1. Description

1.1. Project

Project Name	GUITestNoOS
Board Name	custom
Generated with:	STM32CubeMX 5.5.0
Date	01/28/2020

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F412
MCU name	STM32F412ZGTx
MCU Package	LQFP144
MCU Pin number	144

2. Pinout Configuration
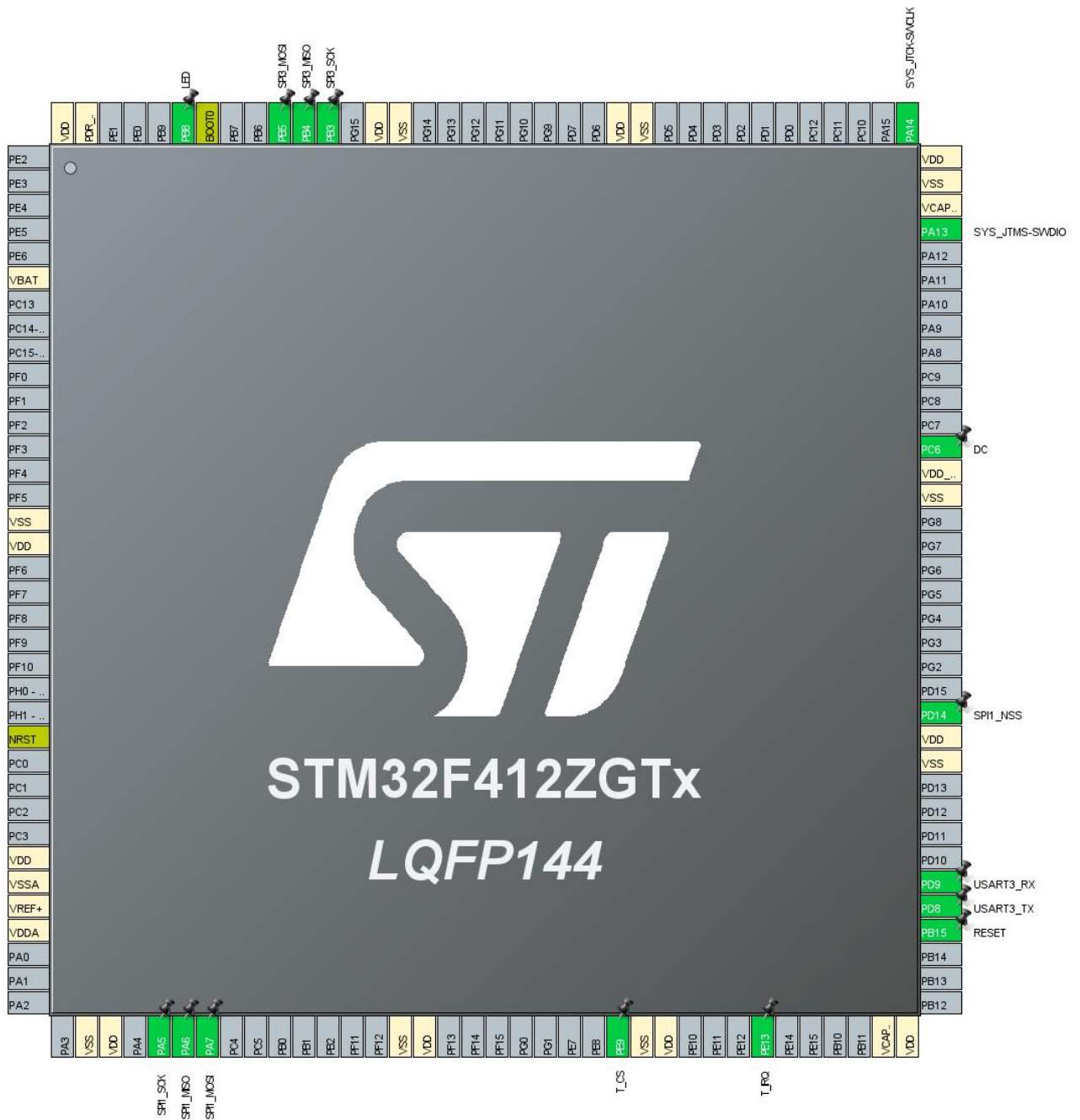
3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
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		
60	PE9 *	I/O	GPIO_Output	T_CS
61	VSS	Power		
62	VDD	Power		
66	PE13 *	I/O	GPIO_Input	T_IRQ
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	VDD_USB	Power		
96	PC6 *	I/O	GPIO_Output	DC
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
120	VSS	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
133	PB3	I/O	SPI3_SCK	
134	PB4	I/O	SPI3_MISO	
135	PB5	I/O	SPI3_MOSI	
138	BOOT0	Boot		
139	PB8 *	I/O	GPIO_Output	LED
143	PDR_ON	Power		
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	GUITestNoOS
Project Folder	D:\ST\TouchGFXDemo\GUITestNoOS
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	STM32F412
MCU	STM32F412ZGTx
Datasheet	028087_Rev5

6.2. Parameter Selection

Temperature	25
Vdd	null

7. IPs and Middleware Configuration

7.1. CRC

mode: Activated

7.2. GPIO

7.3. RCC

7.3.1. 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

7.4. SPI1

Mode: Full-Duplex Master
7.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**50.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.5. SPI3

Mode: Full-Duplex Master
7.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**256 ***
Baud Rate	**195.312 KBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.6. SYS

Debug: Serial Wire
Timebase Source: SysTick

7.7. TIM13

mode: Activated
7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**49999 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**15 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

7.8. USART3
Mode: Asynchronous
7.8.1. 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

7.9. STMicroelectronics.X-CUBE-TOUCHGFX.4.13.0
mode: GraphicsJjApplication
7.9.1. TouchGFX Generator:

Display:

Interface	Custom
Framebuffer Pixel Format	RGB565
Width	**320 ***
Height	**240 ***
Framebuffer Strategy	Single Buffer
Buffer Location	By Allocation

Driver:

Application Tick Source	Custom
Graphics Accelerator	None
Real-Time Operating System	No OS

* 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	No pull-up and no pull-down	**Very High** *	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
SPI3	PB3	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB4	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB5	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART3	PD8	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PD9	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
GPIO	PE9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High** *	T_CS
	PE13	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	T_IRQ
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High** *	RESET
	PD14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High** *	SPI1_NSS
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High** *	DC
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Very High** *	LED

8.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_TX	DMA2_Stream2	Memory To Peripheral	Low

SPI1_TX: DMA2_Stream2 DMA request Settings:

Mode:	Normal
Use fifo:	**Enable ***
FIFO Threshold:	Full
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	**Half Word ***
Peripheral Burst Size:	Single
Memory Burst Size:	Single

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
SPI1 global interrupt	true	2	0
USART3 global interrupt	true	4	0
TIM8 update interrupt and TIM13 global interrupt	true	5	0
SPI3 global interrupt	true	3	0
DMA2 stream2 global interrupt	true	1	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
FPU global interrupt	unused		

* User modified value

9. Software Pack Report

9.1. Software Pack selected

Vendor	Name	Version	Component
STMicroelectronics	X-CUBE-TOUCHGFX	4.13.0	Class : Graphics Group : Application Variant : TouchGFX Generator Version : 4.13.0