
STM32
CubeMX

1. Description

1.1. Project

Project Name	NutX_MainBoard_Src
Board Name	custom
Generated with:	STM32CubeMX 6.0.0
Date	08/21/2020

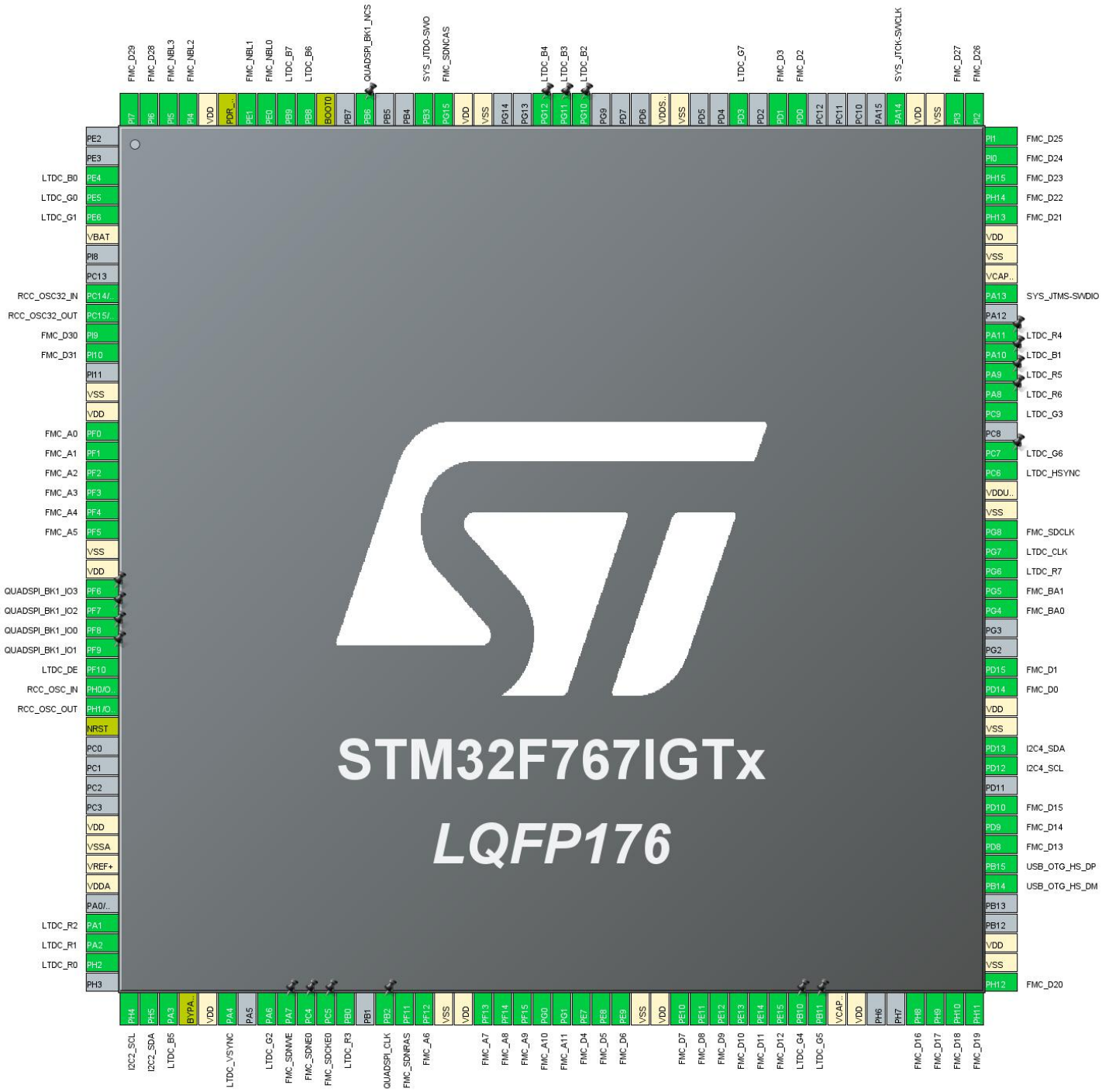
1.2. MCU

MCU Series	STM32F7
MCU Line	STM32F7x7
MCU name	STM32F767IGTx
MCU Package	LQFP176
MCU Pin number	176

1.3. Core(s) information

Core(s)	Arm Cortex-M7

2. Pinout Configuration



3. Pins Configuration

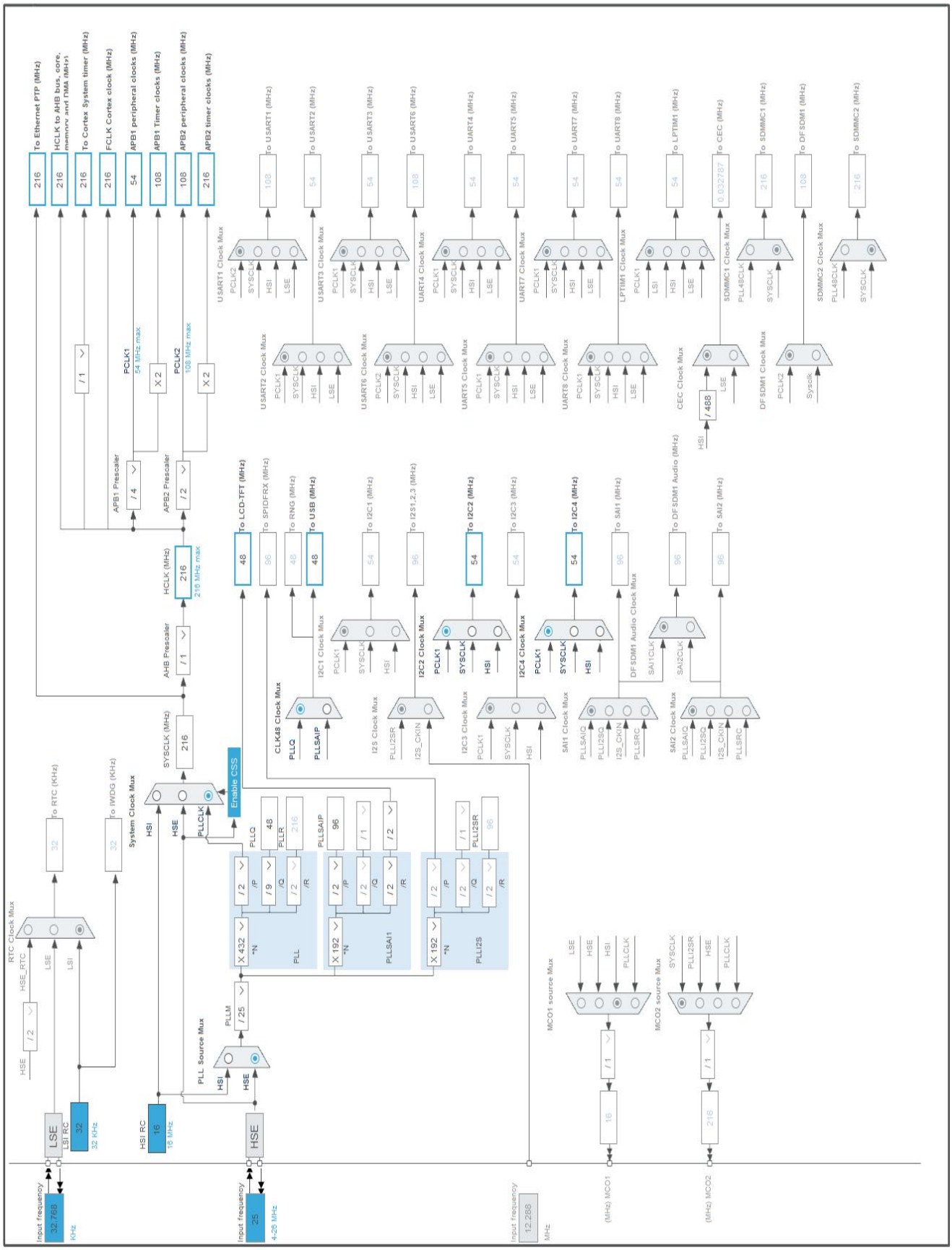
Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
3	PE4	I/O	LTDC_B0	
4	PE5	I/O	LTDC_G0	
5	PE6	I/O	LTDC_G1	
6	VBAT	Power		
9	PC14/OSC32_IN	I/O	RCC_OSC32_IN	
10	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
11	PI9	I/O	FMC_D30	
12	PI10	I/O	FMC_D31	
14	VSS	Power		
15	VDD	Power		
16	PF0	I/O	FMC_A0	
17	PF1	I/O	FMC_A1	
18	PF2	I/O	FMC_A2	
19	PF3	I/O	FMC_A3	
20	PF4	I/O	FMC_A4	
21	PF5	I/O	FMC_A5	
22	VSS	Power		
23	VDD	Power		
24	PF6	I/O	QUADSPI_BK1_IO3	
25	PF7	I/O	QUADSPI_BK1_IO2	
26	PF8	I/O	QUADSPI_BK1_IO0	
27	PF9	I/O	QUADSPI_BK1_IO1	
28	PF10	I/O	LTDC_DE	
29	PH0/OSC_IN	I/O	RCC_OSC_IN	
30	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
31	NRST	Reset		
36	VDD	Power		
37	VSSA	Power		
38	VREF+	Power		
39	VDDA	Power		
41	PA1	I/O	LTDC_R2	
42	PA2	I/O	LTDC_R1	
43	PH2	I/O	LTDC_R0	
45	PH4	I/O	I2C2_SCL	
46	PH5	I/O	I2C2_SDA	
47	PA3	I/O	LTDC_B5	

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
48	BYPASS_REG	Reset		
49	VDD	Power		
50	PA4	I/O	LTDC_VSYNC	
52	PA6	I/O	LTDC_G2	
53	PA7	I/O	FMC_SDNWE	
54	PC4	I/O	FMC_SDNE0	
55	PC5	I/O	FMC_SDCKE0	
56	PB0	I/O	LTDC_R3	
58	PB2	I/O	QUADSPI_CLK	
59	PF11	I/O	FMC_SDNRAS	
60	PF12	I/O	FMC_A6	
61	VSS	Power		
62	VDD	Power		
63	PF13	I/O	FMC_A7	
64	PF14	I/O	FMC_A8	
65	PF15	I/O	FMC_A9	
66	PG0	I/O	FMC_A10	
67	PG1	I/O	FMC_A11	
68	PE7	I/O	FMC_D4	
69	PE8	I/O	FMC_D5	
70	PE9	I/O	FMC_D6	
71	VSS	Power		
72	VDD	Power		
73	PE10	I/O	FMC_D7	
74	PE11	I/O	FMC_D8	
75	PE12	I/O	FMC_D9	
76	PE13	I/O	FMC_D10	
77	PE14	I/O	FMC_D11	
78	PE15	I/O	FMC_D12	
79	PB10	I/O	LTDC_G4	
80	PB11	I/O	LTDC_G5	
81	VCAP_1	Power		
82	VDD	Power		
85	PH8	I/O	FMC_D16	
86	PH9	I/O	FMC_D17	
87	PH10	I/O	FMC_D18	
88	PH11	I/O	FMC_D19	
89	PH12	I/O	FMC_D20	
90	VSS	Power		

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
91	VDD	Power		
94	PB14	I/O	USB_OTG_HS_DM	
95	PB15	I/O	USB_OTG_HS_DP	
96	PD8	I/O	FMC_D13	
97	PD9	I/O	FMC_D14	
98	PD10	I/O	FMC_D15	
100	PD12	I/O	I2C4_SCL	
101	PD13	I/O	I2C4_SDA	
102	VSS	Power		
103	VDD	Power		
104	PD14	I/O	FMC_D0	
105	PD15	I/O	FMC_D1	
108	PG4	I/O	FMC_BA0	
109	PG5	I/O	FMC_BA1	
110	PG6	I/O	LTDC_R7	
111	PG7	I/O	LTDC_CLK	
112	PG8	I/O	FMC_SDCLK	
113	VSS	Power		
114	VDDUSB	Power		
115	PC6	I/O	LTDC_HSYNC	
116	PC7	I/O	LTDC_G6	
118	PC9	I/O	LTDC_G3	
119	PA8	I/O	LTDC_R6	
120	PA9	I/O	LTDC_R5	
121	PA10	I/O	LTDC_B1	
122	PA11	I/O	LTDC_R4	
124	PA13	I/O	SYS_JTMS-SWDIO	
125	VCAP_2	Power		
126	VSS	Power		
127	VDD	Power		
128	PH13	I/O	FMC_D21	
129	PH14	I/O	FMC_D22	
130	PH15	I/O	FMC_D23	
131	PI0	I/O	FMC_D24	
132	PI1	I/O	FMC_D25	
133	PI2	I/O	FMC_D26	
134	PI3	I/O	FMC_D27	
135	VSS	Power		
136	VDD	Power		

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
137	PA14	I/O	SYS_JTCK-SWCLK	
142	PD0	I/O	FMC_D2	
143	PD1	I/O	FMC_D3	
145	PD3	I/O	LTDC_G7	
148	VSS	Power		
149	VDDSDMMC	Power		
153	PG10	I/O	LTDC_B2	
154	PG11	I/O	LTDC_B3	
155	PG12	I/O	LTDC_B4	
158	VSS	Power		
159	VDD	Power		
160	PG15	I/O	FMC_SDNCAS	
161	PB3	I/O	SYS_JTDO-SWO	
164	PB6	I/O	QUADSPI_BK1_NCS	
166	BOOT0	Boot		
167	PB8	I/O	LTDC_B6	
168	PB9	I/O	LTDC_B7	
169	PE0	I/O	FMC_NBL0	
170	PE1	I/O	FMC_NBL1	
171	PDR_ON	Reset		
172	VDD	Power		
173	PI4	I/O	FMC_NBL2	
174	PI5	I/O	FMC_NBL3	
175	PI6	I/O	FMC_D28	
176	PI7	I/O	FMC_D29	

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	NutX_MainBoard_Src
Project Folder	D:\Org-EdgeGravity\NutX_MainBoard_Src
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F7 V1.16.0
Application Structure	Advanced
Generate Under Root	Yes
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 only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	No
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_CRC_Init	CRC
4	MX_DMA2D_Init	DMA2D
5	MX_FMC_Init	FMC
6	MX_I2C2_Init	I2C2
7	MX_I2C4_Init	I2C4
8	MX_LTDC_Init	LTDC
9	MX_QUADSPI_Init	QUADSPI
10	MX_TIM7_Init	TIM7
11	MX_USB_OTG_HS_PCD_Init	USB_OTG_HS

Rank	Function Name	IP Instance Name
0	MX_CORTEX_M7_Init	CORTEX_M7
13	MX_TouchGFX_Init	STMicroelectronics.X-CUBE-TOUCHGFX.4.14.0
14	MX_TouchGFX_Process	STMicroelectronics.X-CUBE-TOUCHGFX.4.14.0

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F7
Line	STM32F7x7
MCU	STM32F767IGTx
Datasheet	DS11532_Rev4

6.2. Parameter Selection

Temperature	25
Vdd	3.3

6.3. Battery Selection

Battery	Alkaline(9V)
Capacity	625.0 mAh
Self Discharge	0.3 %/month
Nominal Voltage	9.0 V
Max Cont Current	200.0 mA
Max Pulse Current	0.0 mA
Cells in series	1
Cells in parallel	1

7. IPs and Middleware Configuration

7.1. CRC

mode: Activated

7.1.1. Parameter Settings:

Basic Parameters:

Default Polynomial State	Enable
Default Init Value State	Enable

Advanced Parameters:

Input Data Inversion Mode	None
Output Data Inversion Mode	Disable
Input Data Format	Bytes

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
DMA2D ALPHA Inversion	Regular Alpha
DMA2D Red and Blue swap	Regular mode (RGB or ARGB)

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	**2 HCLK clock cycles ***

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. I2C2

I2C: I2C

7.5.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	

	0x20404768 *

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

7.6. I2C4

I2C: I2C

7.6.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x20404768 ***

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

7.7. LTDC

Display Type: RGB888 (24 bits)

7.7.1. 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

7.7.2. 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 ***

7.8. QUADSPI

QuadSPI Mode: Bank1 with Quad SPI Lines

7.8.1. Parameter Settings:

General Parameters:

Clock Prescaler	255
Fifo Threshold	1
Sample Shifting	No Sample Shifting
Flash Size	1
Chip Select High Time	1 Cycle
Clock Mode	Low
Flash ID	Flash ID 1
Dual Flash	Disabled

7.9. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.9.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Flash Latency(WS)	7 WS (8 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 Over Drive	Enabled
Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

7.10. SYS

Debug: Trace Asynchronous Sw

Timebase Source: TIM6

7.11. TIM7

mode: Activated

7.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**215 ***
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)

7.12. USB_OTG_HS

Internal FS Phy: Device_Only

7.12.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Enable internal IP DMA	Disabled
Physical interface	Internal Phy
Low power	Disabled
Link Power Management	Disabled
Use dedicated end point 1 interrupt	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

7.13. FREERTOS

Interface: CMSIS_V2

7.13.1. 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	**Disabled ***
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	**Enabled ***

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	**65536 ***
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

7.13.2. Include parameters:

Include definitions:

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

uxTaskGetStackHighWaterMark2	**Enabled ***

7.13.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT	Disabled

Project settings (see parameter description first):

Use FW pack heap file	Enabled

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

7.14.1. 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	0x00000000
Start Address 2	0x00000000

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	
	PA7	FMC_SDNWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC4	FMC_SDNE0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC5	FMC_SDCKE0	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	
I2C2	PH4	I2C2_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
	PH5	I2C2_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	
I2C4	PD12	I2C4_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
	PD13	I2C4_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	
LTDC	PE4	LTDC_B0	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE5	LTDC_G0	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE6	LTDC_G1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PF10	LTDC_DE	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA1	LTDC_R2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA2	LTDC_R1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PH2	LTDC_R0	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA3	LTDC_B5	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA4	LTDC_VSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA6	LTDC_G2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB0	LTDC_R3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB10	LTDC_G4	Alternate Function Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB11	LTDC_G5	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PG6	LTDC_R7	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG7	LTDC_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC6	LTDC_HSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC7	LTDC_G6	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PC9	LTDC_G3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA8	LTDC_R6	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA9	LTDC_R5	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA10	LTDC_B1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA11	LTDC_R4	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PD3	LTDC_G7	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG10	LTDC_B2	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PG11	LTDC_B3	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PG12	LTDC_B4	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB8	LTDC_B6	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB9	LTDC_B7	Alternate Function Push Pull	No pull-up and no pull-down	Low	
QUADSPI	PF6	QUADSPI_BK1_IO3	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PF7	QUADSPI_BK1_IO2	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PF8	QUADSPI_BK1_IO0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PF9	QUADSPI_BK1_IO1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB2	QUADSPI_CLK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB6	QUADSPI_BK1_NCS	Alternate Function Push Pull	No pull-up and no pull-down	**Very 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	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-	n/a	n/a	n/a	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
		SWCLK				
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
USB_OTG_HS	PB14	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB15	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	

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	6	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		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
FMC global interrupt	unused		
USB On The Go HS End Point 1 Out global interrupt	unused		
USB On The Go HS End Point 1 In global interrupt	unused		
USB On The Go HS global interrupt	unused		
FPU global interrupt	unused		
LTDC global error interrupt	unused		
QUADSPI global interrupt	unused		
I2C4 event interrupt	unused		
I2C4 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

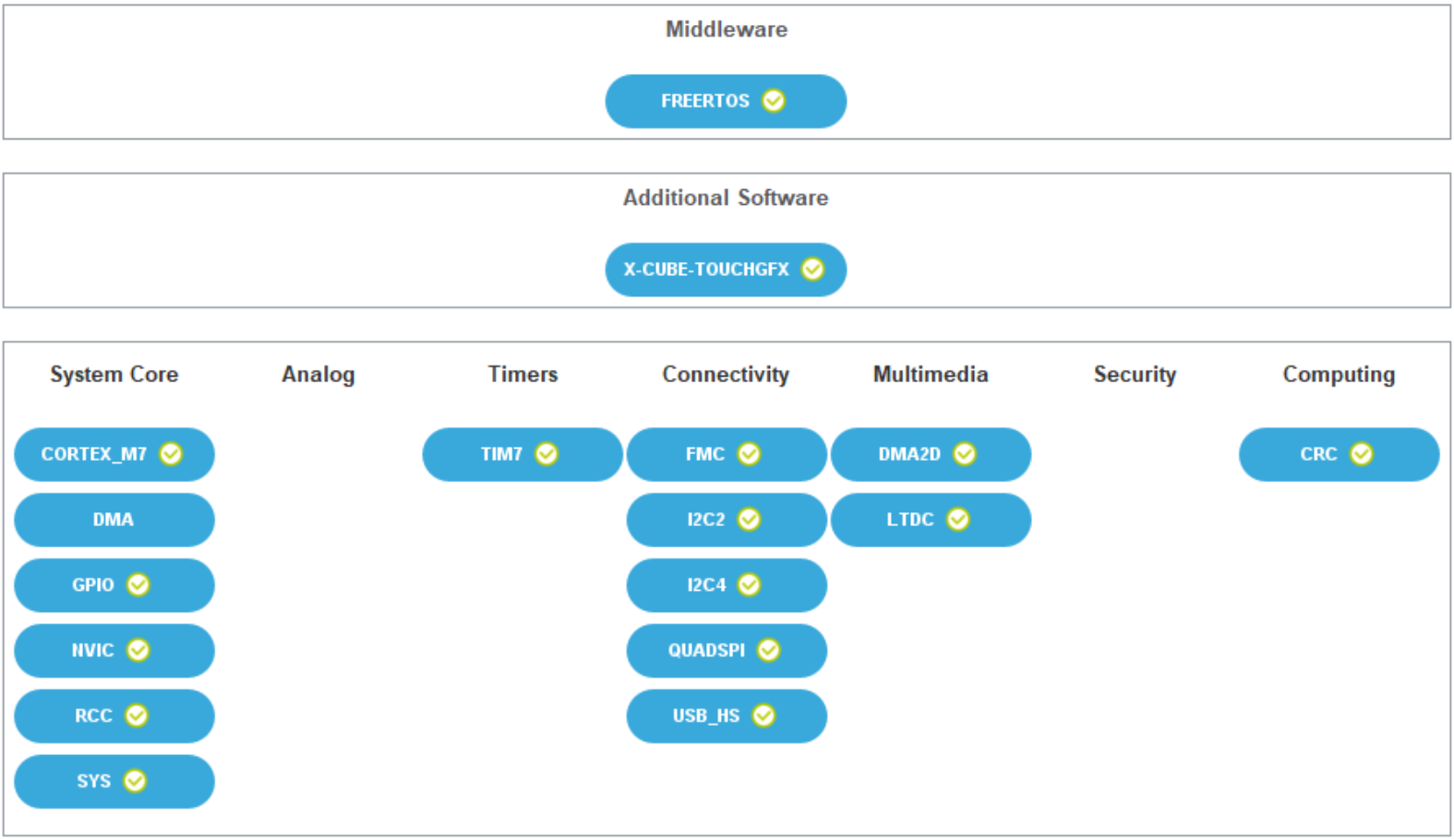
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Undefined instruction or illegal state	true	true	false
System service call via SWI instruction	true	false	false
Debug monitor	true	true	false
Pendable request for system service	true	false	false
System tick timer	true	false	false
TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts	true	true	true
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/DM00273119.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00224583.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00237416.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00257543.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/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/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00046011.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/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf
Application note	http://www.st.com/resource/en/application_note/DM00164538.pdf
Application note	http://www.st.com/resource/en/application_note/DM00164549.pdf
Application note	http://www.st.com/resource/en/application_note/DM00173083.pdf
Application note	http://www.st.com/resource/en/application_note/DM00210367.pdf
Application note	http://www.st.com/resource/en/application_note/DM00220769.pdf
Application note	http://www.st.com/resource/en/application_note/DM00227538.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/DM00272913.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/DM00337702.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/DM00354333.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
Application note	http://www.st.com/resource/en/application_note/DM00600614.pdf