

1. Description

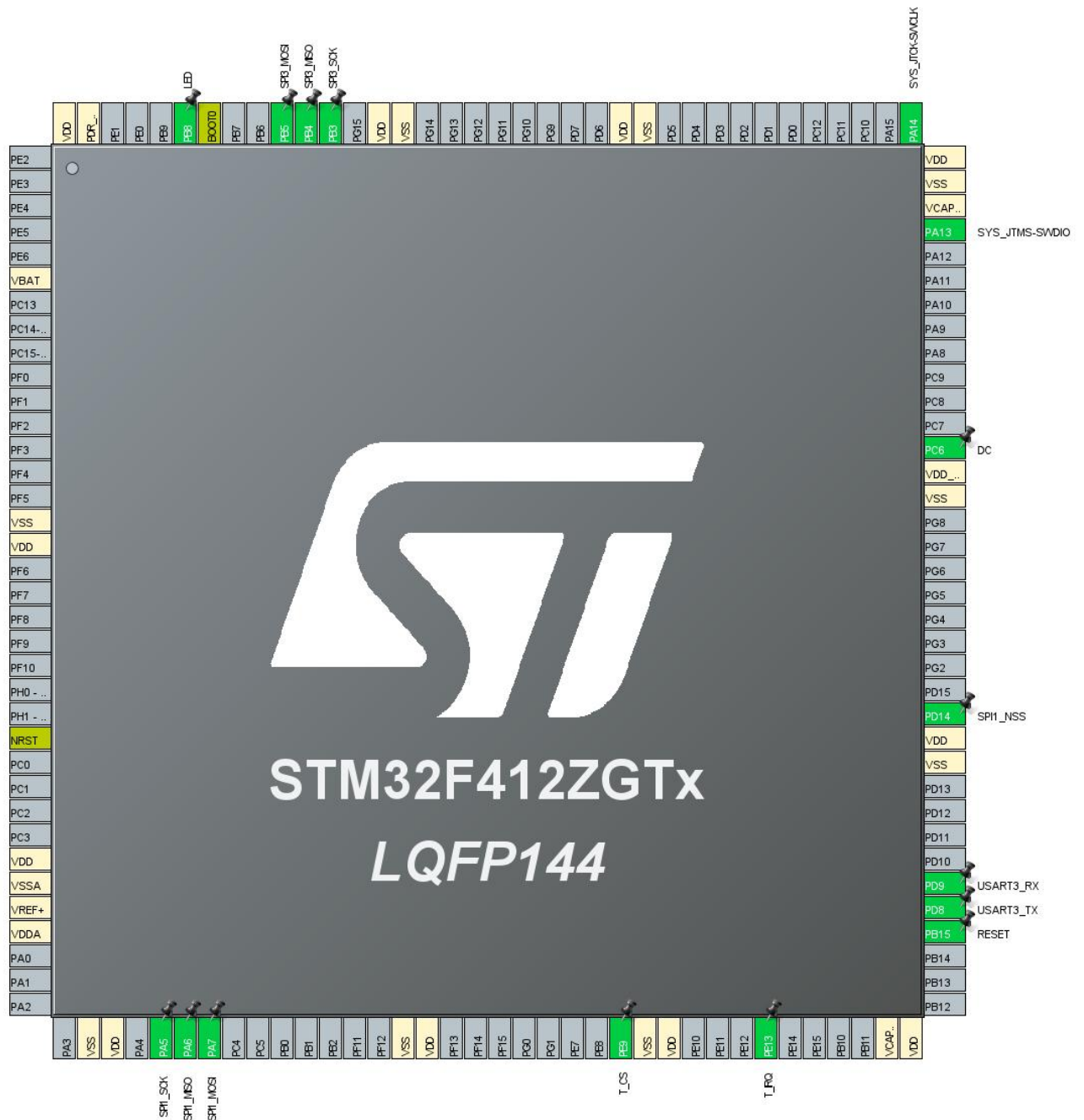
1.1. Project

Project Name	GUI Test
Board Name	custom
Generated with:	STM32CubeMX 5.5.0
Date	01/16/2020

1.2. MCU

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

2. Pinout Configuration



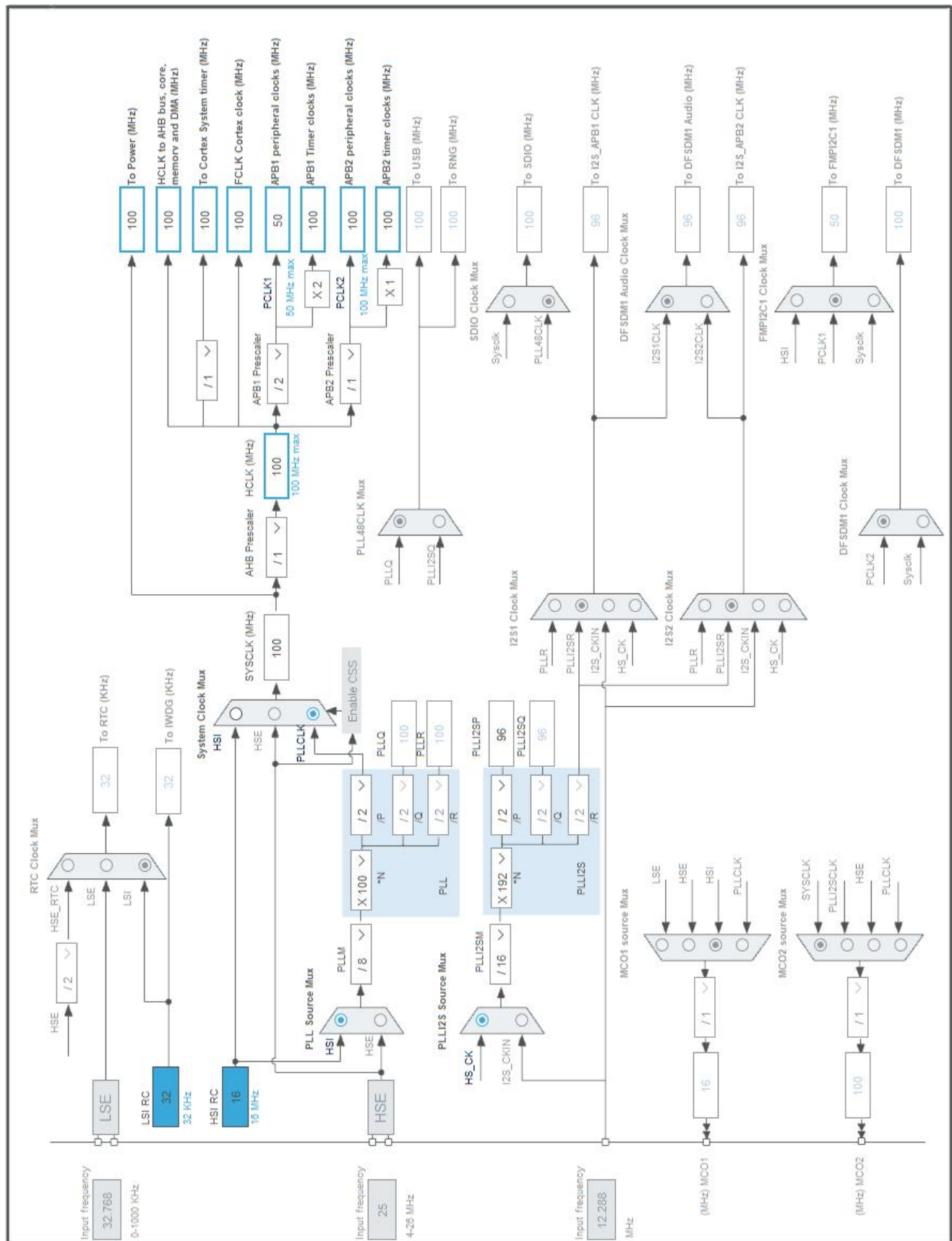
3. Pins Configuration

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	GUI Test
Project Folder	D:\ST\TouchGFXDemo\GUI Test
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 Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
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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: TIM14

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)	199 *
Internal Clock Division (CKD)	No Division
auto-reload preload	Enable *

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. FREERTOS

Interface: CMSIS_V1

7.9.1. Config parameters:

API:

FreeRTOS API	CMSIS v1
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Versions:

FreeRTOS version	10.0.1
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled

ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	15360
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Disabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled
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Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

7.9.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled

xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

7.10. STMicroelectronics.X-CUBE-TOUCHGFX.4.13.0

mode: GraphicsJjApplication

7.10.1. 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	CMSIS_RTOS_V1

* 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: 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	15	0
System tick timer	true	15	0
USART3 global interrupt	true	5	0
TIM8 update interrupt and TIM13 global interrupt	true	5	0
TIM8 trigger and commutation interrupts and TIM14 global interrupt	true	0	0
DMA2 stream2 global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
SPI1 global interrupt	unused		
SPI3 global interrupt	unused		
FPU global interrupt	unused		

* User modified value

9. Software Pack Report

9.1. Software Pack selected

Vendor	Name	Version	Component
STMicroelectronics	FreeRTOS	0.0.1	Class : CMSIS Group : RTOS SubGroup : FreeRTOS Version : 10.2.0 Class : RTOS Group : Core Version : 10.2.0
STMicroelectronics	X-CUBE-TOUCHGFX	4.13.0	Class : Graphics Group : Application Variant : TouchGFX Generator Version : 4.13.0