
STM32
CubeMX

1. Description

1.1. Project

Project Name	STM32F429BIT6_TouchGFX
Board Name	custom
Generated with:	STM32CubeMX 6.0.0
Date	08/16/2020

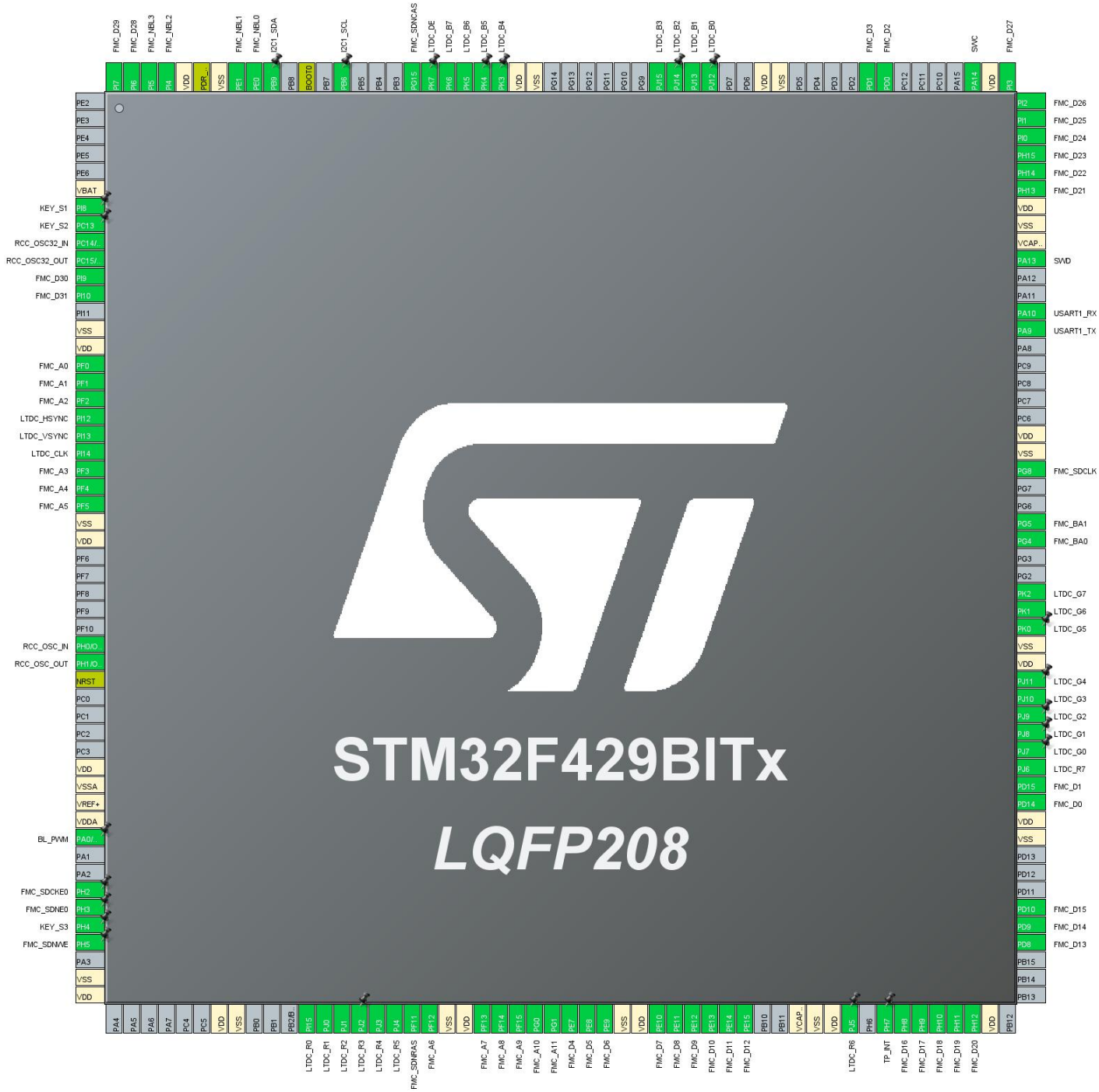
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F429/439
MCU name	STM32F429BITx
MCU Package	LQFP208
MCU Pin number	208

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration



3. Pins Configuration

Pin Number LQFP208	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
7	PI8 *	I/O	GPIO_Input	KEY_S1
8	PC13 *	I/O	GPIO_Input	KEY_S2
9	PC14/OSC32_IN	I/O	RCC_OSC32_IN	
10	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
11	PI9	I/O	FMC_D30	
12	PI10	I/O	FMC_D31	
14	VSS	Power		
15	VDD	Power		
16	PF0	I/O	FMC_A0	
17	PF1	I/O	FMC_A1	
18	PF2	I/O	FMC_A2	
19	PI12	I/O	LTDC_HSYNC	
20	PI13	I/O	LTDC_VSYNC	
21	PI14	I/O	LTDC_CLK	
22	PF3	I/O	FMC_A3	
23	PF4	I/O	FMC_A4	
24	PF5	I/O	FMC_A5	
25	VSS	Power		
26	VDD	Power		
32	PH0/OSC_IN	I/O	RCC_OSC_IN	
33	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
34	NRST	Reset		
39	VDD	Power		
40	VSSA	Power		
41	VREF+	Power		
42	VDDA	Power		
43	PA0/WKUP *	I/O	GPIO_Output	BL_PWM
46	PH2	I/O	FMC_SDCKE0	
47	PH3	I/O	FMC_SDNE0	
48	PH4 *	I/O	GPIO_Input	KEY_S3
49	PH5	I/O	FMC_SDNWE	
51	VSS	Power		
52	VDD	Power		
59	VDD	Power		
60	VSS	Power		

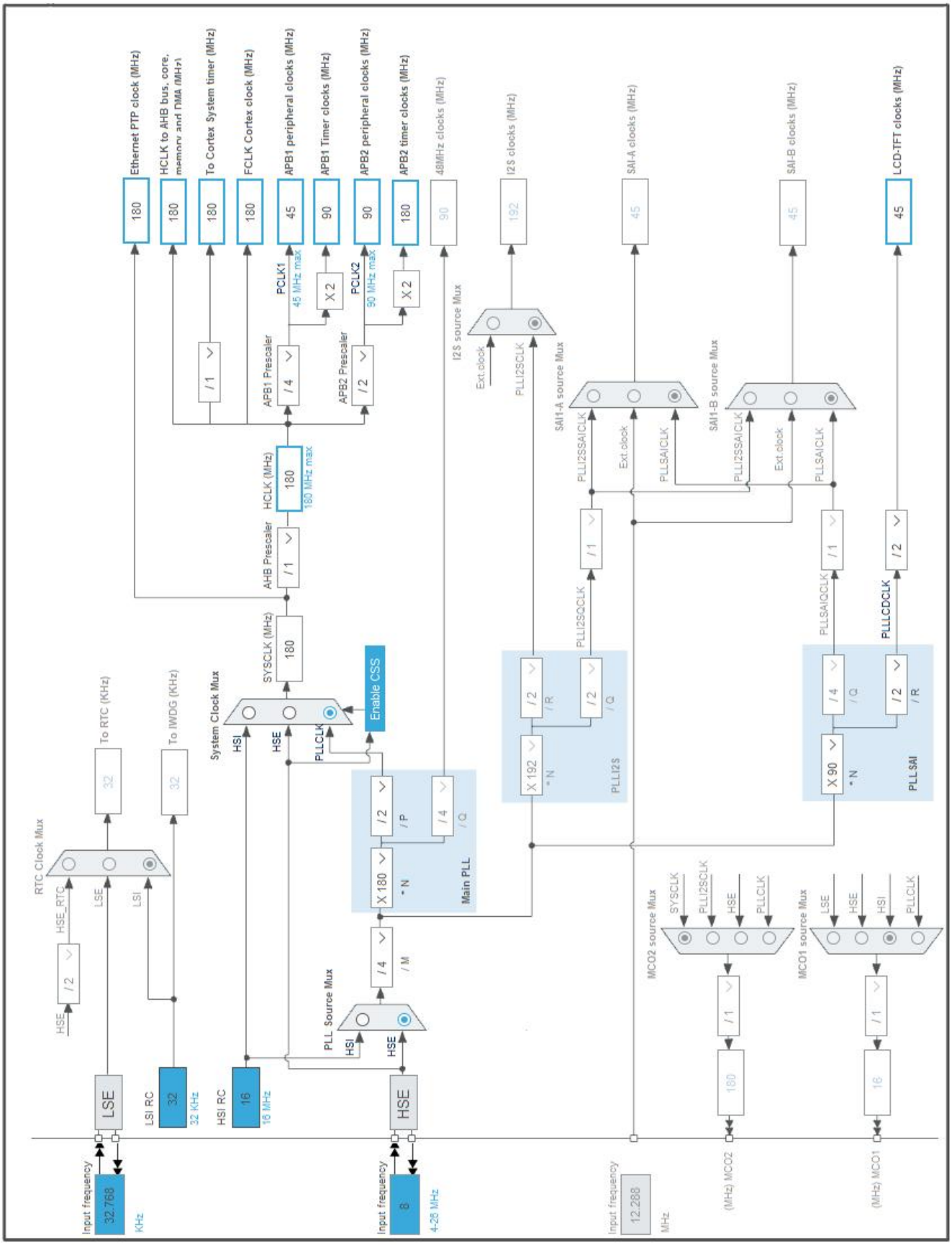
Pin Number LQFP208	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
64	PI15	I/O	LTDC_R0	
65	PJ0	I/O	LTDC_R1	
66	PJ1	I/O	LTDC_R2	
67	PJ2	I/O	LTDC_R3	
68	PJ3	I/O	LTDC_R4	
69	PJ4	I/O	LTDC_R5	
70	PF11	I/O	FMC_SDNRAS	
71	PF12	I/O	FMC_A6	
72	VSS	Power		
73	VDD	Power		
74	PF13	I/O	FMC_A7	
75	PF14	I/O	FMC_A8	
76	PF15	I/O	FMC_A9	
77	PG0	I/O	FMC_A10	
78	PG1	I/O	FMC_A11	
79	PE7	I/O	FMC_D4	
80	PE8	I/O	FMC_D5	
81	PE9	I/O	FMC_D6	
82	VSS	Power		
83	VDD	Power		
84	PE10	I/O	FMC_D7	
85	PE11	I/O	FMC_D8	
86	PE12	I/O	FMC_D9	
87	PE13	I/O	FMC_D10	
88	PE14	I/O	FMC_D11	
89	PE15	I/O	FMC_D12	
92	VCAP_1	Power		
93	VSS	Power		
94	VDD	Power		
95	PJ5	I/O	LTDC_R6	
97	PH7 *	I/O	GPIO_Input	TP_INT
98	PH8	I/O	FMC_D16	
99	PH9	I/O	FMC_D17	
100	PH10	I/O	FMC_D18	
101	PH11	I/O	FMC_D19	
102	PH12	I/O	FMC_D20	
103	VDD	Power		
108	PD8	I/O	FMC_D13	
109	PD9	I/O	FMC_D14	

Pin Number LQFP208	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
110	PD10	I/O	FMC_D15	
114	VSS	Power		
115	VDD	Power		
116	PD14	I/O	FMC_D0	
117	PD15	I/O	FMC_D1	
118	PJ6	I/O	LTDC_R7	
119	PJ7	I/O	LTDC_G0	
120	PJ8	I/O	LTDC_G1	
121	PJ9	I/O	LTDC_G2	
122	PJ10	I/O	LTDC_G3	
123	PJ11	I/O	LTDC_G4	
124	VDD	Power		
125	VSS	Power		
126	PK0	I/O	LTDC_G5	
127	PK1	I/O	LTDC_G6	
128	PK2	I/O	LTDC_G7	
131	PG4	I/O	FMC_BA0	
132	PG5	I/O	FMC_BA1	
135	PG8	I/O	FMC_SDCLK	
136	VSS	Power		
137	VDD	Power		
143	PA9	I/O	USART1_TX	
144	PA10	I/O	USART1_RX	
147	PA13	I/O	SYS_JTMS-SWDIO	SWD
148	VCAP_2	Power		
149	VSS	Power		
150	VDD	Power		
151	PH13	I/O	FMC_D21	
152	PH14	I/O	FMC_D22	
153	PH15	I/O	FMC_D23	
154	PI0	I/O	FMC_D24	
155	PI1	I/O	FMC_D25	
156	PI2	I/O	FMC_D26	
157	PI3	I/O	FMC_D27	
158	VDD	Power		
159	PA14	I/O	SYS_JTCK-SWCLK	SWC
164	PD0	I/O	FMC_D2	
165	PD1	I/O	FMC_D3	
170	VSS	Power		

Pin Number LQFP208	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
171	VDD	Power		
174	PJ12	I/O	LTDC_B0	
175	PJ13	I/O	LTDC_B1	
176	PJ14	I/O	LTDC_B2	
177	PJ15	I/O	LTDC_B3	
184	VSS	Power		
185	VDD	Power		
186	PK3	I/O	LTDC_B4	
187	PK4	I/O	LTDC_B5	
188	PK5	I/O	LTDC_B6	
189	PK6	I/O	LTDC_B7	
190	PK7	I/O	LTDC_DE	
191	PG15	I/O	FMC_SDNCAS	
195	PB6 *	I/O	GPIO_Output	I2C1_SCL
197	BOOT0	Boot		
199	PB9 *	I/O	GPIO_Output	I2C1_SDA
200	PE0	I/O	FMC_NBL0	
201	PE1	I/O	FMC_NBL1	
202	VSS	Power		
203	PDR_ON	Reset		
204	VDD	Power		
205	PI4	I/O	FMC_NBL2	
206	PI5	I/O	FMC_NBL3	
207	PI6	I/O	FMC_D28	
208	PI7	I/O	FMC_D29	

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	STM32F429BIT6_TouchGFX
Project Folder	E:\Src\STM32F429BIT6_TouchGFX
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F4 V1.25.0
Application Structure	Advanced
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x400
Minimum Stack Size	0x400

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	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	Yes
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	Yes
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	IP Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_DMA2D_Init	DMA2D
4	MX_FMC_Init	FMC
5	MX_LTDC_Init	LTDC
6	MX_TIM5_Init	TIM5
7	MX_USART1_UART_Init	USART1
8	MX_CRC_Init	CRC
9	MX_TIM7_Init	TIM7
10	MX_TouchGFX_Init	STMicroelectronics.X-CUBE-TOUCHGFX.4.14.0
11	MX_TouchGFX_Process	STMicroelectronics.X-CUBE-TOUCHGFX.4.14.0

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F429/439
MCU	STM32F429BITx
Datasheet	DS9405_Rev9

6.2. Parameter Selection

Temperature	25
Vdd	3.3

6.3. Battery Selection

Battery	Li-SOCL2(DD36000)
Capacity	36000.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	450.0 mA
Max Pulse Current	1000.0 mA
Cells in series	1
Cells in parallel	1

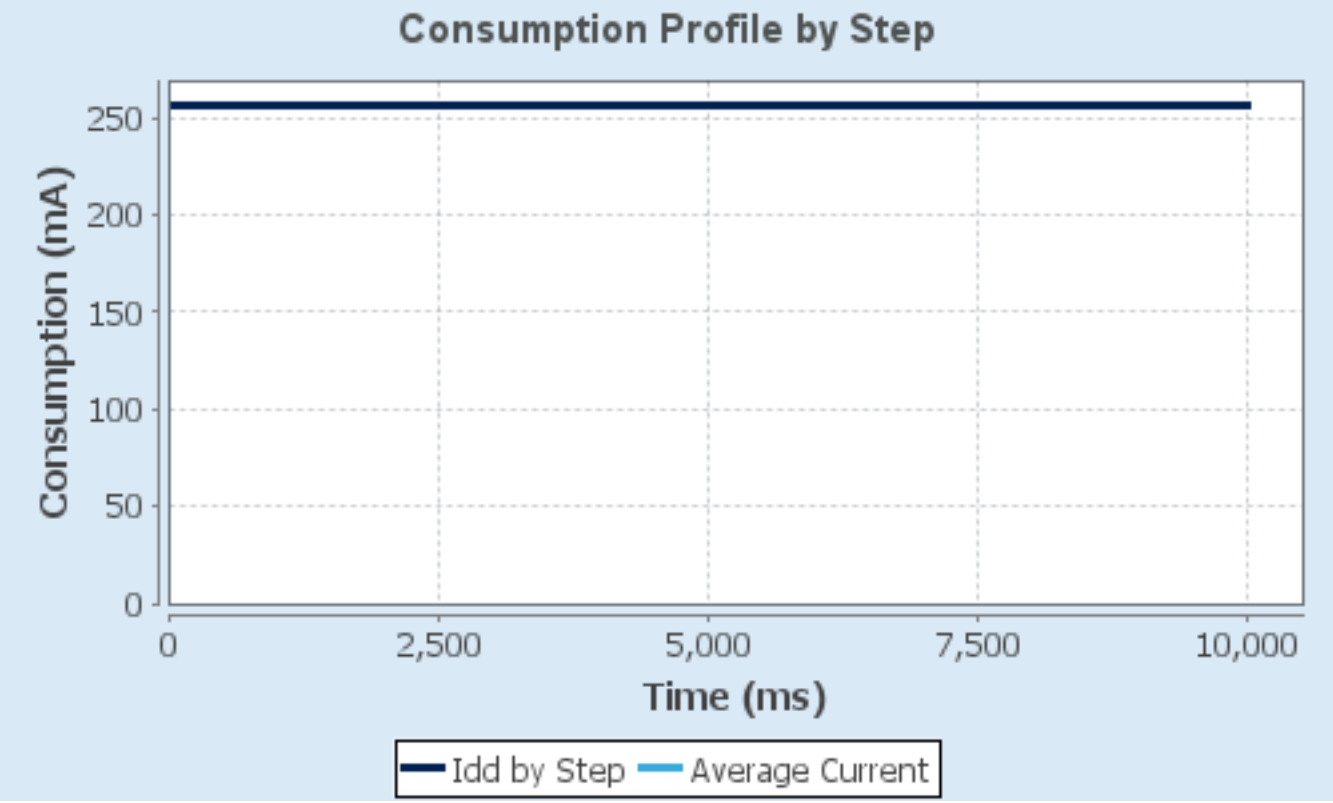
6.4. Sequence

Step	Step1
Mode	RUN
Vdd	3.3
Voltage Source	Battery
Range	Scale1-High
Fetch Type	FLASH
CPU Frequency	180 MHz
Clock Configuration	HSE PLL
Clock Source Frequency	4 MHz
Peripherals	CRC DMA2D FMC GPIOA GPIOB GPIOC GPIOD GPIOE GPIOF GPIOG GPIOH GPIOI GPIOJ GPIOK LTDC SYS TIM5 TIM7 USART1
Additional Cons.	180 mA
Average Current	255.8 mA
Duration	10 s
DMIPS	225.0
Ta Max	88.96
Category	In DS Table

6.5. Results

Sequence Time	10 s	Average Current	255.8 mA
Battery Life	5 days, 20 hours	Average DMIPS	225.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
250
200
150
100
50
0
0
2,500
5,000
7,500
10,000
Time (ms)
Idd by Step
Average Current

7. IPs and Middleware Configuration

7.1. CRC

mode: Activated

7.2. DMA2D

mode: Activated

7.2.1. Parameter Settings:

Basic Parameters:

Transfer Mode	Memory to Memory
Color Mode	**RGB565 ***
Output Offset	0
DMA2D Bytes Swap	Bytes in regular order in output FIFO
DMA2D Line Offset Mode	Line offsets expressed in pixels

Foreground layer Configuration:

DMA2D Input Color Mode	RGB565
DMA2D ALPHA MODE	No modification of the alpha channel value
Input Alpha	0
Input Offset	0

7.3. FMC

SDRAM 1

Clock and chip enable: SDCKE0+SDNE0

Internal bank number: 4 banks

Address: 12 bits

Data: 32 bits

Byte enable: 32-bit byte enable

7.3.1. SDRAM 1:

SDRAM control:

Bank	SDRAM bank 1
Number of column address bits	8 bits
Number of row address bits	12 bits
CAS latency	**3 memory clock cycles ***
Write protection	Disabled
SDRAM common clock	**2 HCLK clock cycles ***

SDRAM common burst read	**Enabled ***
SDRAM common read pipe delay	**1 HCLK clock cycle ***

SDRAM timing in memory clock cycles:

Load mode register to active delay	**2 ***
Exit self-refresh delay	**7 ***
Self-refresh time	**4 ***
SDRAM common row cycle delay	**7 ***
Write recovery time	**3 ***
SDRAM common row precharge delay	**2 ***
Row to column delay	**2 ***

7.4. GPIO

7.5. LTDC

Display Type: RGB888 (24 bits)

7.5.1. Parameter Settings:

Synchronization for Width:

Horizontal Synchronization Width	**96 ***
Horizontal Back Porch	**10 ***
Active Width	**800 ***
Horizontal Front Porch	**10 ***
HSync Width	95
Accumulated Horizontal Back Porch Width	105
Accumulated Active Width	905
Total Width	915

Synchronization for Height:

Vertical Synchronization Height	**2 ***
Vertical Back Porch	**10 ***
Active Height	480
Vertical Front Porch	**10 ***
VSync Height	1
Accumulated Vertical Back Porch Height	11
Accumulated Active Height	491
Total Height	501

Signal Polarity:

Horizontal Synchronization Polarity	Active Low
Vertical Synchronization Polarity	Active Low
Not Data Enable Polarity	Active Low
Pixel Clock Polarity	Normal Input

BackGround Color:

Red	0
Green	0
Blue	0

7.5.2. Layer Settings:

BackGround Color:

Layer 0 - Blue	0
Layer 0 - Green	0
Layer 0 - Red	0

Number of Layers:

Number of Layers	**1 layer ***

Windows Position:

Layer 0 - Window Horizontal Start	0
Layer 0 - Window Horizontal Stop	**800 ***
Layer 0 - Window Vertical Start	0
Layer 0 - Window Vertical Stop	**480 ***

Pixel Parameters:

Layer 0 - Pixel Format	**RGB565 ***

Blending:

Layer 0 - Alpha constant for blending	**255 ***
Layer 0 - Default Alpha value	0
Layer 0 - Blending Factor1	Alpha constant
Layer 0 - Blending Factor2	Alpha constant

Frame Buffer:

Layer 0 - Color Frame Buffer Start Adress	**SDRAM_BANK_ADDR ***
Layer 0 - Color Frame Buffer Line Length (Image Width)	**800 ***
Layer 0 - Color Frame Buffer Number of Lines (Image Height)	**480 ***

7.6. RCC

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

7.6.1. 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

7.7. SYS

Debug: Serial Wire
Timebase Source: TIM6

7.8. TIM5

mode: Clock Source

7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**19 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**8399 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

7.9. TIM7

mode: Activated

7.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**179 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**99 ***
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Reset (UG bit from TIMx_EGR)

7.10. USART1

Mode: Asynchronous

7.10.1. 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

7.11. FREERTOS

Interface: CMSIS_V2

7.11.1. Config parameters:

API:

FreeRTOS API	CMSIS v2

Versions:

FreeRTOS version	10.2.1
CMSIS-RTOS version	2.00

MPU/FPU:

ENABLE_MPU	Disabled
ENABLE_FPU	**Enabled ***

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	**Enabled ***
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	**30720 ***
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	**Enabled ***
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	**Option2 ***

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	**Enabled ***
USE_TRACE_FACILITY	Enabled
USE_STATS_FORMATTING_FUNCTIONS	**Enabled ***

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

Added with 10.2.1 support:

MESSAGE_BUFFER_LENGTH_TYPE	size_t
USE_POSIX_ERRNO	Disabled

7.11.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	**Enabled ***
uxTaskGetStackHighWaterMark	Enabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Enabled
xEventGroupSetBitFromISR	**Enabled ***
xTimerPendFunctionCall	Enabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled
uxTaskGetStackHighWaterMark2	Disabled

7.11.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT	Disabled

Project settings (see parameter description first):

Use FW pack heap file	Enabled

7.12. STMicroelectronics.X-CUBE-TOUCHGFX.4.14.0 mode: GraphicsJjApplication

7.12.1. TouchGFX Generator:

Display:

Interface	**Parallel RGB (LTDC) ***
Framebuffer Pixel Format (LTDC)	RGB565
Width (LTDC)	800
Height (LTDC)	480
Framebuffer Strategy	**Double Buffer ***
Buffer Location	**By Address ***
Start Address	**0 ***
Start Address 2	**0 ***

Driver:

Application Tick Source	**LTDC ***
Graphics Accelerator	**ChromART (DMA2D) ***
Real-Time Operating System	CMSIS_RTOS_V2

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
FMC	PI9	FMC_D30	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI10	FMC_D31	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF0	FMC_A0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF1	FMC_A1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF2	FMC_A2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF3	FMC_A3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF4	FMC_A4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF5	FMC_A5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH2	FMC_SDCKE0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH3	FMC_SDNE0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH5	FMC_SDNWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF11	FMC_SDNRAS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF12	FMC_A6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF13	FMC_A7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF14	FMC_A8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF15	FMC_A9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG0	FMC_A10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG1	FMC_A11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE7	FMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE8	FMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE9	FMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE10	FMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE11	FMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE12	FMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE13	FMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE14	FMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE15	FMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH8	FMC_D16	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH9	FMC_D17	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH10	FMC_D18	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH11	FMC_D19	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH12	FMC_D20	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD8	FMC_D13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD9	FMC_D14	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD10	FMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD14	FMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD15	FMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG4	FMC_BA0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG5	FMC_BA1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG8	FMC_SDCLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH13	FMC_D21	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH14	FMC_D22	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH15	FMC_D23	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI0	FMC_D24	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI1	FMC_D25	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI2	FMC_D26	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI3	FMC_D27	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD0	FMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD1	FMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG15	FMC_SDNCAS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE0	FMC_NBL0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE1	FMC_NBL1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI4	FMC_NBL2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI5	FMC_NBL3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI6	FMC_D28	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PI7	FMC_D29	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
LTDC	PI12	LTDC_HSYNC	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PI13	LTDC_VSYNC	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PI14	LTDC_CLK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PI15	LTDC_R0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ0	LTDC_R1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ1	LTDC_R2	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ2	LTDC_R3	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ3	LTDC_R4	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ4	LTDC_R5	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ5	LTDC_R6	Alternate Function Push Pull	No pull-up and no pull-down		

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
					Very High *	
	PJ6	LTDC_R7	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ7	LTDC_G0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ8	LTDC_G1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ9	LTDC_G2	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ10	LTDC_G3	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ11	LTDC_G4	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK0	LTDC_G5	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK1	LTDC_G6	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK2	LTDC_G7	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ12	LTDC_B0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ13	LTDC_B1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ14	LTDC_B2	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PJ15	LTDC_B3	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK3	LTDC_B4	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK4	LTDC_B5	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK5	LTDC_B6	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK6	LTDC_B7	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PK7	LTDC_DE	Alternate Function Push Pull	No pull-up and no pull-down	**Very High**	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
					*	
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	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWD
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWC
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
GPIO	PI8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	KEY_S1
	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	KEY_S2
	PA0/WKUP	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	BL_PWM
	PH4	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	KEY_S3
	PH7	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	TP_INT
	PB6	GPIO_Output	**Output Open Drain ***	**Pull-up ***	**High ***	I2C1_SCL
	PB9	GPIO_Output	**Output Open Drain ***	**Pull-up ***	**High ***	I2C1_SDA

8.2. DMA configuration

nothing configured in DMA service

8.3. NVIC configuration

8.3.1. NVIC

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
TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts	true	0	0
TIM7 global interrupt	true	0	0
LTDC global interrupt	true	5	0
DMA2D global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USART1 global interrupt	unused		
FMC global interrupt	unused		
TIM5 global interrupt	unused		
FPU global interrupt	unused		
LTDC global error interrupt	unused		

8.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	true	true	false
Hard fault interrupt	true	true	false
Memory management fault	true	true	false
Pre-fetch fault, memory access fault	true	true	false
Undefined instruction or illegal state	true	true	false
System service call via SWI instruction	true	false	false
Debug monitor	true	true	false
Pendable request for system service	true	false	false
System tick timer	true	false	false
TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts	true	true	true

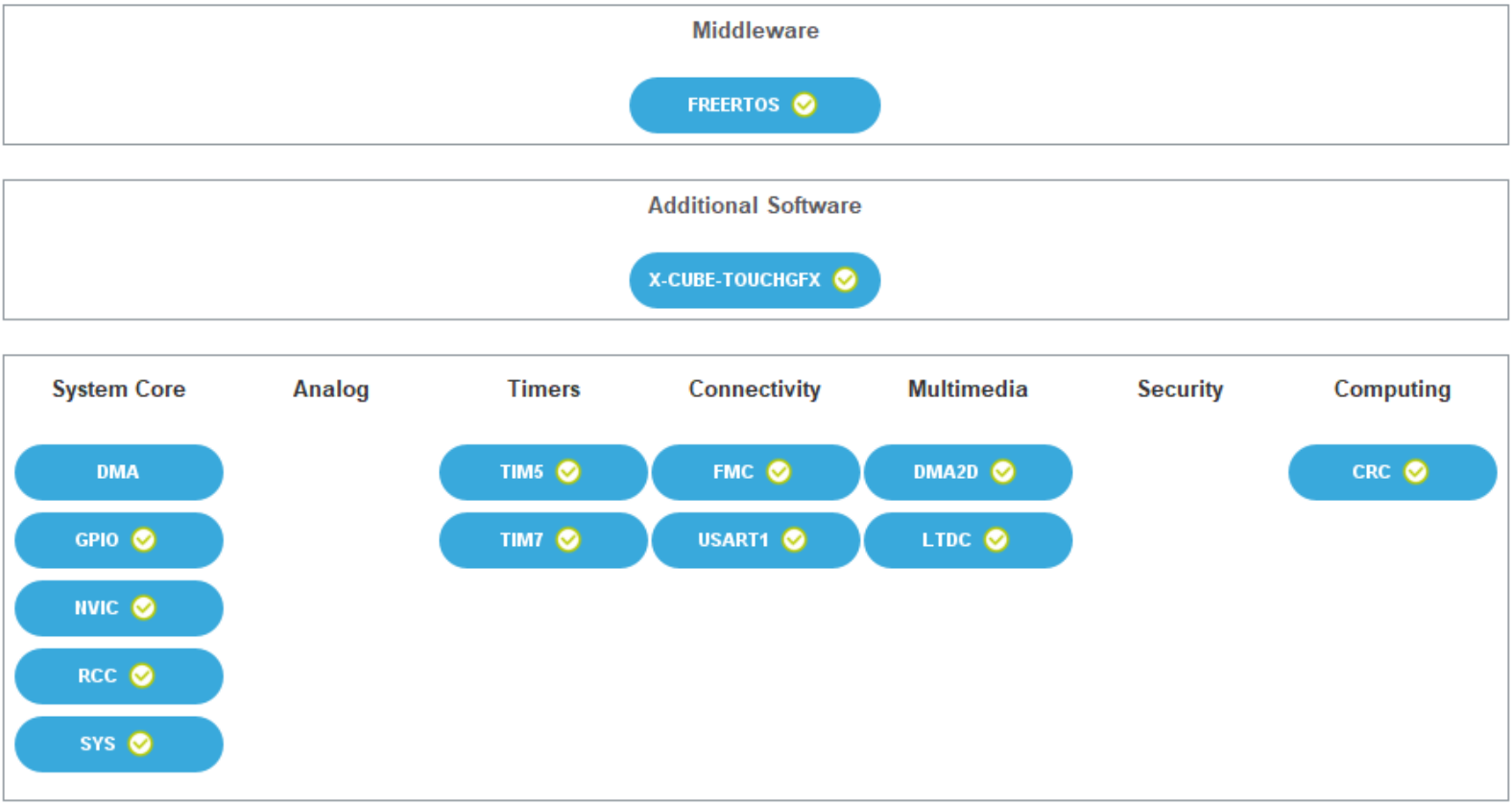
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
TIM7 global interrupt	true	true	true
LTDC global interrupt	true	true	true
DMA2D global interrupt	true	true	true

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current



10. Software Pack Report

10.1. Software Pack selected

Vendor	Name	Version	Component
STMicroelectronics	FreeRTOS	0.0.1	Class : CMSIS Group : RTOS2 SubGroup : FreeRTOS Version : 10.2.0 Class : RTOS Group : Core Version : 10.2.0
STMicroelectronics	X-CUBE-TOUCHGFX	4.14.0	Class : Graphics Group : Application Variant : TouchGFX Generator Version : 4.14.0

11. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00071990.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00031020.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00068628.pdf
Application note	http://www.st.com/resource/en/application_note/CD00167594.pdf
Application note	http://www.st.com/resource/en/application_note/CD00211314.pdf
Application note	http://www.st.com/resource/en/application_note/CD00249778.pdf
Application note	http://www.st.com/resource/en/application_note/CD00259245.pdf
Application note	http://www.st.com/resource/en/application_note/CD00264321.pdf
Application note	http://www.st.com/resource/en/application_note/CD00264342.pdf
Application note	http://www.st.com/resource/en/application_note/CD00264379.pdf
Application note	http://www.st.com/resource/en/application_note/DM00024853.pdf
Application note	http://www.st.com/resource/en/application_note/DM00040802.pdf
Application note	http://www.st.com/resource/en/application_note/DM00040808.pdf
Application note	http://www.st.com/resource/en/application_note/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00046011.pdf
Application note	http://www.st.com/resource/en/application_note/DM00050879.pdf
Application note	http://www.st.com/resource/en/application_note/DM00072315.pdf
Application note	http://www.st.com/resource/en/application_note/DM00073742.pdf
Application note	http://www.st.com/resource/en/application_note/DM00073853.pdf
Application note	http://www.st.com/resource/en/application_note/DM00080497.pdf
Application note	http://www.st.com/resource/en/application_note/DM00081379.pdf
Application note	http://www.st.com/resource/en/application_note/DM00115714.pdf
Application note	http://www.st.com/resource/en/application_note/DM00123028.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf

Application note	http://www.st.com/resource/en/application_note/DM00154959.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf
Application note	http://www.st.com/resource/en/application_note/DM00161778.pdf
Application note	http://www.st.com/resource/en/application_note/DM00164538.pdf
Application note	http://www.st.com/resource/en/application_note/DM00172465.pdf
Application note	http://www.st.com/resource/en/application_note/DM00213525.pdf
Application note	http://www.st.com/resource/en/application_note/DM00220769.pdf
Application note	http://www.st.com/resource/en/application_note/DM00257177.pdf
Application note	http://www.st.com/resource/en/application_note/DM00272912.pdf
Application note	http://www.st.com/resource/en/application_note/DM00226326.pdf
Application note	http://www.st.com/resource/en/application_note/DM00236305.pdf
Application note	http://www.st.com/resource/en/application_note/DM00281138.pdf
Application note	http://www.st.com/resource/en/application_note/DM00296349.pdf
Application note	http://www.st.com/resource/en/application_note/DM00327191.pdf
Application note	http://www.st.com/resource/en/application_note/DM00287603.pdf
Application note	http://www.st.com/resource/en/application_note/DM00354244.pdf
Application note	http://www.st.com/resource/en/application_note/DM00373474.pdf
Application note	http://www.st.com/resource/en/application_note/DM00315319.pdf
Application note	http://www.st.com/resource/en/application_note/DM00380469.pdf
Application note	http://www.st.com/resource/en/application_note/DM00395696.pdf
Application note	http://www.st.com/resource/en/application_note/DM00431633.pdf
Application note	http://www.st.com/resource/en/application_note/DM00493651.pdf
Application note	http://www.st.com/resource/en/application_note/DM00536349.pdf