1. Description

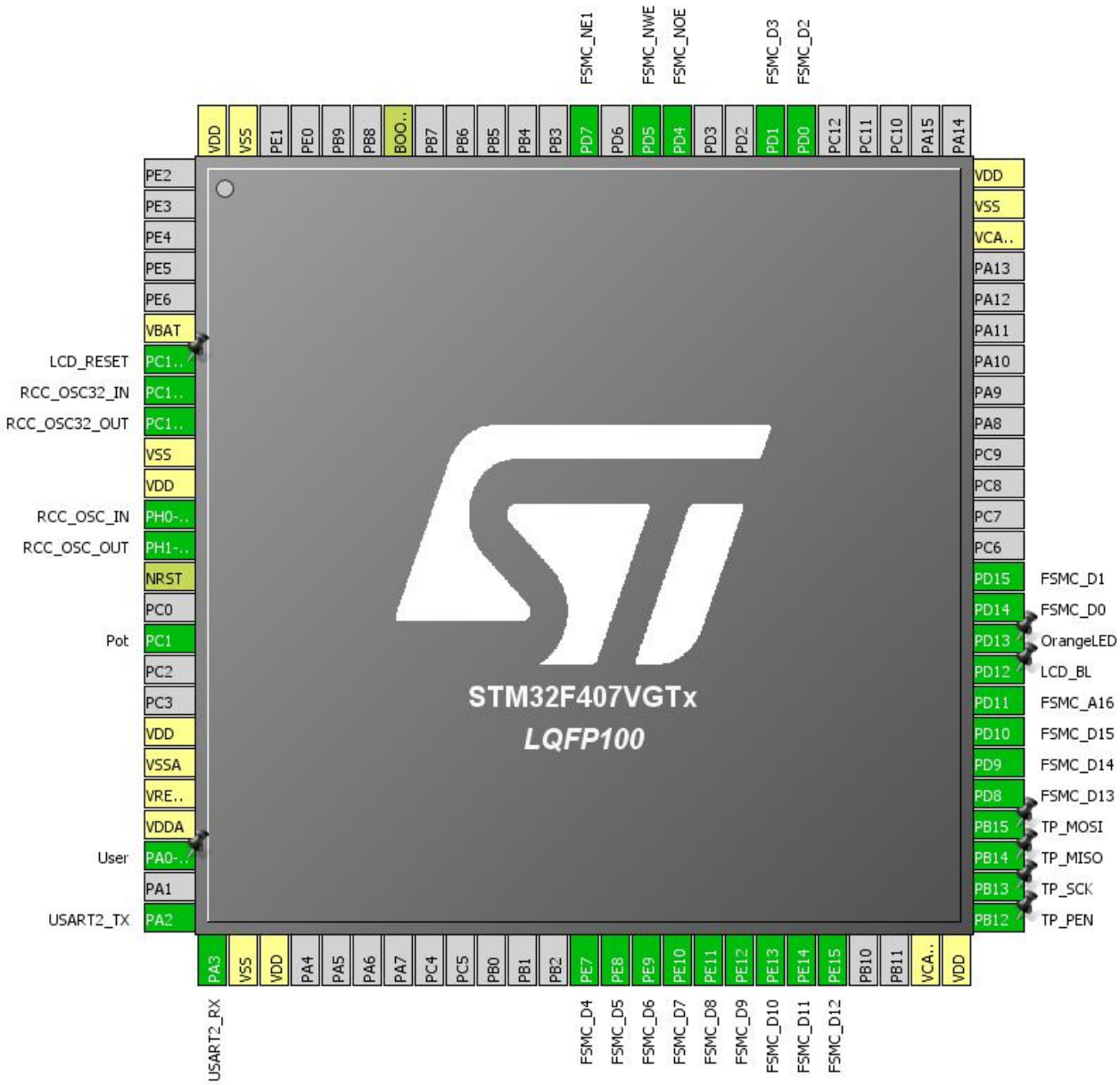
1.1. Project

Project Name	TFT
Board Name	TFT2
Generated with:	STM32CubeMX 4.22.1
Date	10/19/2017

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VGTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



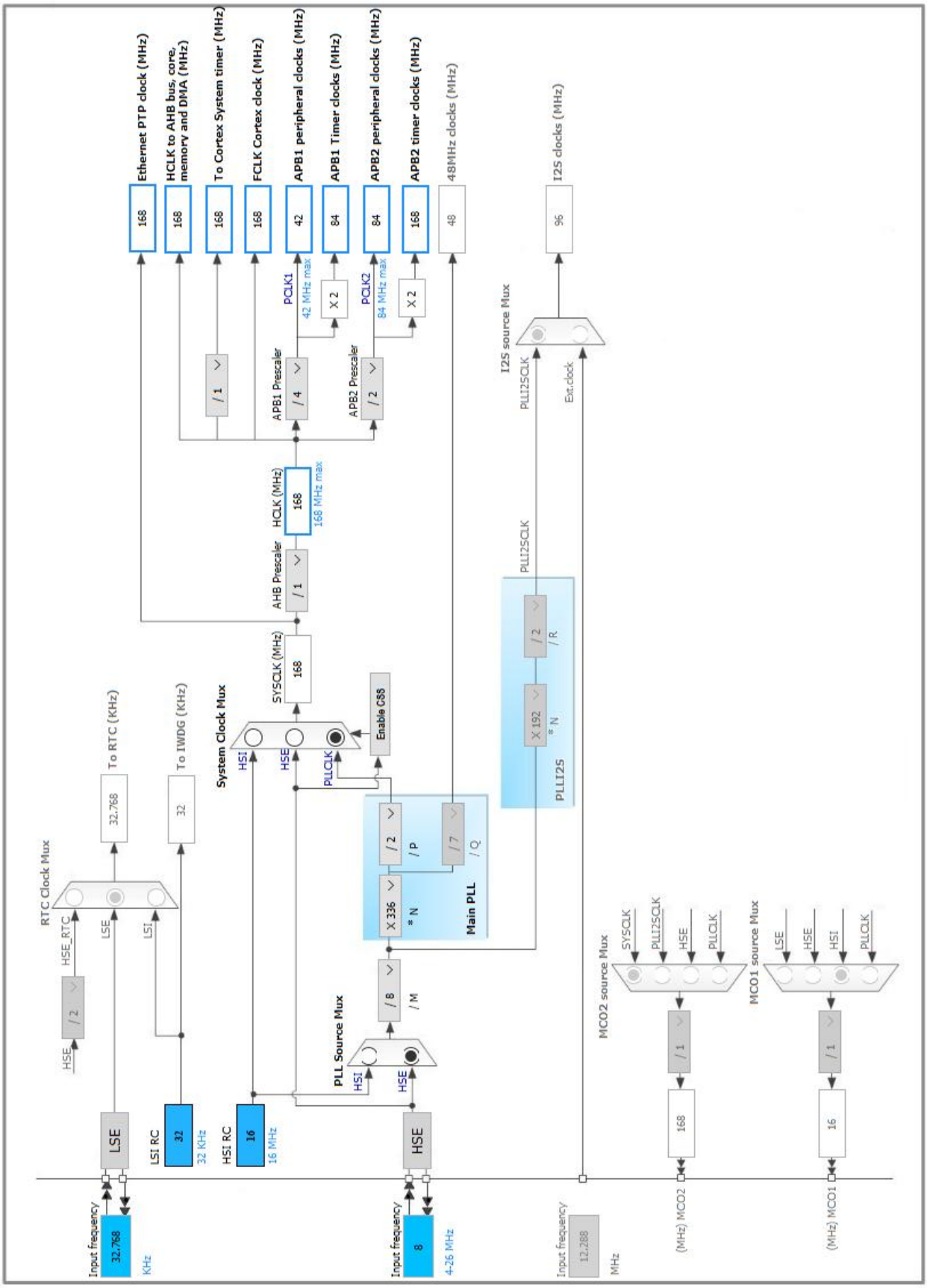
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
7	PC13-ANTI_TAMP *	I/O	GPIO_Output	LCD_RESET
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		
16	PC1	I/O	ADC3_IN11	Pot
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0-WKUP *	I/O	GPIO_Input	User
25	PA2	I/O	USART2_TX	
26	PA3	I/O	USART2_RX	
27	VSS	Power		
28	VDD	Power		
38	PE7	I/O	FSMC_D4	
39	PE8	I/O	FSMC_D5	
40	PE9	I/O	FSMC_D6	
41	PE10	I/O	FSMC_D7	
42	PE11	I/O	FSMC_D8	
43	PE12	I/O	FSMC_D9	
44	PE13	I/O	FSMC_D10	
45	PE14	I/O	FSMC_D11	
46	PE15	I/O	FSMC_D12	
49	VCAP_1	Power		
50	VDD	Power		
51	PB12 *	I/O	GPIO_Input	TP_PEN
52	PB13	I/O	SPI2_SCK	TP_SCK
53	PB14	I/O	SPI2_MISO	TP_MISO
54	PB15	I/O	SPI2_MOSI	TP_MOSI
55	PD8	I/O	FSMC_D13	
56	PD9	I/O	FSMC_D14	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
57	PD10	I/O	FSMC_D15	
58	PD11	I/O	FSMC_A16	
59	PD12 *	I/O	GPIO_Output	LCD_BL
60	PD13 *	I/O	GPIO_Output	OrangeLED
61	PD14	I/O	FSMC_D0	
62	PD15	I/O	FSMC_D1	
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
81	PD0	I/O	FSMC_D2	
82	PD1	I/O	FSMC_D3	
85	PD4	I/O	FSMC_NOE	
86	PD5	I/O	FSMC_NWE	
88	PD7	I/O	FSMC_NE1	
94	BOOT0	Boot		
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC3

mode: IN11

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	EOC flag at the end of single channel conversion

ADC_Regular_ConversionMode:

Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 11
Sampling Time	3 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

5.2. CRC

mode: Activated

5.3. FSMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

Chip Select: set
Memory type: LCD Interface
LCD Register Select: A16
Data: 16 bits

5.3.1. NOR/PSRAM 1:

NOR/PSRAM control:

Memory type	LCD Interface
Bank	Bank 1 NOR/PSRAM 1
Write operation	Enabled
Extended mode	**Enabled ***

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	**30 ***
Bus turn around time in HCLK clock cycles	15
Access mode	A

NOR/PSRAM timing for write accesses:

Extended address setup time	**5 ***
Extended data setup time	**5 ***
Extended bus turn around time	**5 ***
Extended access mode	A

5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator
Low Speed Clock (LSE) : Crystal/Ceramic Resonator

5.4.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	5 WS (6 CPU cycle)

RCC Parameters:

HSI Calibration Value	16

HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 1

5.5. SPI2

Mode: Full-Duplex Master

5.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**32 ***
Baud Rate	**1.3125 MBits/s ***
Clock Polarity (CPOL)	**High ***
Clock Phase (CPHA)	**2 Edge ***

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.6. SYS

Timebase Source: SysTick

5.7. USART2

Mode: Asynchronous

5.7.1. 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
ADC3	PC1	ADC3_IN11	Analog mode	No pull-up and no pull-down	n/a	Pot
FSMC	PE7	FSMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE8	FSMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE9	FSMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE10	FSMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE11	FSMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE12	FSMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE13	FSMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE14	FSMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PE15	FSMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD8	FSMC_D13	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD9	FSMC_D14	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD10	FSMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD11	FSMC_A16	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD14	FSMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD15	FSMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD0	FSMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD1	FSMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD4	FSMC_NOE	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD5	FSMC_NWE	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD7	FSMC_NE1	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
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	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	TP_SCK

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	TP_MISO
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	TP_MOSI
USART2	PA2	USART2_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
GPIO	PC13-ANTI_TAMP	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_RESET
	PA0-WKUP	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	User
	PB12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TP_PEN
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_BL
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OrangeLED

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
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
ADC1, ADC2 and ADC3 global interrupts	true	0	0
USART2 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
SPI2 global interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407VGTx
Datasheet	022152_Rev8

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	TFT
Project Folder	C:\Users\twizz\OneDrive\Documents\GitHub\TFTDisplay
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F4 V1.16.0

8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Add necessary library files as reference in the toolchain project configuration file
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