
STM32
CubeMX

# 1. Description

## 1.1. Project

| | |
|---|---|
| Project Name | STM32F746G_DISCO |
| Board Name | custom |
| Generated with: | STM32CubeMX 6.1.0 |
| Date | 11/30/2020 |

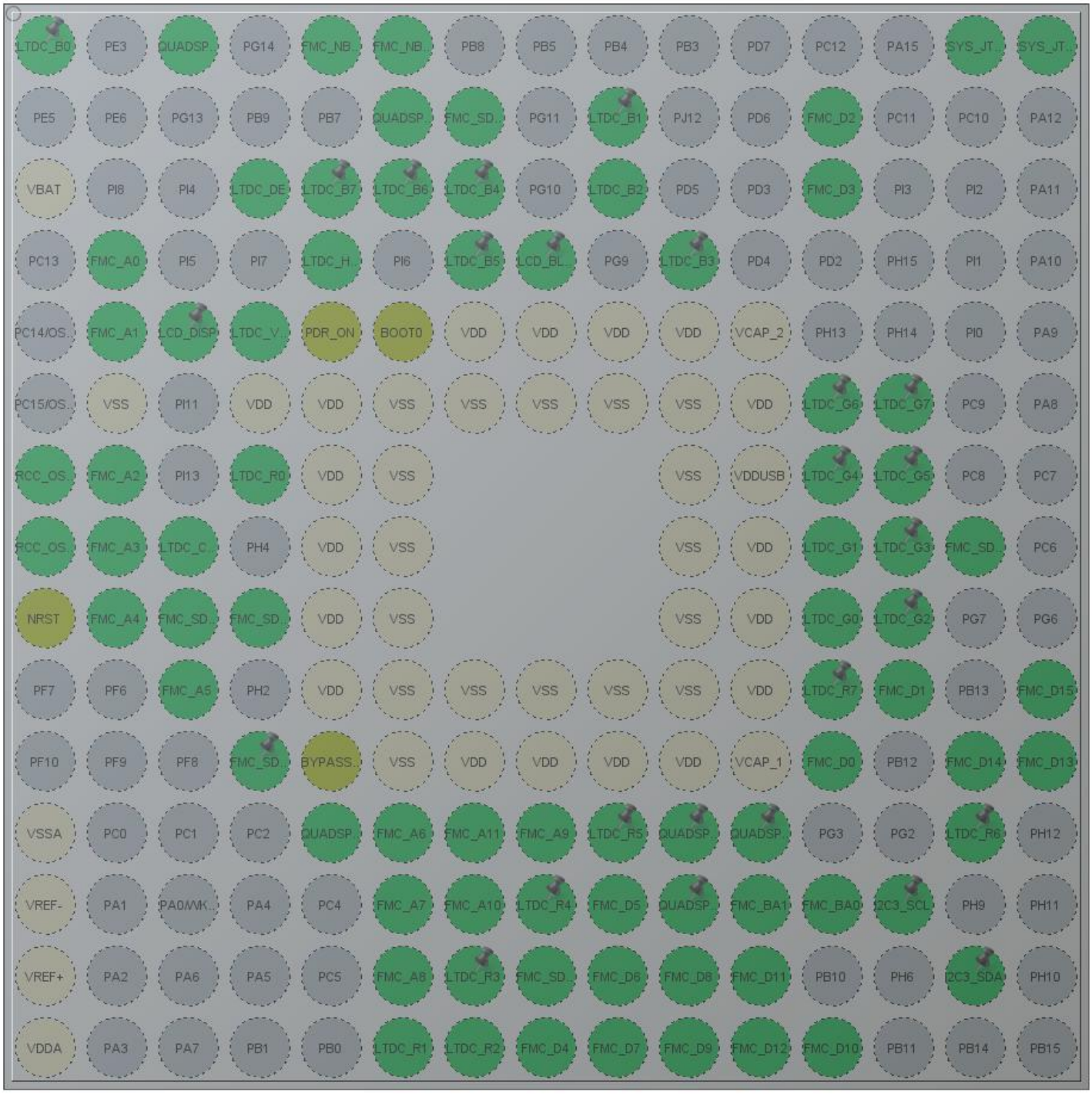
## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F7 |
| MCU Line | STM32F7x6 |
| MCU name | STM32F746NGHx |
| MCU Package | TFBGA216 |
| MCU Pin number | 216 |

## 1.3. Core(s) information

| | |
|---|---|
| Core(s) | Arm Cortex-M7 |

## 2. Pinout Configuration




TFBGA216 (Top view)

# 3. Pins Configuration

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| A1 | PE4 | I/O | LTDC_B0 | |
| A3 | PE2 | I/O | QUADSPI_BK1_IO2 | |
| A5 | PE1 | I/O | FMC_NBL1 | |
| A6 | PE0 | I/O | FMC_NBL0 | |
| A14 | PA14 | I/O | SYS_JTCK-SWCLK | |
| A15 | PA13 | I/O | SYS_JTMS-SWDIO | |
| B6 | PB6 | I/O | QUADSPI_BK1_NCS | |
| B7 | PG15 | I/O | FMC_SDNCAS | |
| B9 | PJ13 | I/O | LTDC_B1 | |
| B12 | PD0 | I/O | FMC_D2 | |
| C1 | VBAT | Power | | |
| C4 | PK7 | I/O | LTDC_DE | |
| C5 | PK6 | I/O | LTDC_B7 | |
| C6 | PK5 | I/O | LTDC_B6 | |
| C7 | PG12 | I/O | LTDC_B4 | |
| C9 | PJ14 | I/O | LTDC_B2 | |
| C12 | PD1 | I/O | FMC_D3 | |
| D2 | PF0 | I/O | FMC_A0 | |
| D5 | PI10 | I/O | LTDC_HSYNC | |
| D7 | PK4 | I/O | LTDC_B5 | |
| D8 | PK3 * | I/O | GPIO_Output | LCD_BL_CTRL |
| D10 | PJ15 | I/O | LTDC_B3 | |
| E2 | PF1 | I/O | FMC_A1 | |
| E3 | PI12 * | I/O | GPIO_Output | LCD_DISP |
| E4 | PI9 | I/O | LTDC_VSYNC | |
| E5 | PDR_ON | Reset | | |
| E6 | BOOT0 | Boot | | |
| E7 | VDD | Power | | |
| E8 | VDD | Power | | |
| E9 | VDD | Power | | |
| E10 | VDD | Power | | |
| E11 | VCAP_2 | Power | | |
| F2 | VSS | Power | | |
| F4 | VDD | Power | | |
| F5 | VDD | Power | | |
| F6 | VSS | Power | | |

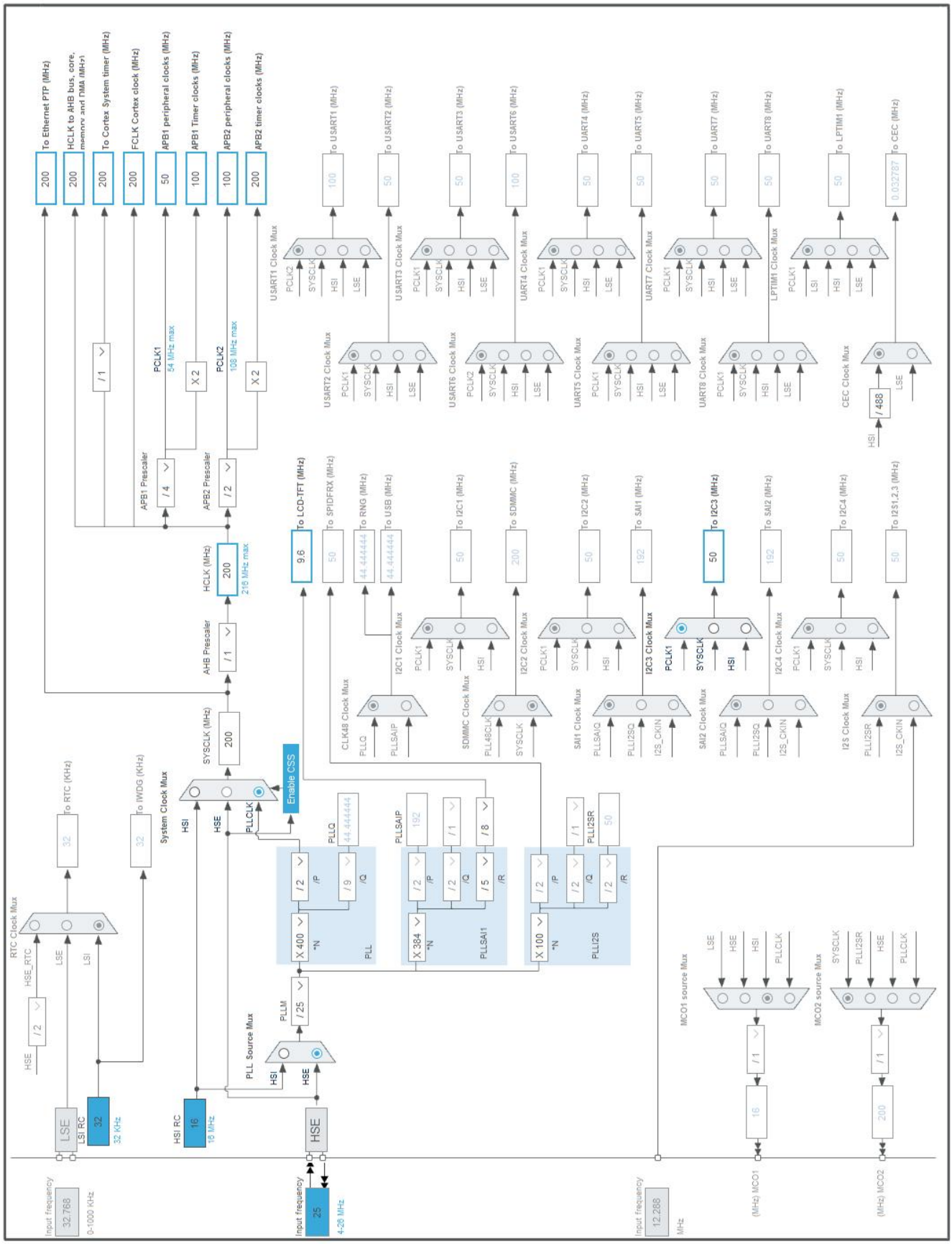
| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| F7 | VSS | Power | | |
| F8 | VSS | Power | | |
| F9 | VSS | Power | | |
| F10 | VSS | Power | | |
| F11 | VDD | Power | | |
| F12 | PK1 | I/O | LTDC_G6 | |
| F13 | PK2 | I/O | LTDC_G7 | |
| G1 | PH0/OSC_IN | I/O | RCC_OSC_IN | |
| G2 | PF2 | I/O | FMC_A2 | |
| G4 | PI15 | I/O | LTDC_R0 | |
| G5 | VDD | Power | | |
| G6 | VSS | Power | | |
| G10 | VSS | Power | | |
| G11 | VDDUSB | Power | | |
| G12 | PJ11 | I/O | LTDC_G4 | |
| G13 | PK0 | I/O | LTDC_G5 | |
| H1 | PH1/OSC_OUT | I/O | RCC_OSC_OUT | |
| H2 | PF3 | I/O | FMC_A3 | |
| H3 | PI14 | I/O | LTDC_CLK | |
| H5 | VDD | Power | | |
| H6 | VSS | Power | | |
| H10 | VSS | Power | | |
| H11 | VDD | Power | | |
| H12 | PJ8 | I/O | LTDC_G1 | |
| H13 | PJ10 | I/O | LTDC_G3 | |
| H14 | PG8 | I/O | FMC_SDCLK | |
| J1 | NRST | Reset | | |
| J2 | PF4 | I/O | FMC_A4 | |
| J3 | PH5 | I/O | FMC_SDNWE | |
| J4 | PH3 | I/O | FMC_SDNE0 | |
| J5 | VDD | Power | | |
| J6 | VSS | Power | | |
| J10 | VSS | Power | | |
| J11 | VDD | Power | | |
| J12 | PJ7 | I/O | LTDC_G0 | |
| J13 | PJ9 | I/O | LTDC_G2 | |
| K3 | PF5 | I/O | FMC_A5 | |
| K5 | VDD | Power | | |
| K6 | VSS | Power | | |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| K7 | VSS | Power | | |
| K8 | VSS | Power | | |
| K9 | VSS | Power | | |
| K10 | VSS | Power | | |
| K11 | VDD | Power | | |
| K12 | PJ6 | I/O | LTDC_R7 | |
| K13 | PD15 | I/O | FMC_D1 | |
| K15 | PD10 | I/O | FMC_D15 | |
| L4 | PC3 | I/O | FMC_SDCKE0 | |
| L5 | BYPASS_REG | Reset | | |
| L6 | VSS | Power | | |
| L7 | VDD | Power | | |
| L8 | VDD | Power | | |
| L9 | VDD | Power | | |
| L10 | VDD | Power | | |
| L11 | VCAP_1 | Power | | |
| L12 | PD14 | I/O | FMC_D0 | |
| L14 | PD9 | I/O | FMC_D14 | |
| L15 | PD8 | I/O | FMC_D13 | |
| M1 | VSSA | Power | | |
| M5 | PB2 | I/O | QUADSPI_CLK | |
| M6 | PF12 | I/O | FMC_A6 | |
| M7 | PG1 | I/O | FMC_A11 | |
| M8 | PF15 | I/O | FMC_A9 | |
| M9 | PJ4 | I/O | LTDC_R5 | |
| M10 | PD12 | I/O | QUADSPI_BK1_IO1 | |
| M11 | PD13 | I/O | QUADSPI_BK1_IO3 | |
| M14 | PJ5 | I/O | LTDC_R6 | |
| N1 | VREF- | Power | | |
| N6 | PF13 | I/O | FMC_A7 | |
| N7 | PG0 | I/O | FMC_A10 | |
| N8 | PJ3 | I/O | LTDC_R4 | |
| N9 | PE8 | I/O | FMC_D5 | |
| N10 | PD11 | I/O | QUADSPI_BK1_IO0 | |
| N11 | PG5 | I/O | FMC_BA1 | |
| N12 | PG4 | I/O | FMC_BA0 | |
| N13 | PH7 | I/O | I2C3_SCL | |
| P1 | VREF+ | Power | | |
| P6 | PF14 | I/O | FMC_A8 | |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| P7 | PJ2 | I/O | LTDC_R3 | |
| P8 | PF11 | I/O | FMC_SDNRAS | |
| P9 | PE9 | I/O | FMC_D6 | |
| P10 | PE11 | I/O | FMC_D8 | |
| P11 | PE14 | I/O | FMC_D11 | |
| P14 | PH8 | I/O | I2C3_SDA | |
| R1 | VDDA | Power | | |
| R6 | PJ0 | I/O | LTDC_R1 | |
| R7 | PJ1 | I/O | LTDC_R2 | |
| 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 | STM32F746G_DISCO |
| Project Folder | C:\TouchGFXProjects\Lab_HW3 |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F7 V1.16.0 |
| Application Structure | Advanced |
| Generate Under Root | No |
| Do not generate the main() | No |
| Minimum Heap Size | 0xA00 |
| Minimum Stack Size | 0xA00 |

## 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 |
| 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) | No |
| Enable Full Assert | No |

## 5.3. Advanced Settings - Generated Function Calls

| Rank | Function Name | Peripheral 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_I2C3_Init | I2C3 |
| 7 | MX_LTDC_Init | LTDC |
| 8 | MX_QUADSPI_Init | QUADSPI |

# 6. Power Consumption Calculator report

## 6.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F7 |
| Line | STM32F7x6 |
| MCU | STM32F746NGHx |
| Datasheet | DS10916_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 |

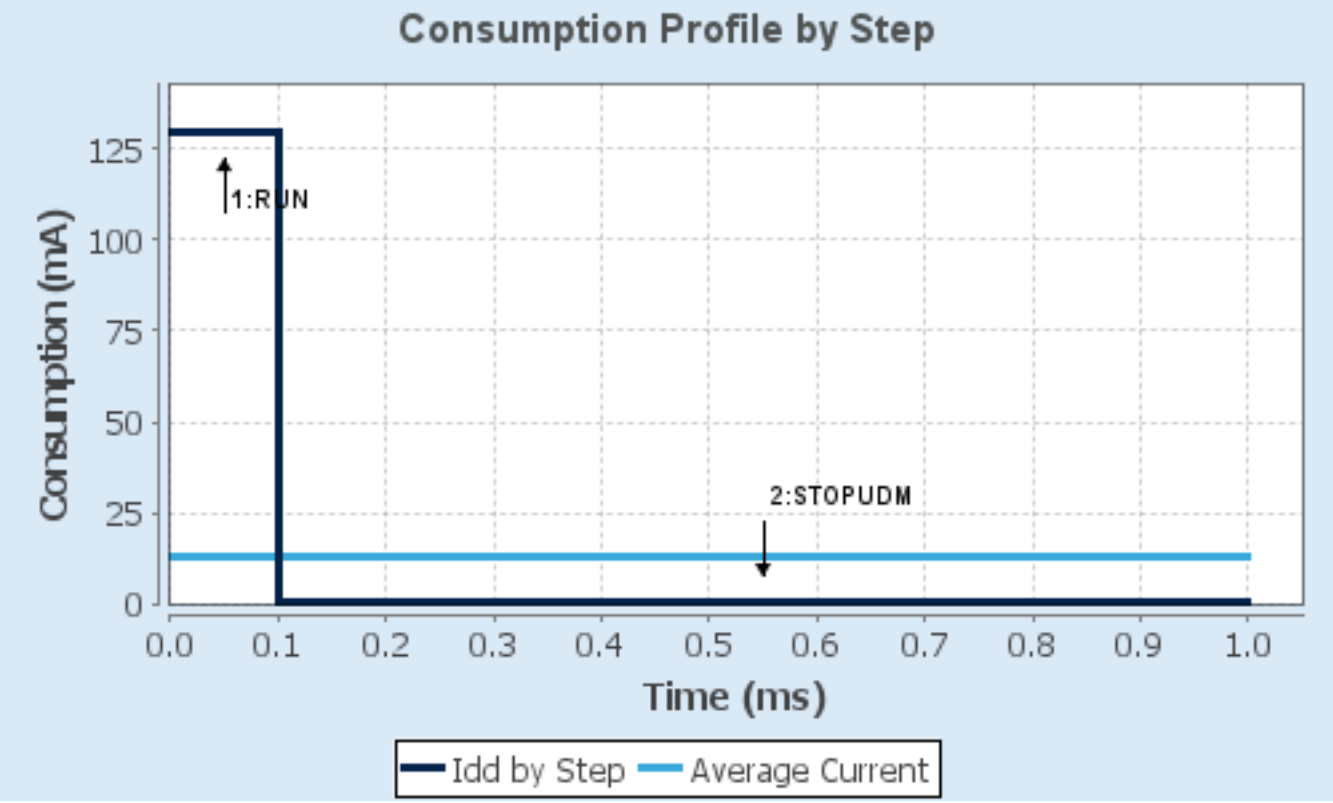
## 6.4. Sequence

| ***Step*** | Step1 | Step2 |
|---|---|---|
| ***Mode*** | RUN | STOP_UDM (Under Drive) |
| ***Vdd*** | 3.3 | 3.3 |
| ***Voltage Source*** | Battery | Battery |
| ***Range*** | Scale1-High | No Scale |
| ***Fetch Type*** | ITCM/FLASH/REGON | n/a |
| ***CPU Frequency*** | 216 MHz | 0 Hz |
| ***Clock Configuration*** | HSE PLL | Regulator_LP Flash-PwrDwn |
| ***Clock Source Frequency*** | 4 MHz | 0 Hz |
| ***Peripherals*** | | |
| ***Additional Cons.*** | 0 mA | 0 mA |
| ***Average Current*** | 130 mA | 100 µA |
| ***Duration*** | 0.1 ms | 0.9 ms |
| ***DMIPS*** | 462.0 | 0.0 |
| ***Ta Max*** | 92.56 | 104.99 |
| ***Category*** | In DS Table | In DS Table |

## 6.5. Results

| Sequence Time | 1 ms | Average Current | 13.09 mA |
|---|---|---|---|
| Battery Life | 1 day, 23 hours | Average DMIPS | 462.24005 DMIPS |

## 6.6. Chart


Consumption Profile by Step
Consumption (mA)
125
100
75
50
25
0
1:RUN
2:STOPUDM
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

# 7. Peripherals and Middlewares Configuration

## 7.1. CORTEX_M7

### 7.1.1. Parameter Settings:

**Cortex Interface Settings:**

| | |
|---|---|
| Flash Interface | AXI Interface |
| ART ACCLERATOR | **Enabled *** |
| Instruction Prefetch | **Enabled *** |
| CPU ICache | **Enabled *** |
| CPU DCache | **Enabled *** |

**Cortex Memory Protection Unit Control Settings:**

| | |
|---|---|
| MPU Control Mode | **Background Region Privileged accesses only + MPU Disabled during hard fault, NMI and FAULTMASK handlers *** |

**Cortex Memory Protection Unit Region 0 Settings:**

| | |
|---|---|
| MPU Region | **Enabled *** |
| MPU Region Base Address | **0x90000000 *** |
| MPU Region Size | **256MB *** |
| MPU SubRegion Disable | **0x0 *** |
| MPU TEX field level | level 0 |
| MPU Access Permission | **ALL ACCESS PERMITTED *** |
| MPU Instruction Access | ENABLE |
| MPU Shareability Permission | DISABLE |
| MPU Cacheable Permission | DISABLE |
| MPU Bufferable Permission | DISABLE |

**Cortex Memory Protection Unit Region 1 Settings:**

| | |
|---|---|
| MPU Region | **Enabled *** |
| MPU Region Base Address | **0x90000000 *** |
| MPU Region Size | **16MB *** |
| MPU SubRegion Disable | **0x0 *** |
| MPU TEX field level | level 0 |
| MPU Access Permission | **ALL ACCESS PERMITTED *** |
| MPU Instruction Access | ENABLE |
| MPU Shareability Permission | DISABLE |
| MPU Cacheable Permission | **ENABLE *** |
| MPU Bufferable Permission | DISABLE |

**Cortex Memory Protection Unit Region 2 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 3 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 4 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 5 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 6 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 7 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 8 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 9 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 10 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 11 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 12 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 13 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 14 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

**Cortex Memory Protection Unit Region 15 Settings:**

| | |
|---|---|
| MPU Region | Disabled |

## 7.2. CRC

## mode: Activated

### 7.2.1. 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 |

### 7.3. DMA2D

**mode: Activated**

#### 7.3.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Transfer Mode | Memory to Memory |
| Color Mode | ARGB8888 |
| 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 | ARGB8888 |
| DMA2D ALPHA MODE | No modification of the alpha channel value |
| Input Alpha | 0 |
| Input Offset | 0 |

### 7.4. FMC

*SDRAM 1*

**Clock and chip enable: SDCKE0+SDNE0**

**Internal bank number: 4 banks**

**Address: 12 bits**

**Data: 16 bits**

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

#### 7.4.1. 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 | 0 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 *** |

## 7.5. I2C3

## 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 | **0x00C0EAFF *** |

**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. LTDC

## Display Type: RGB888 (24 bits)

### 7.6.1. Parameter Settings:

**Synchronization for Width:**

| | |
|---|---|
| Horizontal Synchronization Width | **41 *** |
| Horizontal Back Porch | **13 *** |
| Active Width | **480 *** |
| Horizontal Front Porch | **32 *** |

| | |
|---|---|
| HSync Width | 40 |
| Accumulated Horizontal Back Porch Width | 53 |
| Accumulated Active Width | 533 |
| Total Width | 565 |

**Synchronization for Height:**

| | |
|---|---|
| Vertical Synchronization Height | **10 *** |
| Vertical Back Porch | 2 |
| Active Height | **272 *** |
| Vertical Front Porch | 2 |
| VSync Height | 9 |
| Accumulated Vertical Back Porch Height | 11 |
| Accumulated Active Height | 283 |
| Total Height | 285 |

**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 |

## 7.6.2. 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 | **480 *** |
| Layer 0 - Window Vertical Start | 0 |
| Layer 0 - Window Vertical Stop | **272 *** |

**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 | **0xC0000000 *** |
| Layer 0 - Color Frame Buffer Line Length (Image Width) | **480 *** |
| Layer 0 - Color Frame Buffer Number of Lines (Image Height) | **272 *** |

## 7.7. QUADSPI

### QuadSPI Mode: Bank1 with Quad SPI Lines

#### 7.7.1. Parameter Settings:

**General Parameters:**

| | |
|---|---|
| Clock Prescaler | **1 *** |
| Fifo Threshold | **4 *** |
| Sample Shifting | **Sample Shifting Half Cycle *** |
| Flash Size | **24 *** |
| Chip Select High Time | **6 Cycles *** |
| Clock Mode | Low |
| Flash ID | Flash ID 1 |
| Dual Flash | Disabled |

## 7.8. RCC

### High Speed Clock (HSE): Crystal/Ceramic Resonator

#### 7.8.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Flash Latency(WS) | 6 WS (7 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 |

## 7.9. SYS

### Debug: Serial Wire

### Timebase Source: TIM6

## 7.10. FREERTOS

### Interface: CMSIS_V1

#### 7.10.1. Config parameters:

**API:**

| | |
|---|---|
| FreeRTOS API | CMSIS v1 |

**Versions:**

| | |
|---|---|
| FreeRTOS version | 10.2.1 |
| CMSIS-RTOS version | 1.02 |

**MPU/FPU:**

| | |
|---|---|
| ENABLE_MPU | Disabled |
| ENABLE_FPU | Disabled |

**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 | **Enabled *** |
| USE_COUNTING_SEMAPHORES | **Enabled *** |
| QUEUE_REGISTRY_SIZE | 8 |
| USE_APPLICATION_TASK_TAG | **Enabled *** |
| 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 *** |
| TOTAL_HEAP_SIZE | **65536 *** |
| Memory Management scheme | heap_4 |

**Hook function related definitions:**

| | |
|---|---|
| USE_IDLE_HOOK | **Enabled *** |
| 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 |

**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 |

## 7.10.2. 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 |
| uxTaskGetStackHighWaterMark2 | Disabled |

### 7.10.3. Advanced settings:

**Newlib settings (see parameter description first):**

| | |
|---|---|
| USE_NEWLIB_REENTRANT | Disabled |

**Project settings (see parameter description first):**

| | |
|---|---|
| Use FW pack heap file | Enabled |

*** 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 | |
| | PG15 | FMC_SDNCAS | 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 | |
| | 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 | |
| | PG8 | FMC_SDCLK | 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 | |
| | PH5 | FMC_SDNWE | 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 | |
| | 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 | |
| | PC3 | FMC_SDCKE0 | 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 | |
| | 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 | |
| | PG5 | FMC_BA1 | 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 | |
| | PF14 | FMC_A8 | 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 | |
| | 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 | |
| | 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 | |
| | | | | | | |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | 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 | |
| I2C3 | PH7 | I2C3_SCL | Alternate Function Open Drain | Pull-up | **Very High *** | |
| | PH8 | I2C3_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 | |
| | PJ13 | LTDC_B1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PK7 | LTDC_DE | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PK6 | LTDC_B7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PK5 | LTDC_B6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PG12 | LTDC_B4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ14 | LTDC_B2 | 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 | |
| | PK4 | LTDC_B5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ15 | LTDC_B3 | 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 | |
| | PK1 | LTDC_G6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PK2 | LTDC_G7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PI15 | LTDC_R0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ11 | LTDC_G4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PK0 | LTDC_G5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PI14 | LTDC_CLK | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ8 | LTDC_G1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ10 | LTDC_G3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ7 | LTDC_G0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ9 | LTDC_G2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ6 | LTDC_R7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ4 | LTDC_R5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ5 | LTDC_R6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ3 | LTDC_R4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ2 | LTDC_R3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ0 | LTDC_R1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PJ1 | LTDC_R2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| QUADSPI | PE2 | QUADSPI_BK1_IO2 | 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 *** | |
| | PB2 | QUADSPI_CLK | 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 |
|---|---|---|---|---|---|---|
| | | | | | * | |
| | PD12 | QUADSPI_BK1_IO1 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| | PD13 | QUADSPI_BK1_IO3 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| | PD11 | QUADSPI_BK1_IO0 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| 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 | |
| SYS | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | |
| | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | |
| GPIO | PK3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LCD_BL_CTRL |
| | PI12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LCD_DISP |

### 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 | 15 | 0 |
| System tick timer | true | 15 | 0 |
| TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts | 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 | | |
| FMC global interrupt | unused | | |
| I2C3 event interrupt | unused | | |
| I2C3 error interrupt | unused | | |
| FPU global interrupt | unused | | |
| LTDC global error interrupt | unused | | |
| QUADSPI global 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 | false | true | false |
| Hard fault interrupt | false | true | false |
| Memory management fault | false | true | false |
| Pre-fetch fault, memory access fault | false | true | false |
| Undefined instruction or illegal state | false | true | false |
| System service call via SWI instruction | false | false | false |
| Debug monitor | false | true | false |
| Pendable request for system service | false | false | false |
| System tick timer | false | false | true |
| TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts | false | true | true |
| | | | |

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

*** User modified value**

# 9. System Views

9.1. Category view

*9.1.1. Current*

# 10. Docs & Resources

| Type | Link |
|---|---|
| Datasheet | http://www.st.com/resource/en/datasheet/DM00166116.pdf |
| Reference manual | http://www.st.com/resource/en/reference_manual/DM00124865.pdf |
| Programming manual | http://www.st.com/resource/en/programming_manual/DM00237416.pdf |
| Errata sheet | http://www.st.com/resource/en/errata_sheet/DM00145382.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/DM00340311.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/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 |