VSS	Power		
64	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. Software Project

5.1. Project Settings

Name	Value
Project Name	FW00055
Project Folder	D:\svn\firmware\FW00055\trunk
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_F2 V1.7.0

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	Yes
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	STM32F2
Line	STM32F2x5
MCU	STM32F205RCTx
Datasheet	15818_Rev15

6.2. Parameter Selection

Temperature	25
Vdd	3.3

6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

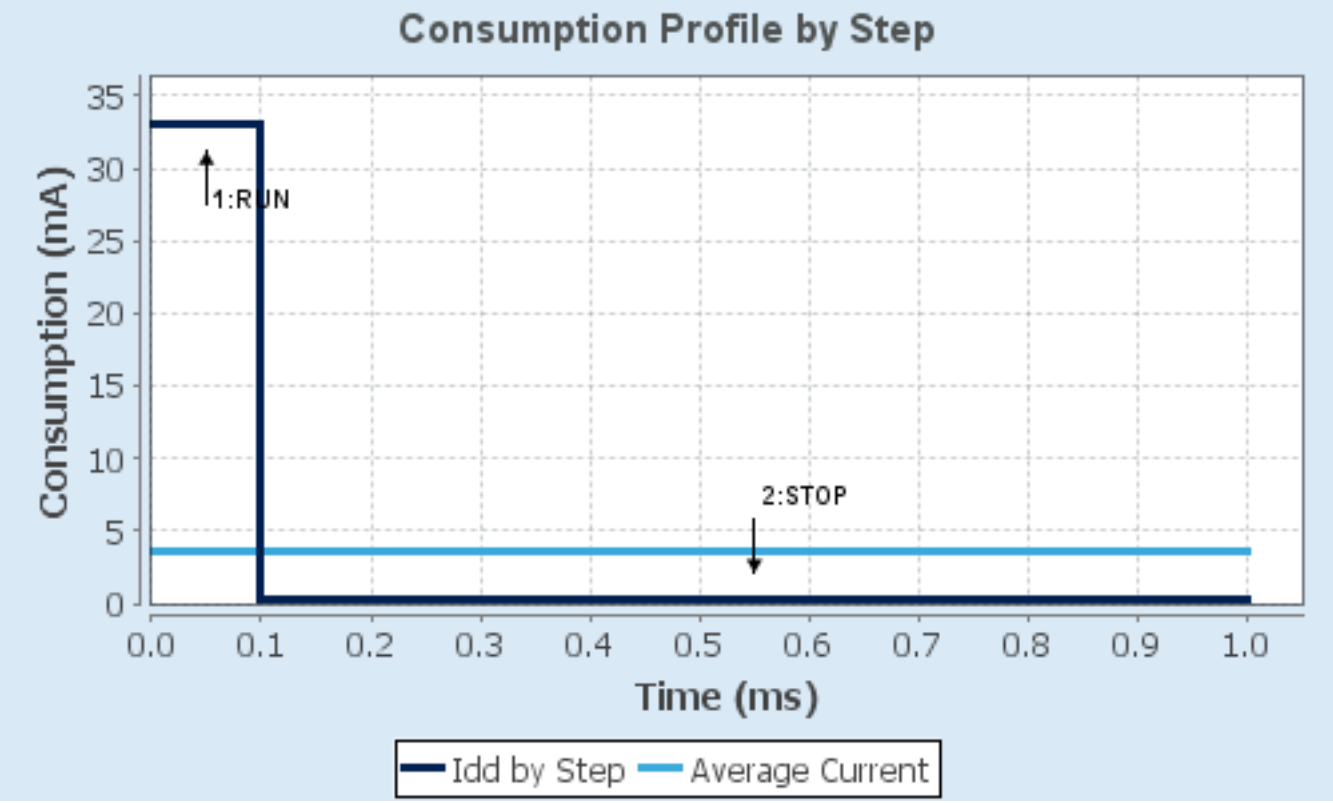
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	No-Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	120 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LP Flash-PwrDwn
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	33 mA	300 µA
Duration	0.1 ms	0.9 ms
DMIPS	150.0	0.0
Ta Max	100.1	104.96
Category	In DS Table	In DS Table

6.5. RESULTS

Sequence Time	1 ms	Average Current	3.57 mA
Battery Life	1 month, 9 days, 5 hours	Average DMIPS	150.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
35
30
25
20
15
10
5
0
1:RUN
2:STOP
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

7. IPs and Middleware Configuration

7.1. ADC1

mode: IN0

mode: IN1

mode: IN2

mode: IN3

mode: IN14

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	PCLK2 divided by 2
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	**EOC flag at the end of all conversions ***

ADC_Regular_ConversionMode:

Number Of Conversion	**5 ***
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 0
Sampling Time	**480 Cycles ***
Rank	**2 ***
Channel	**Channel 1 ***
Sampling Time	**480 Cycles ***
Rank	**3 ***
Channel	**Channel 2 ***
Sampling Time	**480 Cycles ***
Rank	**4 ***
Channel	**Channel 3 ***
Sampling Time	**480 Cycles ***
Rank	**5 ***

Channel	**Channel 14 ***
Sampling Time	**480 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

7.2. CRC

mode: Activated

7.3. GPIO

7.4. IWDG

mode: Activated

7.4.1. Parameter Settings:

Clocking:

IWDG counter clock prescaler	**16 ***
IWDG down-counter reload value	4095

7.5. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.5.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	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

7.6. RTC

mode: Activate Clock Source

mode: Calibration 512Hz

7.6.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

Calibration:

Calibration	Signal has a regular waveform at 512Hz

7.7. SYS

Timebase Source: SysTick

7.8. TIM2

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**3 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**7499 ***
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)

PWM Generation Channel 1:

Mode	PWM mode 1

Pulse (32 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (32 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 3:

Mode	PWM mode 1
Pulse (32 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 4:

Mode	PWM mode 1
Pulse (32 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

7.9. USART1

Mode: Asynchronous

7.9.1. 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

7.10. USB_OTG_FS

Mode: Device_Only

7.10.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Low power	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

7.11. USB_DEVICE

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

7.11.1. 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_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USB CDC Rx Buffer Size	2048
USB CDC Tx Buffer Size	2048

7.11.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PA0-WKUP	ADC1_IN0	Analog mode	No pull-up and no pull-down	n/a	AN0_CO2
	PA1	ADC1_IN1	Analog mode	No pull-up and no pull-down	n/a	AN1_AUX1
	PA2	ADC1_IN2	Analog mode	No pull-up and no pull-down	n/a	AN2_AUX2
	PA3	ADC1_IN3	Analog mode	No pull-up and no pull-down	n/a	AN3_TEMP_EXT
	PC4	ADC1_IN14	Analog mode	No pull-up and no pull-down	n/a	AN14_TEMP_INT
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	
RTC	PC13	RTC_AF1	n/a	n/a	n/a	
TIM2	PB10	TIM2_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	ANOUT_H2O
	PB11	TIM2_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	ANOUT_BATT
	PA15	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	ANOUT_FAN1
	PB3	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	ANOUT_FAN2
USART1	PB6	USART1_TX	Alternate Function Push Pull	**Pull-up ***	**High ***	RS485_TX
	PB7	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	RS485_RX
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
Single Mapped Signals	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	FLASH_SCK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	FLASH_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	FLASH_MOSI
	PA9	USB_OTG_FS_VBUS	Input mode	No pull-up and no pull-down	**n/a**	
	PA10	USB_OTG_FS_ID	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA13	SYS_JTMS-SWDIO	n/a	n/a	**n/a**	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	**n/a**	
GPIO	PC0	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_1

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC1	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_2
	PC2	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_3
	PC3	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_4
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	FLASH_CS
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELE_AUX1
	PB0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	TACH_F1
	PB1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	TACH_F2
	PB2	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_5
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELE_FAN2
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELE_BATT
	PB14	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_7
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELE_FAN1
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELE_BYP
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DIN_TERMOST
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DIN_FILTRO
	PC9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DIN_HV2
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DIN_HV1
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_ERR
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_ON
	PC12	GPIO_Input	Input mode	**Pull-up ***	n/a	UART5_TX
	PD2	GPIO_Input	Input mode	**Pull-up ***	n/a	UART5_RX
	PB4	GPIO_Input	Input mode	**Pull-up ***	n/a	DIP_6
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RS485_DIR
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_PC1
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_PC2

8.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC1	DMA2_Stream0	Peripheral To Memory	Low

ADC1: DMA2_Stream0 DMA request Settings:

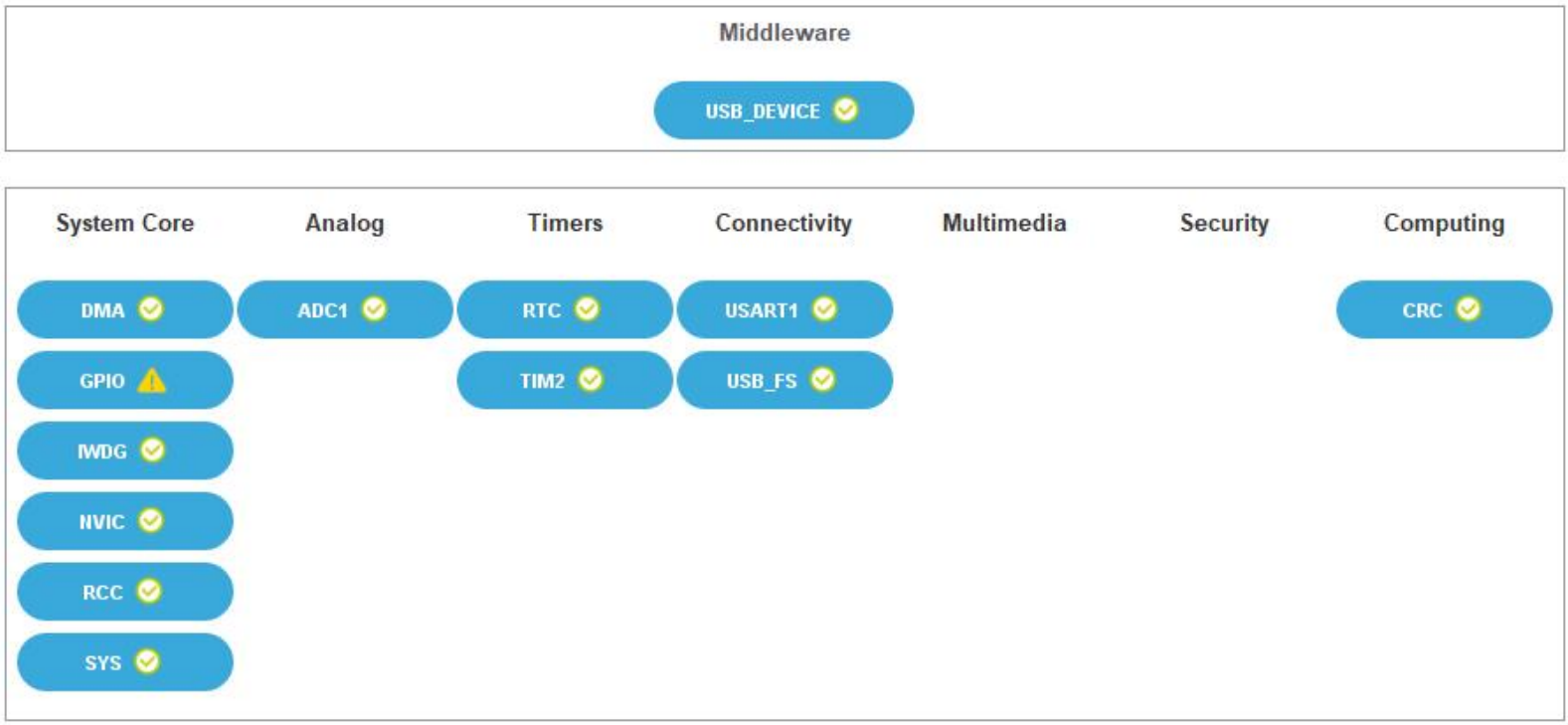
Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Half Word
Memory Data Width:	Half Word

8.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
Pre-fetch 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	0	0
System tick timer	true	0	0
EXTI line0 interrupt	true	0	0
EXTI line1 interrupt	true	0	0
USART1 global interrupt	true	0	0
DMA2 Stream0 global interrupt	true	0	0
USB On The Go FS global interrupt	true	0	0
PVD interrupt through EXTI line16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1, ADC2 and ADC3 global interrupts	unused		
TIM2 global interrupt	unused		

*** User modified value**

9. Predefined Views - Category view : Current



10. Software Pack Report