1. Description

1.1. Project

Project Name	TimerOutputCompare
Board Name	STM32F411E-DISCO
Generated with:	STM32CubeMX 5.5.0
Date	09/22/2020

1.2. MCU

| MCU Series	STM32F4
MCU Line	STM32F411
MCU name	STM32F411VETx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration
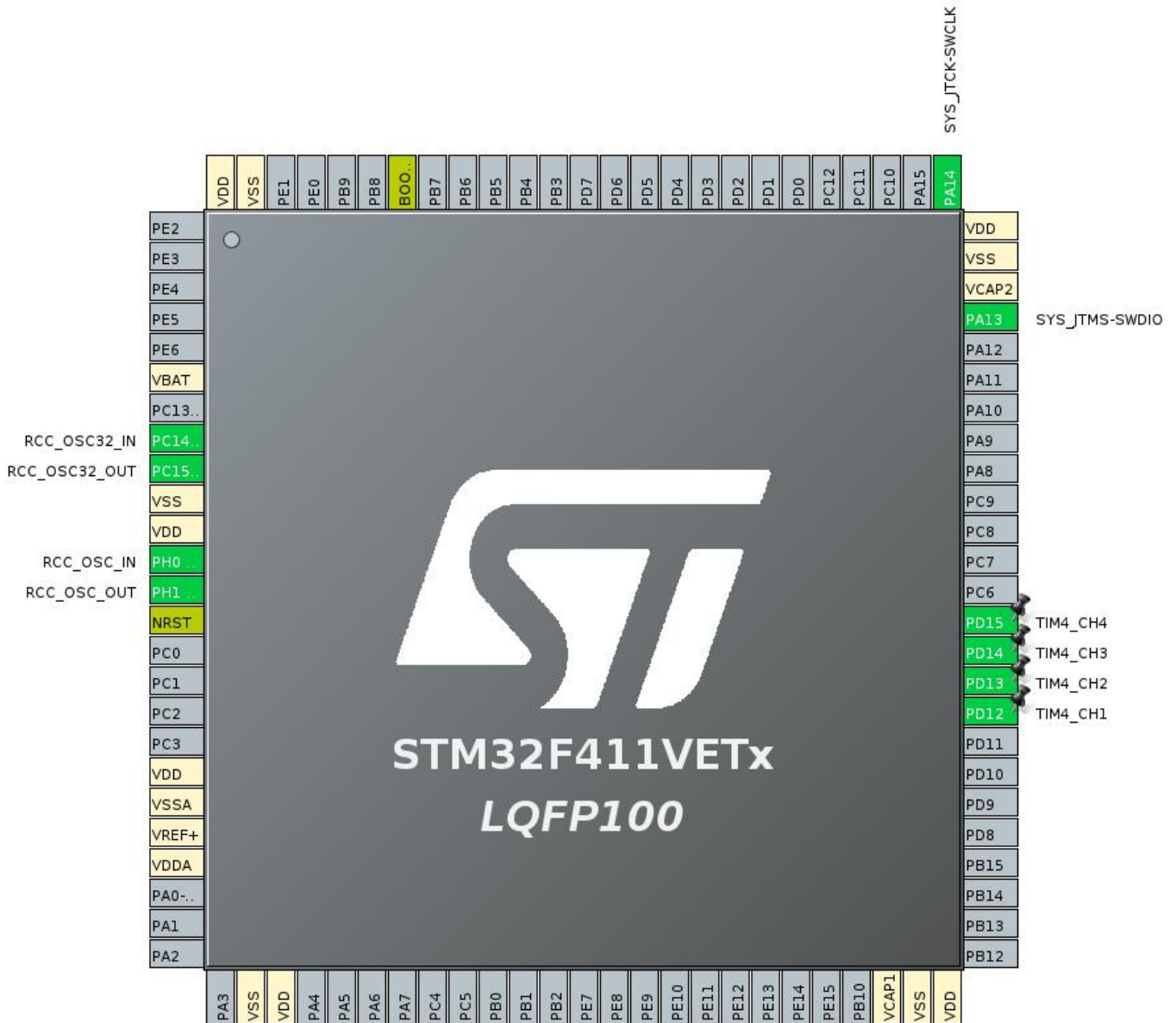
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
10	VSS	Power		
11	VDD	Power		
12	PH0 - OSC_IN	I/O	RCC_OSC_IN	
13	PH1 - OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
27	VSS	Power		
28	VDD	Power		
48	VCAP1	Power		
49	VSS	Power		
50	VDD	Power		
59	PD12	I/O	TIM4_CH1	
60	PD13	I/O	TIM4_CH2	
61	PD14	I/O	TIM4_CH3	
62	PD15	I/O	TIM4_CH4	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	VCAP2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
94	BOOT0	Boot		
99	VSS	Power		
100	VDD	Power		

4. Clock Tree Configuration
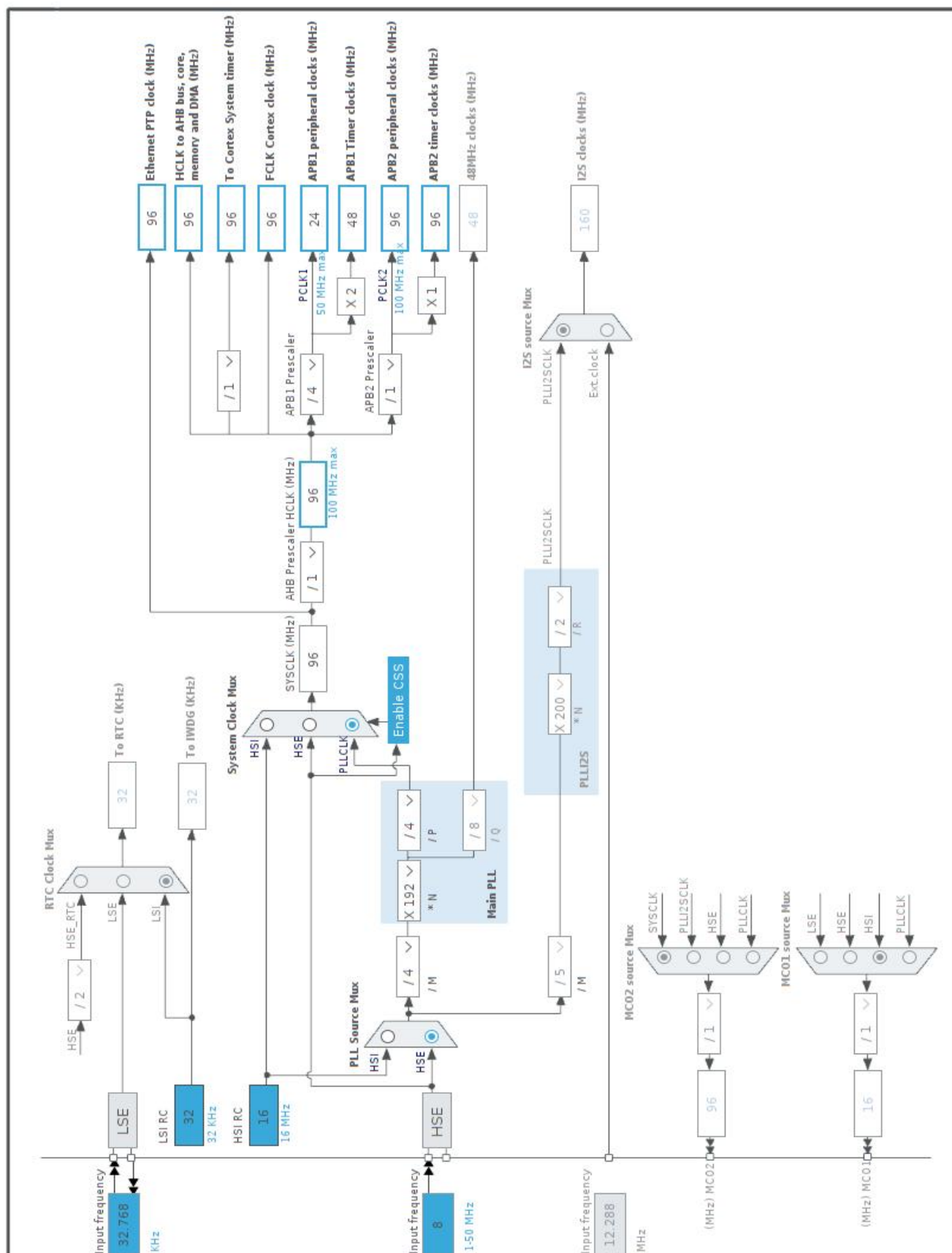
5. Software Project

5.1. Project Settings

Name	Value
Project Name	TimerOutputCompare
Project Folder	/home/quang/Desktop/Mastering-STM32/TimerOutputCompare
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F4 V1.24.2

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	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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F411
MCU	STM32F411VETx
Datasheet	026289_Rev6

6.2. Parameter Selection

Temperature	25
Vdd	null

7. IPs and Middleware Configuration

7.1. GPIO

7.2. RCC

High Speed Clock (HSE): BYPASS Clock Source
Low Speed Clock (LSE) : Crystal/Ceramic Resonator
7.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	3 WS (4 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

7.3. SYS

Debug: Serial Wire
Timebase Source: SysTick

7.4. TIM4

Clock Source   : Internal Clock
Channel1: Output Compare CH1
Channel2: Output Compare CH2
Channel3: Output Compare CH3
Channel4: Output Compare CH4
7.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**48000 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**1000 ***
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	**Toggle on match ***
Pulse (16 bits value)	**200 ***
Output compare preload	**Enable ***
CH Polarity	High

Output Compare Channel 2:

Mode	**Toggle on match ***
Pulse (16 bits value)	**500 ***
Output compare preload	**Enable ***
CH Polarity	High

Output Compare Channel 3:

Mode	**Toggle on match ***
Pulse (16 bits value)	**750 ***
Output compare preload	**Enable ***
CH Polarity	High

Output Compare Channel 4:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	**1000 ***
Output compare preload	**Enable ***
CH Polarity	High

* User modified value

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM4	PD12	TIM4_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD13	TIM4_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD14	TIM4_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD15	TIM4_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	

8.2. DMA configuration

nothing configured in DMA service

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
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM4 global interrupt	unused		
FPU global interrupt	unused		

* User modified value

9. Software Pack Report