1. Description

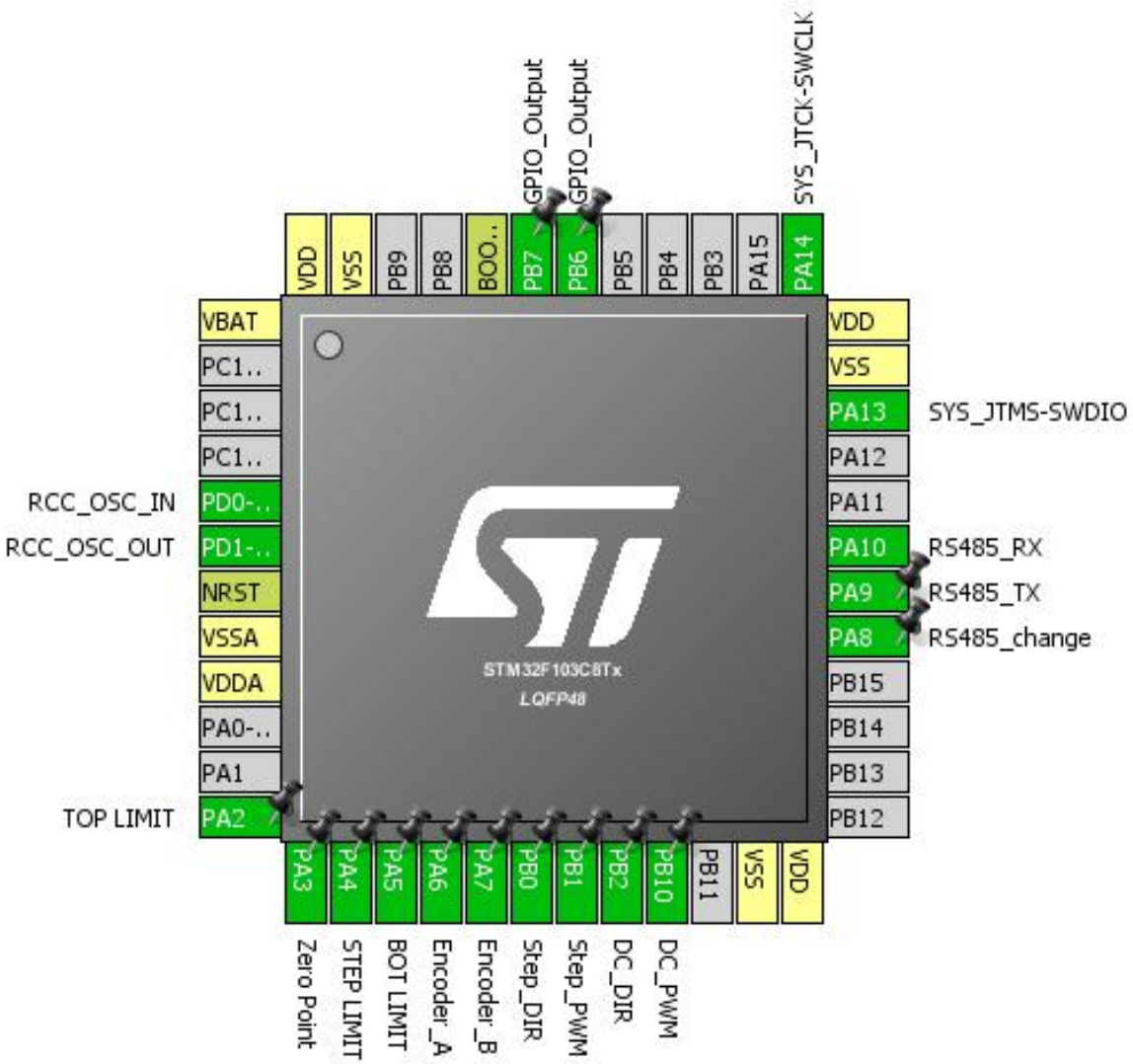
1.1. Project

Project Name	Tap_machine_v1
Board Name	Tap_machine_v1
Generated with:	STM32CubeMX 4.15.1
Date	12/06/2016

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103C8Tx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration

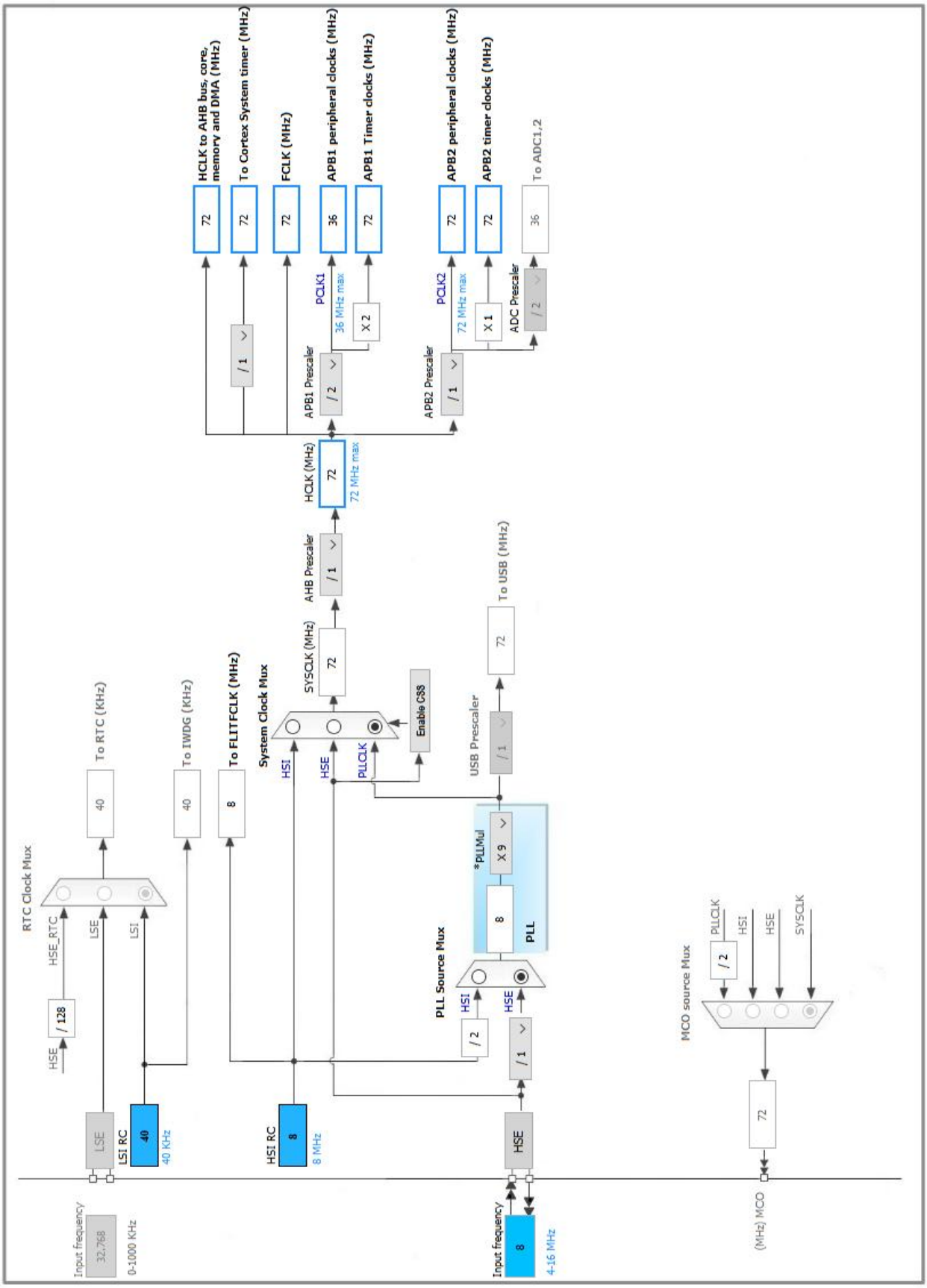


3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
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		
12	PA2 *	I/O	GPIO_Input	TOP LIMIT
13	PA3 *	I/O	GPIO_Input	Zero Point
14	PA4 *	I/O	GPIO_Input	STEP LIMIT
15	PA5 *	I/O	GPIO_Input	BOT LIMIT
16	PA6	I/O	TIM3_CH1	Encoder_A
17	PA7	I/O	TIM3_CH2	Encoder_B
18	PB0 *	I/O	GPIO_Output	Step_DIR
19	PB1 *	I/O	GPIO_Output	Step_PWM
20	PB2 *	I/O	GPIO_Output	DC_DIR
21	PB10	I/O	TIM2_CH3	DC_PWM
23	VSS	Power		
24	VDD	Power		
29	PA8 *	I/O	GPIO_Output	RS485_change
30	PA9	I/O	USART1_TX	RS485_TX
31	PA10	I/O	USART1_RX	RS485_RX
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
42	PB6 *	I/O	GPIO_Output	
43	PB7 *	I/O	GPIO_Output	
44	BOOT0	Boot		
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. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.1.1. 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 Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.2. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.3. TIM2

Channel3: PWM Generation CH3

5.3.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**7200 ***
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)

PWM Generation Channel 3:

Mode	PWM mode 1

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

5.4. TIM3

Combined Channels: Encoder Mode

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**0xffff ***
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)

Encoder:

Encoder Mode	**Encoder Mode TI1 and TI2 ***
____ Parameters for Channel 1 ____	
Polarity	**Both Edges ***
IC Selection	Direct
Prescaler Division Ratio	**Division by 2 ***
Input Filter	0
____ Parameters for Channel 2 ____	
Polarity	**Both Edges ***
IC Selection	Direct
Prescaler Division Ratio	**Division by 2 ***
Input Filter	0

5.5. TIM4

mode: Clock Source

5.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**3600 ***
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)

5.6. USART1

Mode: Asynchronous

5.6.1. 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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	PB10	TIM2_CH3	Alternate Function Push Pull	n/a	Low	DC_PWM
TIM3	PA6	TIM3_CH1	Input mode	**Pull-up ***	n/a	Encoder_A
	PA7	TIM3_CH2	Input mode	**Pull-up ***	n/a	Encoder_B
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	RS485_TX
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	RS485_RX
GPIO	PA2	GPIO_Input	Input mode	**Pull-up ***	n/a	TOP LIMIT
	PA3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Zero Point
	PA4	GPIO_Input	Input mode	**Pull-up ***	n/a	STEP LIMIT
	PA5	GPIO_Input	Input mode	**Pull-up ***	n/a	BOT LIMIT
	PB0	GPIO_Output	Output Push Pull	**n/a**	Low	Step_DIR
	PB1	GPIO_Output	Output Push Pull	**n/a**	Low	Step_PWM
	PB2	GPIO_Output	Output Push Pull	**n/a**	Low	DC_DIR
	PA8	GPIO_Output	Output Push Pull	**n/a**	Low	RS485_change
	PB6	GPIO_Output	Output Push Pull	**n/a**	Low	
	PB7	GPIO_Output	Output Push Pull	**n/a**	Low	

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	0	0
System tick timer	true	0	0
TIM4 global interrupt	true	0	0
USART1 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM2 global interrupt	unused		
TIM3 global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103C8Tx
Datasheet	13587_Rev17

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	Tap_machine_v1
Project Folder	D:\Project\2016\16 Tap machine Trung\Tap_machine_v1.1
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 all used libraries into the project folder
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)	Yes