1. Description

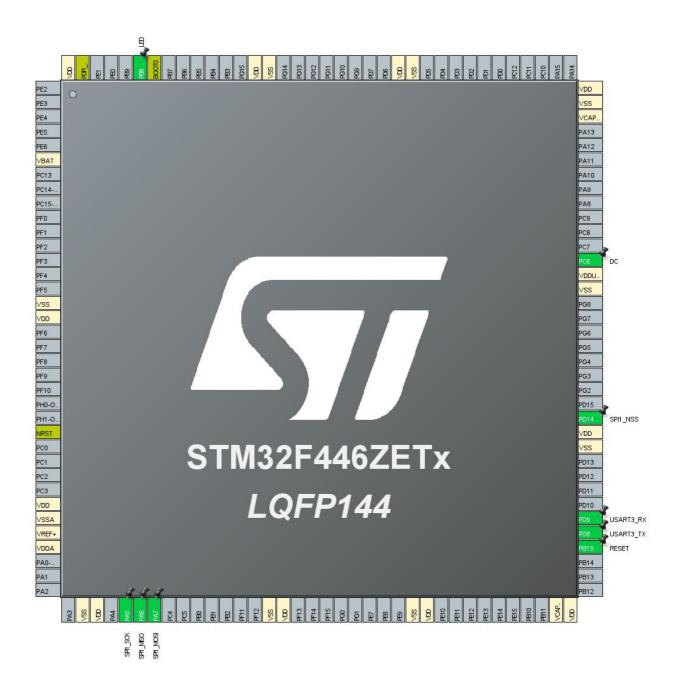
1.1. Project

Project Name	SPILCDTestXY
Board Name	custom
Generated with:	STM32CubeMX 5.4.0
Date	01/10/2020

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F446
MCU name	STM32F446ZETx
MCU Package	LQFP144
MCU Pin number	144

2. Pinout Configuration



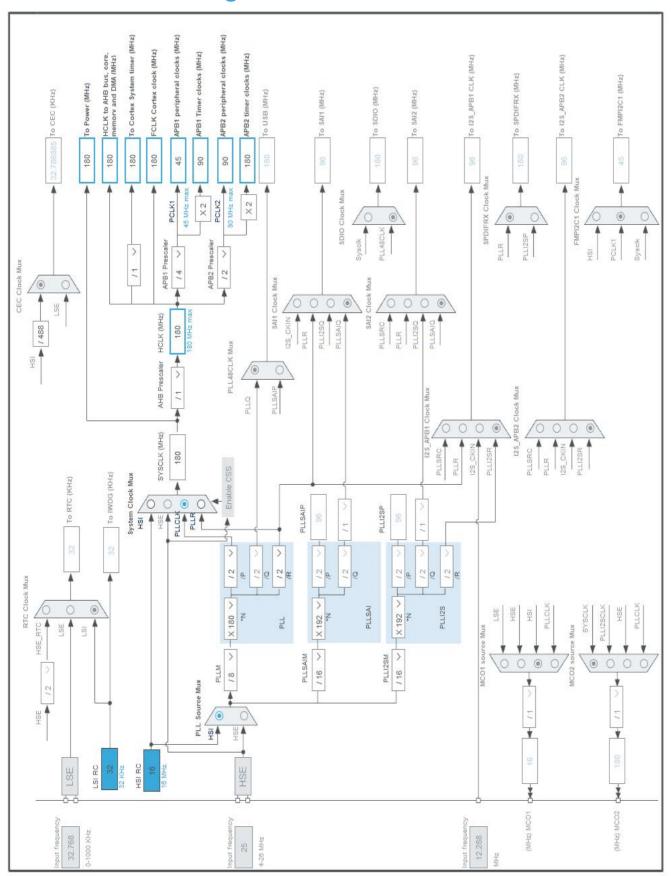
3. Pins Configuration

Pin Number	Pin Name	Pin Type	Alternate	Label
LQFP144	(function after		Function(s)	
	reset)			
6	VBAT	Power		
16	VSS	Power		
17	VDD	Power		
25	NRST	Reset		
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
38	VSS	Power		
39	VDD	Power		
41	PA5	I/O	SPI1_SCK	
42	PA6	I/O	SPI1_MISO	
43	PA7	I/O	SPI1_MOSI	
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
71	VCAP_1	Power		
72	VDD	Power		
76	PB15 *	I/O	GPIO_Output	RESET
77	PD8	I/O	USART3_TX	
78	PD9	I/O	USART3_RX	
83	VSS	Power		
84	VDD	Power		
85	PD14 *	I/O	GPIO_Output	SPI1_NSS
94	VSS	Power		
95	VDDUSB	Power		
96	PC6 *	I/O	GPIO_Output	DC
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
138	BOOT0	Boot		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
139	PB8 *	I/O	GPIO_Output	LED
143	PDR_ON	Reset		
144	VDD	Power		

^{*} The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value	
Project Name	SPILCDTestXY	
Project Folder	D:\ST\TouchGFXDemo\SPILCDTestXY	
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	No
consumption)	

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F446
мси	STM32F446ZETx
Datasheet	027107_Rev6

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration 7.1. GPIO

7.2. RCC

7.2.1. 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

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

Power Over Drive Enabled

7.3. SPI1

Mode: Full-Duplex Master 7.3.1. Parameter Settings:

Basic Parameters:

Frame Format Motorola

Data Size 8 Bits

First Bit MSB First

Clock Parameters:

Prescaler (for Baud Rate) 2

Baud Rate 45.0 MBits/s *

Clock Polarity (CPOL) Low
Clock Phase (CPHA) 1 Edge

Advanced Parameters:

CRC Calculation Disabled
NSS Signal Type Software

7.4. SYS

Timebase Source: SysTick

7.5. TIM2

Clock Source: Internal Clock 7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)

Counter Mode

Counter Period (AutoReload Register - 32 bits value)

Internal Clock Division (CKD)

auto-reload preload

A4999 *

A999 *

Internal Clock Division (CKD)

AutoReload Register - 32 bits value)

A999 *

A999 *

Brable *

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)

Disable (Trigger input effect not delayed)

Trigger Event Selection Reset (UG bit from TIMx_EGR)

7.6. USART3

Mode: Asynchronous

7.6.1. 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

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	Pull-down *	Very High	
	PA6	SPI1_MISO	Alternate Function Push Pull	Pull-down *	Very High	
	PA7	SPI1_MOSI	Alternate Function Push Pull	Pull-down *	Very High	
USART3	PD8	USART3_TX	Alternate Function Push Pull	Pull-up	Very High	
	PD9	USART3_RX	Alternate Function Push Pull	Pull-up	Very High	
GPIO	PB15	GPIO_Output	Output Push Pull	Pull-up *	Very High	RESET
	PD14	GPIO_Output	Output Push Pull	Pull-up *	Very High	SPI1_NSS
	PC6	GPIO_Output	Output Push Pull	Pull-up *	Very High	DC
	PB8	GPIO_Output	Output Push Pull	Pull-up *	Very High	LED

8.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_TX	DMA2_Stream3	Memory To Peripheral	Low

SPI1_TX: DMA2_Stream3 DMA request Settings:

Mode: Normal
Use fifo: Disable
Peripheral Increment: Disable
Memory Increment: Enable *

Peripheral Data Width: Byte
Memory Data Width: Byte

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	
TIM2 global interrupt	true	2	0	
USART3 global interrupt	true 3		0	
DMA2 stream3 global interrupt	true	1	0	
PVD interrupt through EXTI line 16	unused			
Flash global interrupt	unused			
RCC global interrupt	unused			
SPI1 global interrupt	unused			
FPU global interrupt	unused			

^{*} User modified value

9. Software Pack Report