

## 1. Description

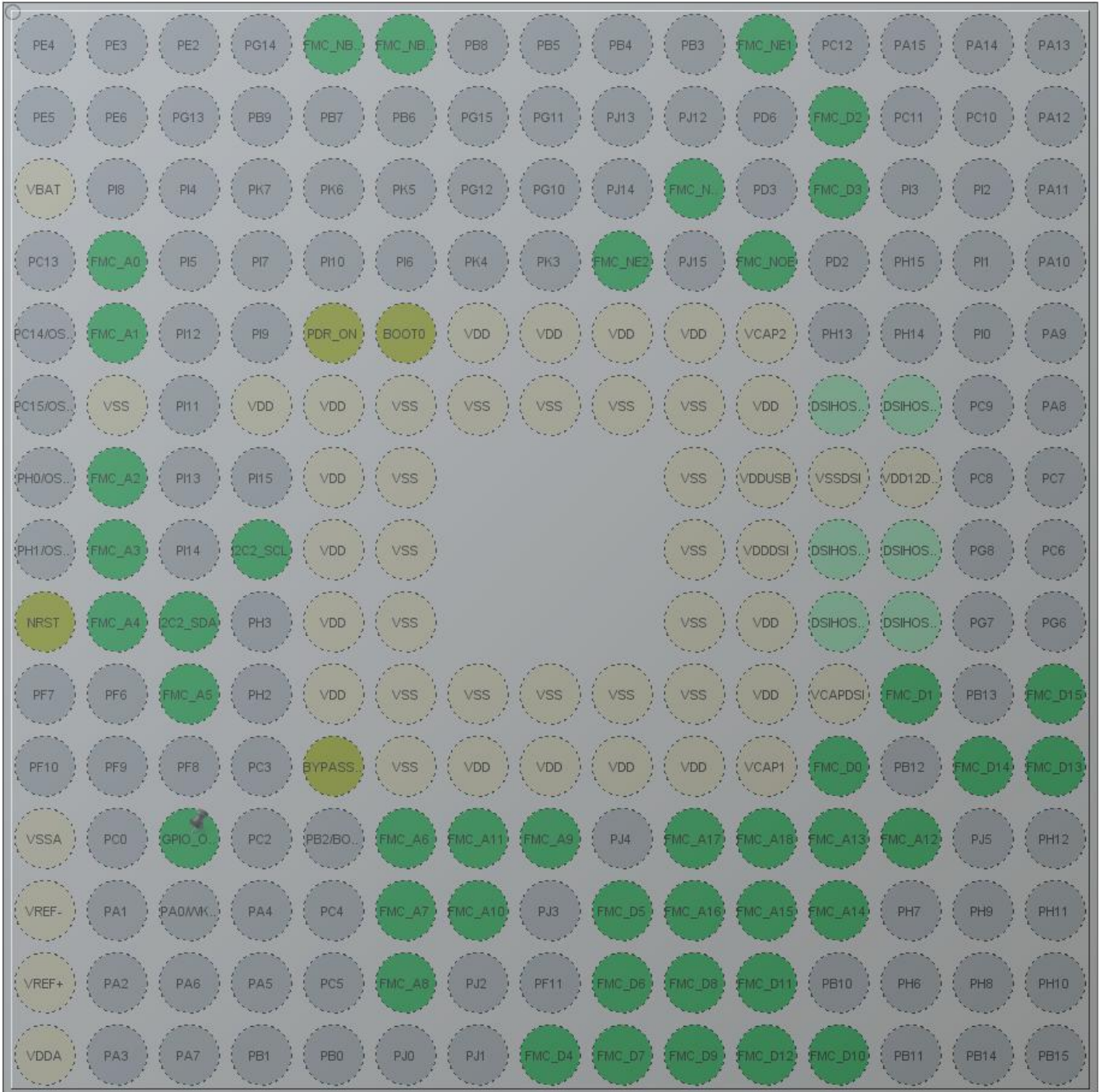
### 1.1. Project

Project Name	LCD_1
Board Name	custom
Generated with:	STM32CubeMX 5.3.0
Date	09/09/2019

### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F469/479
MCU name	STM32F469NIHx
MCU Package	TFBGA216
MCU Pin number	216

## 2. Pinout Configuration



TFPGA216 (Top view)

### 3. Pins Configuration

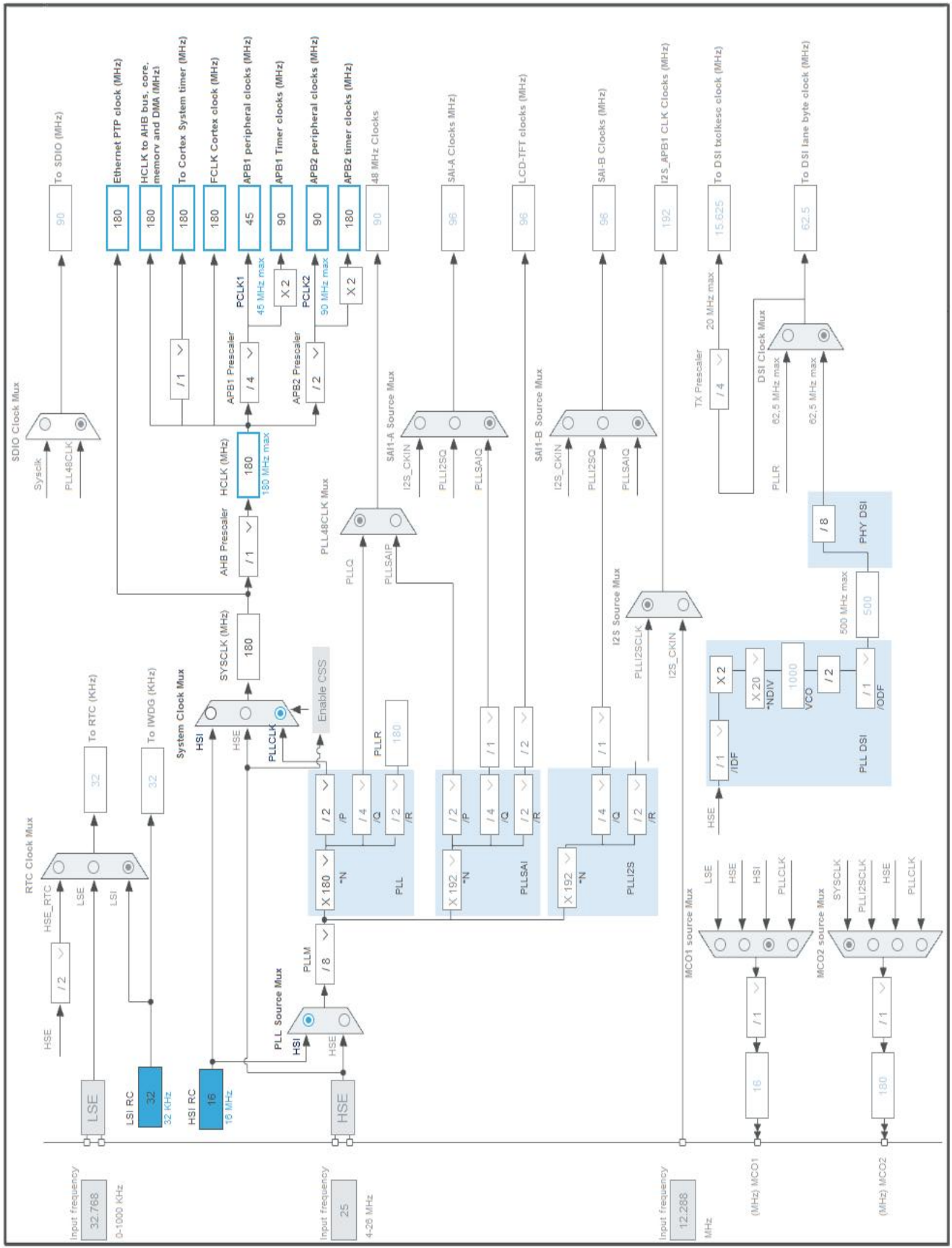
Pin Number TFBGA216	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
A5	PE1	I/O	FMC_NBL1	
A6	PE0	I/O	FMC_NBL0	
A11	PD7	I/O	FMC_NE1	
B12	PD0	I/O	FMC_D2	
C1	VBAT	Power		
C10	PD5	I/O	FMC_NWE	
C12	PD1	I/O	FMC_D3	
D2	PF0	I/O	FMC_A0	
D9	PG9	I/O	FMC_NE2	
D11	PD4	I/O	FMC_NOE	
E2	PF1	I/O	FMC_A1	
E5	PDR_ON	Reset		
E6	BOOT0	Boot		
E7	VDD	Power		
E8	VDD	Power		
E9	VDD	Power		
E10	VDD	Power		
E11	VCAP2	Power		
F2	VSS	Power		
F4	VDD	Power		
F5	VDD	Power		
F6	VSS	Power		
F7	VSS	Power		
F8	VSS	Power		
F9	VSS	Power		
F10	VSS	Power		
F11	VDD	Power		
G2	PF2	I/O	FMC_A2	
G5	VDD	Power		
G6	VSS	Power		
G10	VSS	Power		
G11	VDDUSB	Power		
G12	VSSDSI	Power		
G13	VDD12DSI	Power		
H2	PF3	I/O	FMC_A3	
H4	PH4	I/O	I2C2_SCL	

Pin Number TFBGA216	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
H5	VDD	Power		
H6	VSS	Power		
H10	VSS	Power		
H11	VDDDSI	Power		
J1	NRST	Reset		
J2	PF4	I/O	FMC_A4	
J3	PH5	I/O	I2C2_SDA	
J5	VDD	Power		
J6	VSS	Power		
J10	VSS	Power		
J11	VDD	Power		
K3	PF5	I/O	FMC_A5	
K5	VDD	Power		
K6	VSS	Power		
K7	VSS	Power		
K8	VSS	Power		
K9	VSS	Power		
K10	VSS	Power		
K11	VDD	Power		
K12	VCAPDSI	Power		
K13	PD15	I/O	FMC_D1	
K15	PD10	I/O	FMC_D15	
L5	BYPASS_REG	Reset		
L6	VSS	Power		
L7	VDD	Power		
L8	VDD	Power		
L9	VDD	Power		
L10	VDD	Power		
L11	VCAP1	Power		
L12	PD14	I/O	FMC_D0	
L14	PD9	I/O	FMC_D14	
L15	PD8	I/O	FMC_D13	
M1	VSSA	Power		
M3	PC1 *	I/O	GPIO_Output	
M6	PF12	I/O	FMC_A6	
M7	PG1	I/O	FMC_A11	
M8	PF15	I/O	FMC_A9	
M10	PD12	I/O	FMC_A17	
M11	PD13	I/O	FMC_A18	

Pin Number TFBGA216	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
M12	PG3	I/O	FMC_A13	
M13	PG2	I/O	FMC_A12	
N1	VREF-	Power		
N6	PF13	I/O	FMC_A7	
N7	PG0	I/O	FMC_A10	
N9	PE8	I/O	FMC_D5	
N10	PD11	I/O	FMC_A16	
N11	PG5	I/O	FMC_A15	
N12	PG4	I/O	FMC_A14	
P1	VREF+	Power		
P6	PF14	I/O	FMC_A8	
P9	PE9	I/O	FMC_D6	
P10	PE11	I/O	FMC_D8	
P11	PE14	I/O	FMC_D11	
R1	VDDA	Power		
R8	PE7	I/O	FMC_D4	
R9	PE10	I/O	FMC_D7	
R10	PE12	I/O	FMC_D9	
R11	PE15	I/O	FMC_D12	
R12	PE13	I/O	FMC_D10	

\* The pin is affected with an I/O function

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	LCD_1.54_MCU_F469
Project Folder	E:\E-Steth\LCD_1.54_MCU_F469
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.24.1

### 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	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	STM32F469/479
MCU	STM32F469NIHx
Datasheet	028196_Rev4

### 6.2. Parameter Selection

Temperature	25
Vdd	3.3



## 7. IPs and Middleware Configuration

### 7.1. CRC

**mode: Activated**

### 7.2. FMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

**Chip Select: NE2**

**Memory type: SRAM**

**Address: 18 bits**

**Data: 16 bits**

**Byte enable: 16-bit byte enable**

NOR Flash/PSRAM/SRAM/ROM/LCD 2

**Chip Select: NE1**

**Memory type: LCD Interface**

**LCD Register Select: A18**

**Data: 16 bits**

#### 7.2.1. NOR/PSRAM 1:

##### **NOR/PSRAM control:**

Memory type	SRAM
Bank	Bank 1 NOR/PSRAM 2
Write operation	Disabled
Write FIFO	Enabled
Extended mode	Disabled

##### **NOR/PSRAM timing:**

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

#### 7.2.2. NOR/PSRAM 2:

##### **NOR/PSRAM control:**

Memory type	LCD Interface
Bank	Bank 1 NOR/PSRAM 1
Write operation	Enabled
Write FIFO	Enabled
Extended mode	Disabled

**NOR/PSRAM timing:**

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

## 7.3. I2C2

### I2C: I2C

#### 7.3.1. Parameter Settings:

**Master Features:**

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

**Slave Features:**

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

## 7.4. SYS

### Timebase Source: SysTick

## 7.5. FREERTOS

### Interface: CMSIS\_V1

#### 7.5.1. 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

**7.5.2. Include parameters:**

**Include definitions:**

vTaskPrioritySet	Enabled
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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

## 7.6. GRAPHICS

### Graphics Framework: STemWin

#### Display Interface : Display Bus Interface using FMC

##### 7.6.1. Parameter Settings:

###### Stack Name:

Name STemWin

###### External Tool:

Use GUIBuilder Tool **Enabled \***

###### Physical Display Size:

X size(Pixels) **240 \***

Y size(Pixels) **240 \***

###### Display Driver:

Display Driver GUIDRV\_FLEXCOLOR\_F66702

Supported LCD Controller Solomon SSD1284

Display Controller Mode GUIDRV\_FLEXCOLOR\_M16C0B8

Orientation None

###### Frame Buffer:

Color Conversion GUICC\_233

Frame Buffer Depth(bpp) 16

FMC Bank address **0x0000 \***

**GUI Memory size:**

Number of Kbytes 110

Memory size(byte) 112640

**General Settings:**

FREERTOS Enabled

**GUI Parameters:**

GUI RGB Ordering ARGB

GUI Speed Optimization Enabled

GUI Default Font Font6x8

### 7.6.2. EA\_1\_STemWin:

**External application info:**

Name GUIBuilder

**Settings:**

Graphics Application Category FrameWindow

**Location:**

Customizable Path **Yes \***

**Inputs:**

Physical Display X Size 800

Physical Display Y Size 480

\* 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	PE1	FMC_NBL1	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	
	PD7	FMC_NE1	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	
	PD5	FMC_NWE	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	
	PF0	FMC_A0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG9	FMC_NE2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD4	FMC_NOE	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	
	PD15	FMC_D1	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	
	PD9	FMC_D14	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	
	PF12	FMC_A6	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	
	PF15	FMC_A9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD12	FMC_A17	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD13	FMC_A18	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG3	FMC_A13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG2	FMC_A12	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	
	PG0	FMC_A10	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	
	PD11	FMC_A16	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG5	FMC_A15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG4	FMC_A14	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	
	PE9	FMC_D6	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		
PE14	FMC_D11	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
	PE7	FMC_D4	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	
	PE12	FMC_D9	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	
	PE13	FMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
I2C2	PH4	I2C2_SCL	Alternate Function Open Drain	Pull-up	<b>Very High</b> *	
	PH5	I2C2_SDA	Alternate Function Open Drain	Pull-up	<b>Very High</b> *	
GPIO	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

## 8.2. DMA configuration

nothing configured in DMA service

### 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
PVD interrupt through EXTI line 16		unused	
Flash global interrupt		unused	
RCC global interrupt		unused	
I2C2 event interrupt		unused	
I2C2 error interrupt		unused	
FPU global interrupt		unused	

\* User modified value



## ***9. Software Pack Report***