1. Description

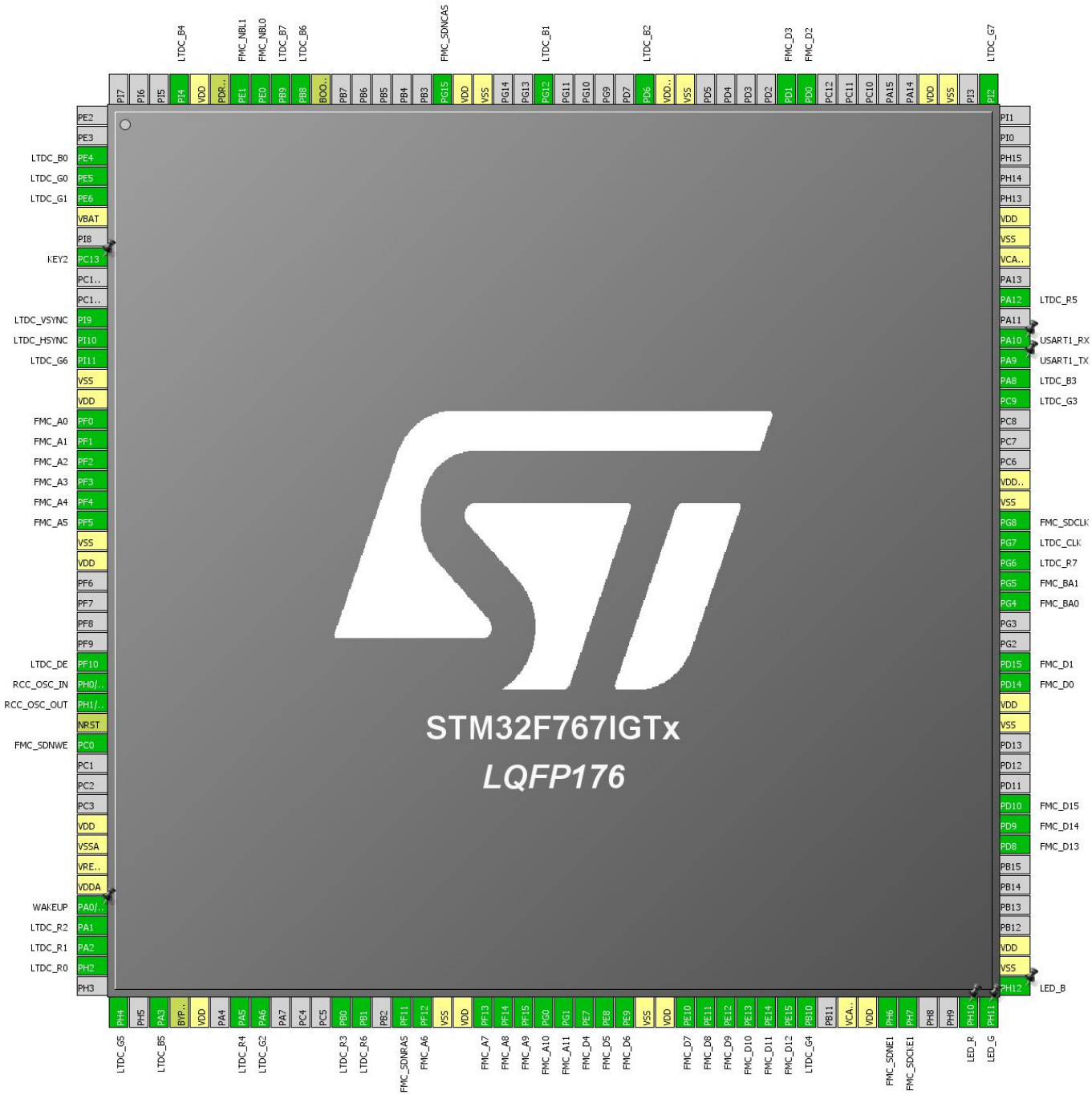
1.1. Project

Project Name	stm32f767
Board Name	custom
Generated with:	STM32CubeMX 4.26.0
Date	07/21/2018

1.2. MCU

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

2. Pinout Configuration



3. Pins Configuration

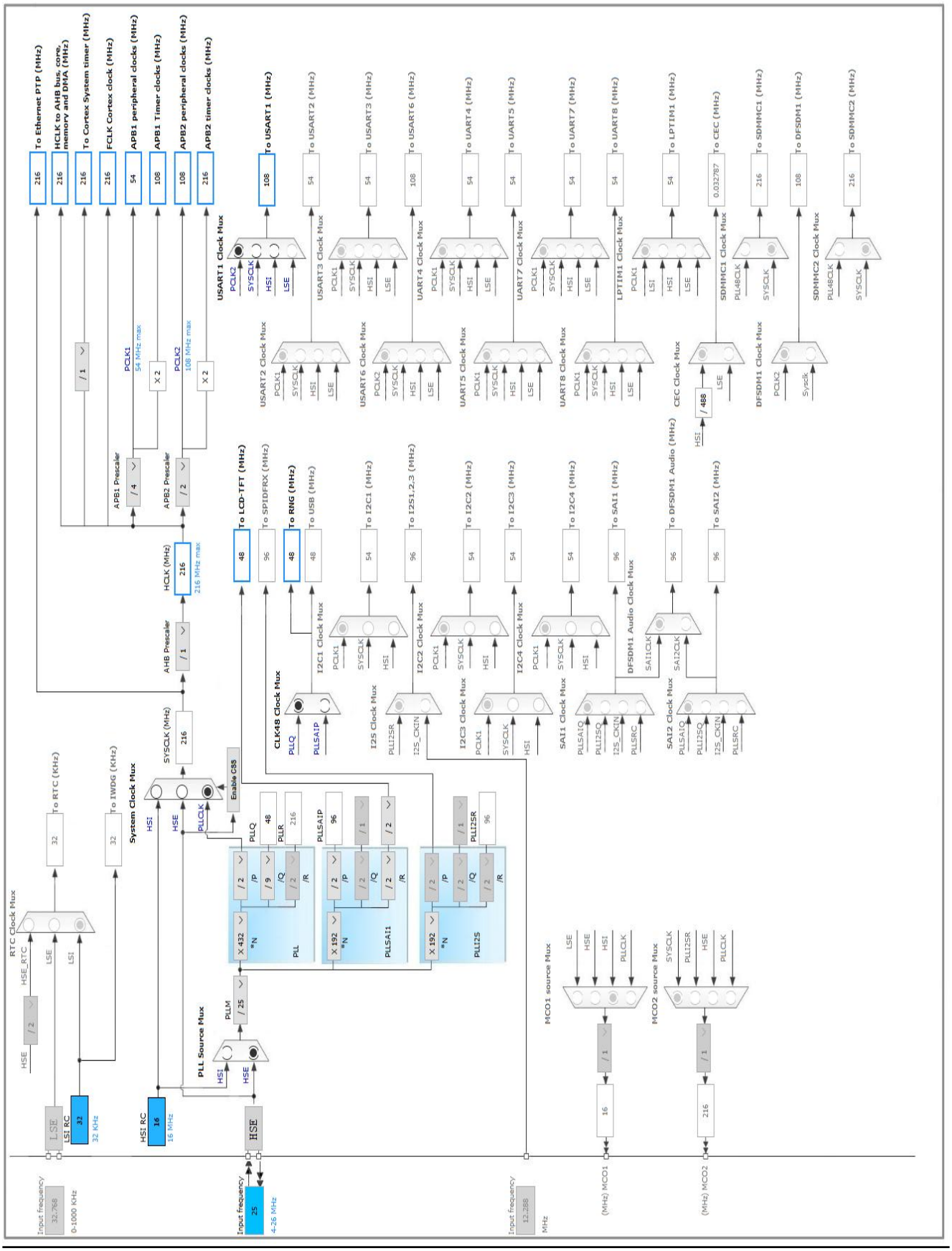
Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
3	PE4	I/O	LTDC_B0	
4	PE5	I/O	LTDC_G0	
5	PE6	I/O	LTDC_G1	
6	VBAT	Power		
8	PC13 *	I/O	GPIO_Input	KEY2
11	PI9	I/O	LTDC_VSYNC	
12	PI10	I/O	LTDC_HSYNC	
13	PI11	I/O	LTDC_G6	
14	VSS	Power		
15	VDD	Power		
16	PF0	I/O	FMC_A0	
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		
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		
32	PC0	I/O	FMC_SDNWE	
36	VDD	Power		
37	VSSA	Power		
38	VREF+	Power		
39	VDDA	Power		
40	PA0/WKUP	I/O	GPIO_EXTI0	WAKEUP
41	PA1	I/O	LTDC_R2	
42	PA2	I/O	LTDC_R1	
43	PH2	I/O	LTDC_R0	
45	PH4	I/O	LTDC_G5	
47	PA3	I/O	LTDC_B5	
48	BYPASS_REG	Reset		
49	VDD	Power		
51	PA5	I/O	LTDC_R4	

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
52	PA6	I/O	LTDC_G2	
56	PB0	I/O	LTDC_R3	
57	PB1	I/O	LTDC_R6	
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	
81	VCAP_1	Power		
82	VDD	Power		
83	PH6	I/O	FMC_SDNE1	
84	PH7	I/O	FMC_SDCKE1	
87	PH10 *	I/O	GPIO_Output	LED_R
88	PH11 *	I/O	GPIO_Output	LED_G
89	PH12 *	I/O	GPIO_Output	LED_B
90	VSS	Power		
91	VDD	Power		
96	PD8	I/O	FMC_D13	
97	PD9	I/O	FMC_D14	
98	PD10	I/O	FMC_D15	
102	VSS	Power		
103	VDD	Power		
104	PD14	I/O	FMC_D0	

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
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		
118	PC9	I/O	LTDC_G3	
119	PA8	I/O	LTDC_B3	
120	PA9	I/O	USART1_TX	
121	PA10	I/O	USART1_RX	
123	PA12	I/O	LTDC_R5	
125	VCAP_2	Power		
126	VSS	Power		
127	VDD	Power		
133	PI2	I/O	LTDC_G7	
135	VSS	Power		
136	VDD	Power		
142	PD0	I/O	FMC_D2	
143	PD1	I/O	FMC_D3	
148	VSS	Power		
149	VDDSDMMC	Power		
150	PD6	I/O	LTDC_B2	
155	PG12	I/O	LTDC_B1	
158	VSS	Power		
159	VDD	Power		
160	PG15	I/O	FMC_SDNCAS	
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	LTDC_B4	

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. DMA2D

mode: Activated

5.1.1. Parameter Settings:

Basic Parameters:

Transfer Mode	Memory to Memory
Color Mode	ARGB8888
Output Offset	0

Foreground layer Configuration:

DMA2D Input Color Mode	ARGB8888
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)

5.2. FMC

SDRAM 1

Clock and chip enable: SDCKE1+SDNE1

Internal bank number: 4 banks

Address: 12 bits

Data: 16 bits

Byte enable: 16-bit byte enable

5.2.1. SDRAM 1:

SDRAM control:

Bank	SDRAM bank 2
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	Disabled
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	**6 ***
Write recovery time	**2 ***
SDRAM common row precharge delay	**2 ***
Row to column delay	**2 ***

5.3. LTDC

Display Type: RGB888 (24 bits)

5.3.1. Parameter Settings:

Synchronization for Width:

Horizontal Synchronization Width	8
Horizontal Back Porch	7
Active Width	640
Horizontal Front Porch	6
HSync Width	7
Accumulated Horizontal Back Porch Width	14
Accumulated Active Width	654
Total Width	660

Synchronization for Height:

Vertical Synchronization Height	4
Vertical Back Porch	2
Active Height	480
Vertical Front Porch	2
VSync Height	3
Accumulated Vertical Back Porch Height	5
Accumulated Active Height	485
Total Height	487

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

5.3.2. Layer Settings:

BackGround Color:

Layer 0 - Blue	0
Layer 0 - Green	0
Layer 0 - Red	0
Layer 1 - Blue	0
Layer 1 - Green	0
Layer 1 - Red	0

Number of Layers:

Number of Layers	2 layers

Windows Position:

Layer 0 - Window Horizontal Start	0
Layer 0 - Window Horizontal Stop	0
Layer 0 - Window Vertical Start	0
Layer 0 - Window Vertical Stop	0
Layer 1 - Window Horizontal Start	0
Layer 1 - Window Horizontal Stop	0
Layer 1 - Window Vertical Start	0
Layer 1 - Window Vertical Stop	0

Pixel Parameters:

Layer 0 - Pixel Format	ARGB8888
Layer 1 - Pixel Format	ARGB8888

Blending:

Layer 0 - Alpha constant for blending	0
Layer 0 - Default Alpha value	0
Layer 0 - Blending Factor1	Alpha constant
Layer 0 - Blending Factor2	Alpha constant
Layer 1 - Alpha constant for blending	0
Layer 1 - Default Alpha value	0
Layer 1 - Blending Factor1	Alpha constant
Layer 1 - Blending Factor2	Alpha constant

Frame Buffer:

Layer 0 - Color Frame Buffer Start Adress	0
Layer 0 - Color Frame Buffer Line Length (Image Width)	0
Layer 0 - Color Frame Buffer Number of Lines (Image Height)	0
Layer 1 - Color Frame Buffer Start Adress	0
Layer 1 - Color Frame Buffer Line Length (Image	0

Width)	
Layer 1 - Color Frame Buffer Number of Lines (Image Height)	0

5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.4.1. 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 Regulatror Voltage Scale	Power Regulator Voltage Scale 1

5.5. RNG

mode: Activated

5.6. SYS

Timebase Source: SysTick

5.7. USART1

Mode: Asynchronous

5.7.1. 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
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
FMC	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	
	PC0	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	
	PH6	FMC_SDNE1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PH7	FMC_SDCKE1	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	
	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	
	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	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	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	
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	
	PI9	LTDC_VSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PI10	LTDC_HSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PI11	LTDC_G6	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	
	PH4	LTDC_G5	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	
	PA5	LTDC_R4	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	
	PB1	LTDC_R6	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	
	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	
	PC9	LTDC_G3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA8	LTDC_B3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA12	LTDC_R5	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PI2	LTDC_G7	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PD6	LTDC_B2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PG12	LTDC_B1	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	
	PI4	LTDC_B4	Alternate Function Push Pull	No pull-up and no pull-down	Low	
RCC	PH0/OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1/OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
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	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	KEY2
	PA0/WKUP	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	WAKEUP

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PH10	GPIO_Output	Output Push Pull	**Pull-up ***	Low	LED_R
	PH11	GPIO_Output	Output Push Pull	**Pull-up ***	Low	LED_G
	PH12	GPIO_Output	Output Push Pull	**Pull-up ***	Low	LED_B

6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART1_RX	DMA2_Stream2	Peripheral To Memory	Low
USART1_TX	DMA2_Stream7	Memory To Peripheral	Low

USART1_RX: DMA2_Stream2 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART1_TX: DMA2_Stream7 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

6.3. 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
EXTI line0 interrupt	true	0	0
DMA2 stream2 global interrupt	true	0	0
DMA2 stream7 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USART1 global interrupt	unused		
FMC global interrupt	unused		
HASH and RNG global interrupts	unused		
FPU global interrupt	unused		
LTDC global interrupt	unused		
LTDC global error interrupt	unused		
DMA2D global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F7
Line	STM32F7x7
MCU	STM32F767IGTx
Datasheet	029041_Rev4

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	stm32f767
Project Folder	D:\Files\MCU\STM32\keil\\9_LCD
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F7 V1.11.0

8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	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	No
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No

9. Software Pack Report