
STM32
CubeMX

# 1. Description

## 1.1. Project

| | |
|---|---|
| Project Name | f746-disco-heart |
| Board Name | STM32F746G-DISCO |
| Generated with: | STM32CubeMX 6.9.1 |
| Date | 09/27/2023 |

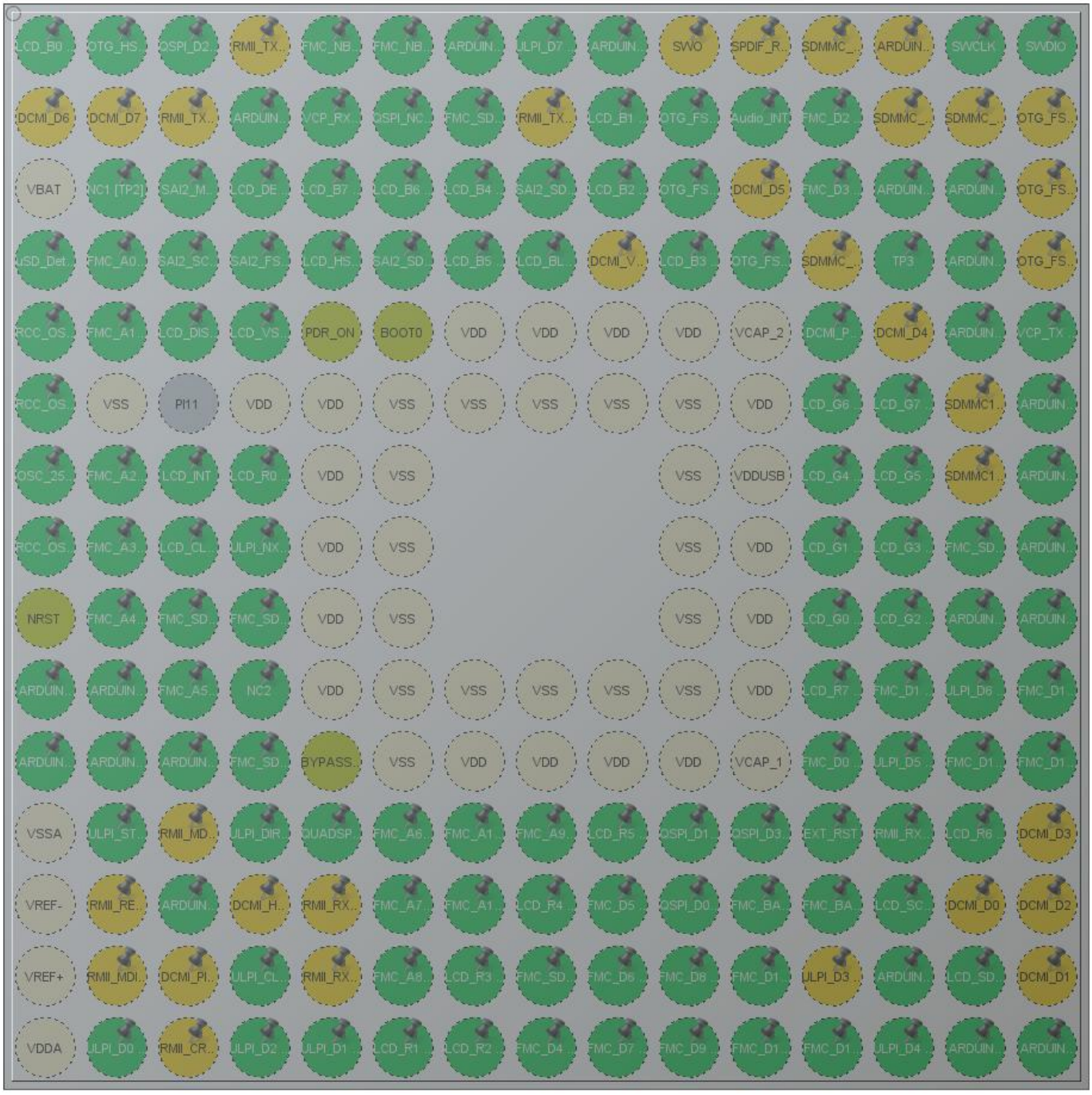
## 1.2. MCU

| | |
|---|---|
| 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 | LCD_B0 [RK043FN48H-CT672B_B0] |
| A2 | PE3 * | I/O | GPIO_Input | OTG_HS_OverCurrent [STMPS2151STR_FAULT] |
| A3 | PE2 | I/O | QUADSPI_BK1_IO2 | QSPI_D2 [N25Q128A13EF840E_DQ2] |
| A4 | PG14 ** | I/O | ETH_TXD1 | RMII_TXD1 [LAN8742A-CZ-TR_TXD1] |
| A5 | PE1 | I/O | FMC_NBL1 | FMC_NBL1 [MT48LC4M32B2B5-6A_DQM1] |
| A6 | PE0 | I/O | FMC_NBL0 | FMC_NBL0 [MT48LC4M32B2B5-6A_DQM0] |
| A7 | PB8 | I/O | I2C1_SCL | ARDUINO SCL/D15 |
| A8 | PB5 | I/O | USB_OTG_HS_ULPI_D7 | ULPI_D7 [USB3320C-EZK_D7] |
| A9 | PB4 | I/O | TIM3_CH1 | ARDUINO PWM/D3 |
| A10 | PB3 ** | I/O | SYS_JTDO-SWO | SWO |
| A11 | PD7 ** | I/O | SPDIFRX_IN0 | SPDIF_RX0 [74LVC1G04SE_4] |
| A12 | PC12 ** | I/O | SDMMC1_CK | SDMMC_CK |
| A13 | PA15 ** | I/O | TIM2_CH1 | ARDUINO PWM/D9 |
| A14 | PA14 | I/O | SYS_JTCK-SWCLK | SWCLK |
| A15 | PA13 | I/O | SYS_JTMS-SWDIO | SWDIO |
| B1 | PE5 ** | I/O | DCMI_D6 | DCMI_D6 |
| B2 | PE6 ** | I/O | DCMI_D7 | DCMI_D7 |
| B3 | PG13 ** | I/O | ETH_TXD0 | RMII_TXD0 [LAN8742A-CZ-TR_TXD0] |
| B4 | PB9 | I/O | I2C1_SDA | ARDUINO SDA/D14 |
| B5 | PB7 | I/O | USART1_RX | VCP_RX [STM32F103CBT6_PA2] |
| B6 | PB6 | I/O | QUADSPI_BK1_NCS | QSPI_NCS [N25Q128A13EF840E_S] |
| B7 | PG15 | I/O | FMC_SDNCAS | FMC_SDNCAS [MT48LC4M32B2B5-6A_CAS] |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| B8 | PG11 ** | I/O | ETH_TX_EN | RMII_TX_EN [LAN8742A-CZ-TR_TXEN] |
| B9 | PJ13 | I/O | LTDC_B1 | LCD_B1 [RK043FN48H-CT672B_B1] |
| B10 | PJ12 * | I/O | GPIO_Input | OTG_FS_VBUS |
| B11 | PD6 | I/O | GPIO_EXTI6 | Audio_INT |
| B12 | PD0 | I/O | FMC_D2 | FMC_D2 [MT48LC4M32B2B5-6A_DQ2] |
| B13 | PC11 ** | I/O | SDMMC1_D3 | SDMMC_D3 |
| B14 | PC10 ** | I/O | SDMMC1_D2 | SDMMC_D2 |
| B15 | PA12 ** | I/O | USB_OTG_FS_DP | OTG_FS_P |
| C1 | VBAT | Power | | |
| C2 | PI8 | I/O | RTC_TS | NC1 [TP2] |
| C3 | PI4 | I/O | SAI2_MCLK_A | SAI2_MCLKA [WM8994ECS/R_MCLK1] |
| C4 | PK7 | I/O | LTDC_DE | LCD_DE [RK043FN48H-CT672B_DE] |
| C5 | PK6 | I/O | LTDC_B7 | LCD_B7 [RK043FN48H-CT672B_B7] |
| C6 | PK5 | I/O | LTDC_B6 | LCD_B6 [RK043FN48H-CT672B_B6] |
| C7 | PG12 | I/O | LTDC_B4 | LCD_B4 [RK043FN48H-CT672B_B4] |
| C8 | PG10 | I/O | SAI2_SD_B | SAI2_SDB [WM8994ECS/R_ADCDAT1] |
| C9 | PJ14 | I/O | LTDC_B2 | LCD_B2 [RK043FN48H-CT672B_B2] |
| C10 | PD5 * | I/O | GPIO_Output | OTG_FS_PowerSwitchOn [STMPS2141STR_EN] |
| C11 | PD3 ** | I/O | DCMI_D5 | DCMI_D5 |
| C12 | PD1 | I/O | FMC_D3 | FMC_D3 [MT48LC4M32B2B5-6A_DQ3] |
| C13 | PI3 * | I/O | GPIO_Output | ARDUINO D7 |
| C14 | PI2 * | I/O | GPIO_Output | ARDUINO D8 |
| C15 | PA11 ** | I/O | USB_OTG_FS_DM | OTG_FS_N |
| D1 | PC13 * | I/O | GPIO_Input | uSD_Detect |
| D2 | PF0 | I/O | FMC_A0 | FMC_A0 [MT48LC4M32B2B5-6A_A0] |
| D3 | PI5 | I/O | SAI2_SCK_A | SAI2_SCKA [WM8994ECS/R_BCLK1] |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| D4 | PI7 | I/O | SAI2_FS_A | SAI2_FSA [WM8994ECS/R_LRCLK1] |
| D5 | PI10 | I/O | LTDC_HSYNC | LCD_HSYNC [RK043FN48H-CT672B_HSYNC] |
| D6 | PI6 | I/O | SAI2_SD_A | SAI2_SDA [WM8994ECS/R_DACDAT1] |
| D7 | PK4 | I/O | LTDC_B5 | LCD_B5 [RK043FN48H-CT672B_B5] |
| D8 | PK3 * | I/O | GPIO_Output | LCD_BL_CTRL [STLD40DPUR_EN] |
| D9 | PG9 ** | I/O | DCMI_VSYNC | DCMI_VSYNC |
| D10 | PJ15 | I/O | LTDC_B3 | LCD_B3 [RK043FN48H-CT672B_B3] |
| D11 | PD4 * | I/O | GPIO_Input | OTG_FS_OverCurrent [STMPS2141STR_Fault] |
| D12 | PD2 ** | I/O | SDMMC1_CMD | SDMMC_CMD |
| D13 | PH15 * | I/O | GPIO_Input | TP3 |
| D14 | PI1 | I/O | SPI2_SCK | ARDUINO SCK/D13 |
| D15 | PA10 ** | I/O | USB_OTG_FS_ID | OTG_FS_ID |
| E1 | PC14/OSC32_IN | I/O | RCC_OSC32_IN | RCC_OSC32_IN |
| E2 | PF1 | I/O | FMC_A1 | FMC_A1 [MT48LC4M32B2B5-6A_A1] |
| E3 | PI12 * | I/O | GPIO_Output | LCD_DISP [RK043FN48H-CT672B_DISP] |
| E4 | PI9 | I/O | LTDC_VSYNC | LCD_VSYNC [RK043FN48H-CT672B_VSYNC] |
| E5 | PDR_ON | Reset | | |
| E6 | BOOT0 | Boot | | |
| E7 | VDD | Power | | |
| E8 | VDD | Power | | |
| E9 | VDD | Power | | |
| E10 | VDD | Power | | |
| E11 | VCAP_2 | Power | | |
| E12 | PH13 * | I/O | GPIO_Output | DCMI_PWR_EN |
| E13 | PH14 ** | I/O | DCMI_D4 | DCMI_D4 |
| E14 | PI0 | I/O | TIM5_CH4 | ARDUINO PWM/CS/D5 |
| E15 | PA9 | I/O | USART1_TX | VCP_TX [STM32F103CBT6_PA3] |
| F1 | PC15/OSC32_OUT | I/O | RCC_OSC32_OUT | RCC_OSC32_OUT |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 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 | | |
| F12 | PK1 | I/O | LTDC_G6 | LCD_G6 [RK043FN48H-CT672B_G6] |
| F13 | PK2 | I/O | LTDC_G7 | LCD_G7 [RK043FN48H-CT672B_G7] |
| F14 | PC9 ** | I/O | SDMMC1_D1 | |
| F15 | PA8 | I/O | TIM1_CH1 | ARDUINO PWM/D10 |
| G1 | PH0/OSC_IN | I/O | RCC_OSC_IN | OSC_25M [NZ2520SB-25.00M_OUT] |
| G2 | PF2 | I/O | FMC_A2 | FMC_A2 [MT48LC4M32B2B5-6A_A2] |
| G3 | PI13 | I/O | GPIO_EXTI13 | LCD_INT |
| G4 | PI15 | I/O | LTDC_R0 | LCD_R0 [RK043FN48H-CT672B_R0] |
| G5 | VDD | Power | | |
| G6 | VSS | Power | | |
| G10 | VSS | Power | | |
| G11 | VDDUSB | Power | | |
| G12 | PJ11 | I/O | LTDC_G4 | LCD_G4 [RK043FN48H-CT672B_G4] |
| G13 | PK0 | I/O | LTDC_G5 | LCD_G5 [RK043FN48H-CT672B_G5] |
| G14 | PC8 ** | I/O | SDMMC1_D0 | |
| G15 | PC7 | I/O | USART6_RX | ARDUINO RX/D0 |
| H1 | PH1/OSC_OUT | I/O | RCC_OSC_OUT | |
| H2 | PF3 | I/O | FMC_A3 | FMC_A3 [MT48LC4M32B2B5-6A_A3] |
| H3 | PI14 | I/O | LTDC_CLK | LCD_CLK [RK043FN48H-CT672B_CLK] |
| H4 | PH4 | I/O | USB_OTG_HS_ULPI_NXT | ULPI_NXT [USB3320C-EZK_NXT] |
| H5 | VDD | Power | | |
| H6 | VSS | Power | | |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| H10 | VSS | Power | | |
| H11 | VDD | Power | | |
| H12 | PJ8 | I/O | LTDC_G1 | LCD_G1 [RK043FN48H-CT672B_G1] |
| H13 | PJ10 | I/O | LTDC_G3 | LCD_G3 [RK043FN48H-CT672B_G3] |
| H14 | PG8 | I/O | FMC_SDCLK | FMC_SDCLK [MT48LC4M32B2B5-6A_CLK] |
| H15 | PC6 | I/O | USART6_TX | ARDUINO TX/D1 |
| J1 | NRST | Reset | | |
| J2 | PF4 | I/O | FMC_A4 | FMC_A4 [MT48LC4M32B2B5-6A_A4] |
| J3 | PH5 | I/O | FMC_SDNWE | FMC_SDNME [MT48LC4M32B2B5-6A_WE] |
| J4 | PH3 | I/O | FMC_SDNE0 | FMC_SDNE0 [MT48LC4M32B2B5-6A_CS] |
| J5 | VDD | Power | | |
| J6 | VSS | Power | | |
| J10 | VSS | Power | | |
| J11 | VDD | Power | | |
| J12 | PJ7 | I/O | LTDC_G0 | LCD_G0 [RK043FN48H-CT672B_G0] |
| J13 | PJ9 | I/O | LTDC_G2 | LCD_G2 [RK043FN48H-CT672B_G2] |
| J14 | PG7 * | I/O | GPIO_Output | ARDUINO D4 |
| J15 | PG6 * | I/O | GPIO_Output | ARDUINO D2 |
| K1 | PF7 | I/O | ADC3_IN5 | ARDUINO A4 |
| K2 | PF6 | I/O | ADC3_IN4 | ARDUINO A5 |
| K3 | PF5 | I/O | FMC_A5 | FMC_A5 [MT48LC4M32B2B5-6A_A5] |
| K4 | PH2 * | I/O | GPIO_Input | NC2 |
| K5 | VDD | Power | | |
| K6 | VSS | Power | | |
| K7 | VSS | Power | | |
| K8 | VSS | Power | | |
| K9 | VSS | Power | | |
| K10 | VSS | Power | | |
| K11 | VDD | Power | | |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| K12 | PJ6 | I/O | LTDC_R7 | LCD_R7 [RK043FN48H-CT672B_R7] |
| K13 | PD15 | I/O | FMC_D1 | FMC_D1 [MT48LC4M32B2B5-6A_DQ1] |
| K14 | PB13 | I/O | USB_OTG_HS_ULPI_D6 | ULPI_D6 [USB3320C-EZK_D6] |
| K15 | PD10 | I/O | FMC_D15 | FMC_D15 [MT48LC4M32B2B5-6A_DQ15] |
| L1 | PF10 | I/O | ADC3_IN8 | ARDUINO A1 |
| L2 | PF9 | I/O | ADC3_IN7 | ARDUINO A2 |
| L3 | PF8 | I/O | ADC3_IN6 | ARDUINO A3 |
| L4 | PC3 | I/O | FMC_SDCKE0 | FMC_SDCKE0 [MT48LC4M32B2B5-6A_CKE] |
| 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 | FMC_D0 [MT48LC4M32B2B5-6A_DQ0] |
| L13 | PB12 | I/O | USB_OTG_HS_ULPI_D5 | ULPI_D5 [USB3320C-EZK_D5] |
| L14 | PD9 | I/O | FMC_D14 | FMC_D14 [MT48LC4M32B2B5-6A_DQ14] |
| L15 | PD8 | I/O | FMC_D13 | FMC_D13 [MT48LC4M32B2B5-6A_DQ13] |
| M1 | VSSA | Power | | |
| M2 | PC0 | I/O | USB_OTG_HS_ULPI_STP | ULPI_STP [USB3320C-EZK_STP] |
| M3 | PC1 ** | I/O | ETH_MDC | RMII_MDC [LAN8742A-CZ-TR_MDC] |
| M4 | PC2 | I/O | USB_OTG_HS_ULPI_DIR | ULPI_DIR [USB3320C-EZK_DIR] |
| M5 | PB2 | I/O | QUADSPI_CLK | |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| M6 | PF12 | I/O | FMC_A6 | FMC_A6 [MT48LC4M32B2B5-6A_A6] |
| M7 | PG1 | I/O | FMC_A11 | FMC_A11 [MT48LC4M32B2B5-6A_A11] |
| M8 | PF15 | I/O | FMC_A9 | FMC_A9 [MT48LC4M32B2B5-6A_A9] |
| M9 | PJ4 | I/O | LTDC_R5 | LCD_R5 [RK043FN48H-CT672B_R5] |
| M10 | PD12 | I/O | QUADSPI_BK1_IO1 | QSPI_D1 [N25Q128A13EF840E_DQ1] |
| M11 | PD13 | I/O | QUADSPI_BK1_IO3 | QSPI_D3 [N25Q128A13EF840E_DQ3] |
| M12 | PG3 * | I/O | GPIO_Output | EXT_RST |
| M13 | PG2 * | I/O | GPIO_Input | RMII_RXER |
| M14 | PJ5 | I/O | LTDC_R6 | LCD_R6 [RK043FN48H-CT672B_R6] |
| M15 | PH12 ** | I/O | DCMI_D3 | DCMI_D3 |
| N1 | VREF- | Power | | |
| N2 | PA1 ** | I/O | ETH_REF_CLK | RMII_REF_CLK [LAN8742A-CZ-TR_REFCLK0] |
| N3 | PA0/WKUP | I/O | ADC3_IN0 | ARDUINO A0 |
| N4 | PA4 ** | I/O | DCMI_HSYNC | DCMI_HSYNC |
| N5 | PC4 ** | I/O | ETH_RXD0 | RMII_RXD0 [LAN8742A-CZ-TR_RXD0] |
| N6 | PF13 | I/O | FMC_A7 | FMC_A7 [MT48LC4M32B2B5-6A_A7] |
| N7 | PG0 | I/O | FMC_A10 | FMC_A10 [MT48LC4M32B2B5-6A_A10] |
| N8 | PJ3 | I/O | LTDC_R4 | LCD_R4 [RK043FN48H-CT672B_R4] |
| N9 | PE8 | I/O | FMC_D5 | FMC_D5 [MT48LC4M32B2B5-6A_DQ5] |
| N10 | PD11 | I/O | QUADSPI_BK1_IO0 | QSPI_D0 [N25Q128A13EF840E_DQ0] |
| N11 | PG5 | I/O | FMC_BA1 | FMC_BA1 [MT48LC4M32B2B5-6A_BA1] |

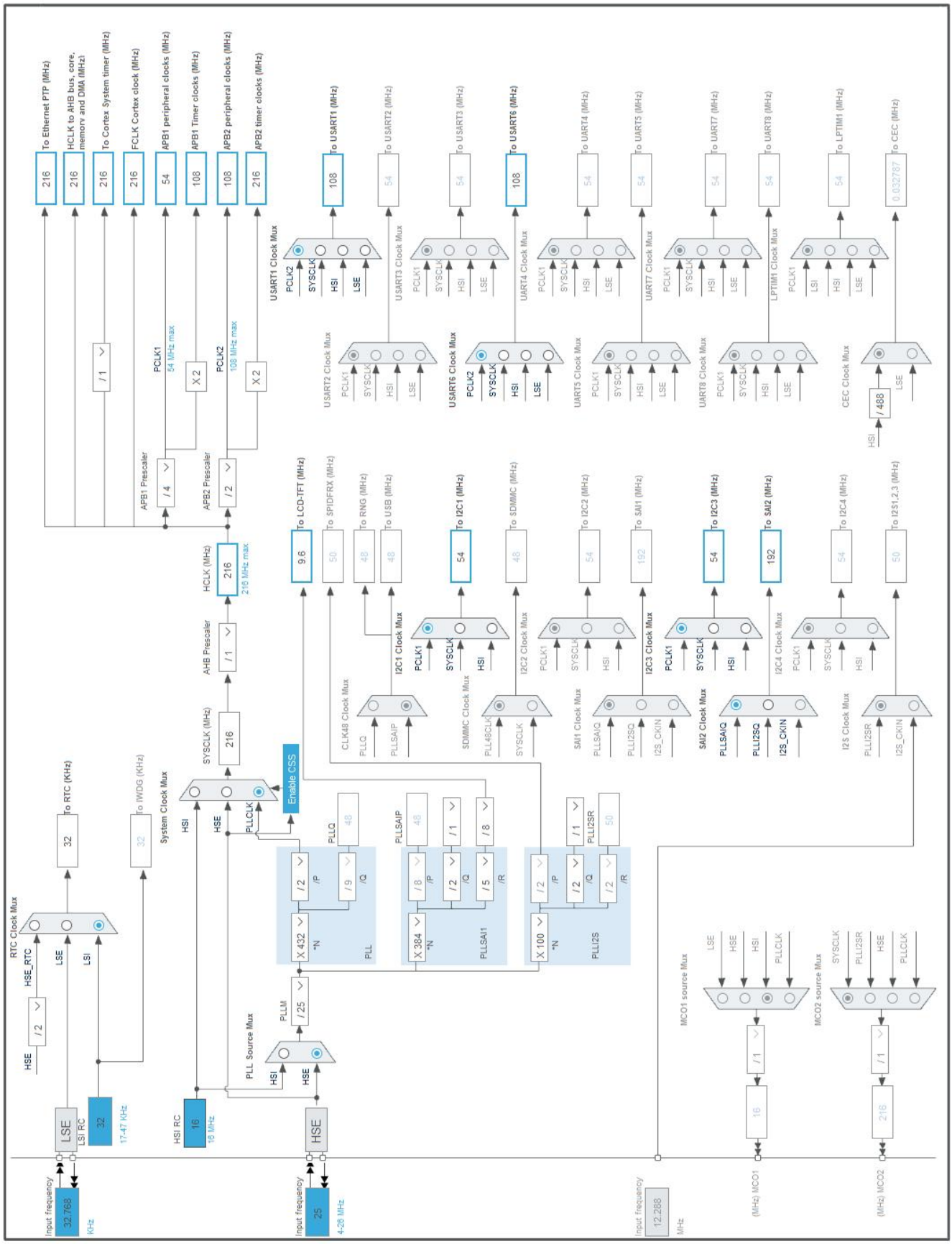
| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| N12 | PG4 | I/O | FMC_BA0 | FMC_BA0 [MT48LC4M32B2B5-6A_BA0] |
| N13 | PH7 | I/O | I2C3_SCL | LCD_SCL [RK043FN48H-CT672B_SCL] |
| N14 | PH9 ** | I/O | DCMI_D0 | DCMI_D0 |
| N15 | PH11 ** | I/O | DCMI_D2 | DCMI_D2 |
| P1 | VREF+ | Power | | |
| P2 | PA2 ** | I/O | ETH_MDIO | RMII_MDIO [LAN8742A-CZ-TR_MDIO] |
| P3 | PA6 ** | I/O | DCMI_PIXCLK | |
| P4 | PA5 | I/O | USB_OTG_HS_ULPI_CK | ULPI_CLK [USB3320C-EZK_CLKOUT] |
| P5 | PC5 ** | I/O | ETH_RXD1 | RMII_RXD1 [LAN8742A-CZ-TR_RXD1] |
| P6 | PF14 | I/O | FMC_A8 | FMC_A8 [MT48LC4M32B2B5-6A_A8] |
| P7 | PJ2 | I/O | LTDC_R3 | LCD_R3 [RK043FN48H-CT672B_R3] |
| P8 | PF11 | I/O | FMC_SDNRAS | FMC_SDNRAS [MT48LC4M32B2B5-6A_RAS] |
| P9 | PE9 | I/O | FMC_D6 | FMC_D6 [MT48LC4M32B2B5-6A_DQ6] |
| P10 | PE11 | I/O | FMC_D8 | FMC_D8 [MT48LC4M32B2B5-6A_DQ8] |
| P11 | PE14 | I/O | FMC_D11 | FMC_D11 [MT48LC4M32B2B5-6A_DQ11] |
| P12 | PB10 ** | I/O | USB_OTG_HS_ULPI_D3 | ULPI_D3 [USB3320C-EZK_D3] |
| P13 | PH6 | I/O | TIM12_CH1 | ARDUINO PWM/D6 |
| P14 | PH8 | I/O | I2C3_SDA | LCD_SDA [RK043FN48H-CT672B_SDA] |
| P15 | PH10 ** | I/O | DCMI_D1 | DCMI_D1 |
| R1 | VDDA | Power | | |
| R2 | PA3 | I/O | USB_OTG_HS_ULPI_D0 | ULPI_D0 [USB3320C-EZK_D0] |
| R3 | PA7 ** | I/O | ETH_CRS_DV | RMII_CRS_DV [LAN8742A-CZ-TR_CRS_DV] |

| Pin Number TFBGA216 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| R4 | PB1 | I/O | USB_OTG_HS_ULPI_D2 | ULPI_D2 [USB3320C-EZK_D2] |
| R5 | PB0 | I/O | USB_OTG_HS_ULPI_D1 | ULPI_D1 [USB3320C-EZK_D1] |
| R6 | PJ0 | I/O | LTDC_R1 | LCD_R1 [RK043FN48H-CT672B_R1] |
| R7 | PJ1 | I/O | LTDC_R2 | LCD_R2 [RK043FN48H-CT672B_R2] |
| R8 | PE7 | I/O | FMC_D4 | FMC_D4 [MT48LC4M32B2B5-6A_DQ4] |
| R9 | PE10 | I/O | FMC_D7 | FMC_D7 [MT48LC4M32B2B5-6A_DQ7] |
| R10 | PE12 | I/O | FMC_D9 | FMC_D9 [MT48LC4M32B2B5-6A_DQ9] |
| R11 | PE15 | I/O | FMC_D12 | FMC_D12 [MT48LC4M32B2B5-6A_DQ12] |
| R12 | PE13 | I/O | FMC_D10 | FMC_D10 [MT48LC4M32B2B5-6A_DQ10] |
| R13 | PB11 | I/O | USB_OTG_HS_ULPI_D4 | ULPI_D4 [USB3320C-EZK_D4] |
| R14 | PB14 | I/O | SPI2_MISO | ARDUINO MISO/D12 |
| R15 | PB15 | I/O | SPI2_MOSI | ARDUINO MOSI/PWM/D11 |

* The pin is affected with an I/O function

** The pin is affected with a peripheral function but no peripheral mode is activated

# 4. Clock Tree Configuration



# 5. Software Project

## 5.1. Project Settings

| Name | Value |
|---|---|
| Project Name | f746-disco-heart |
| Project Folder | D:\projects\f746-disco-heart |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F7 V1.17.1 |
| Application Structure | Advanced |
| Generate Under Root | Yes |
| Do not generate the main() | No |
| Minimum Heap Size | 0x30000 |
| Minimum Stack Size | 0x200 |

## 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_ADC3_Init | ADC3 |
| 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 |
| 9 | MX_RTC_Init | RTC |
| 10 | MX_SAI2_Init | SAI2 |
| 11 | MX_SPI2_Init | SPI2 |

| Rank | Function Name | Peripheral Instance Name |
|---|---|---|
| 12 | MX_TIM1_Init | TIM1 |
| 13 | MX_TIM3_Init | TIM3 |
| 14 | MX_TIM5_Init | TIM5 |
| 15 | MX_TIM8_Init | TIM8 |
| 16 | MX_TIM12_Init | TIM12 |
| 17 | MX_USART1_UART_Init | USART1 |
| 18 | MX_USART6_UART_Init | USART6 |
| 19 | MX_I2C1_Init | I2C1 |

# 1. Power Consumption Calculator report

## 1.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F7 |
| Line | STM32F7x6 |
| MCU | STM32F746NGHx |
| Datasheet | DS10916_Rev4 |

## 1.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.3 |

## 1.3. 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 |

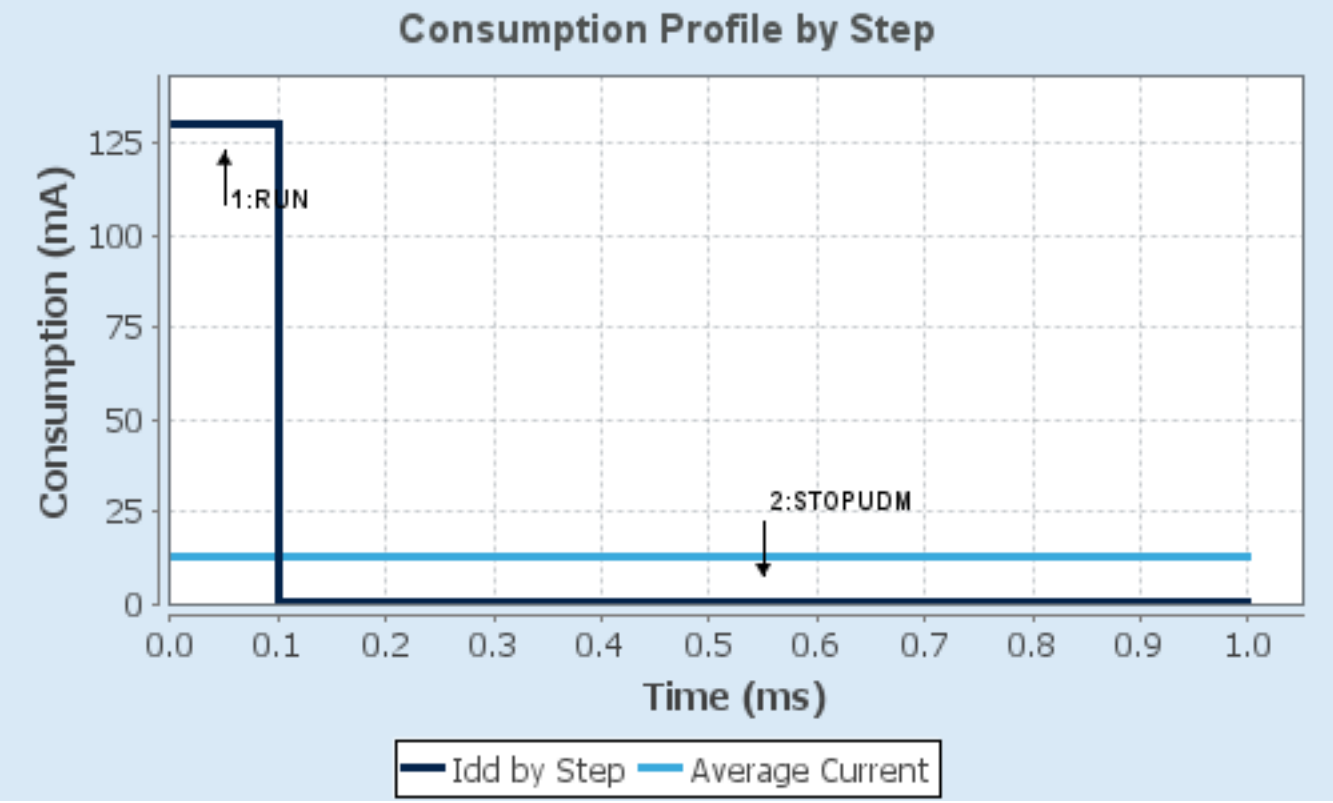
## 1.4. Sequence

| ***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 |

## 1.5. Results

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

## 1.6. 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

# 2. Peripherals and Middlewares Configuration

## 2.1. ADC3

**mode: IN0**

**mode: IN4**

**mode: IN5**

**mode: IN6**

**mode: IN7**

**mode: IN8**

### 2.1.1. Parameter Settings:

**ADC_Settings:**

| | |
|---|---|
| Clock Prescaler | PCLK2 divided by 4 |
| Resolution | 12 bits (15 ADC Clock cycles) |
| Data Alignment | Right alignment |
| Scan Conversion Mode | Disabled |
| Continuous Conversion Mode | Disabled |
| Discontinuous Conversion Mode | Disabled |
| DMA Continuous Requests | Disabled |
| End Of Conversion Selection | EOC flag at the end of single channel conversion |

**ADC_Regular_ConversionMode:**

| | |
|---|---|
| Number Of Conversion | 1 |
| External Trigger Conversion Source | Regular Conversion launched by software |
| External Trigger Conversion Edge | None |
| Rank | 1 |
| Channel | **Channel 4 *** |
| Sampling Time | 3 Cycles |

**ADC_Injected_ConversionMode:**

| | |
|---|---|
| Number Of Conversions | 0 |

**WatchDog:**

| | |
|---|---|
| Enable Analog WatchDog Mode | false |

## 2.2. DMA2D

**mode: Activated**

### 2.2.1. 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 |

## 2.3. 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**

### 2.3.1. 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 | 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 *** |

## 2.4. I2C1

## I2C: I2C

### 2.4.1. Parameter Settings:

**Timing configuration:**

| | |
|---|---|
| I2C Speed Mode | **Fast Mode *** |
| I2C Speed Frequency (KHz) | 400 |
| Rise Time (ns) | 0 |
| Fall Time (ns) | 0 |
| Coefficient of Digital Filter | 0 |
| Analog Filter | Enabled |
| Timing | **0x6000030D *** |

**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 |

## 2.5. I2C3

## I2C: I2C

### 2.5.1. 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 |

## 2.6. LTDC

## Display Type: RGB888 (24 bits)

### 2.6.1. 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 |
| Data Enable Polarity | Active Low |
| Pixel Clock Polarity | Normal Input |

**Layer Default Color:**

| | |
|---|---|
| Red | 0 |
| Green | 0 |
| Blue | 0 |

### 2.6.2. Layer Settings:

**Layer Default Color:**

| | |
|---|---|
| Layer 0 - Alpha | 0 |
| Layer 0 - Blue | 0 |

| | |
|---|---|
| Layer 0 - Green | 0 |
| Layer 0 - Red | 0 |
| Layer 1 - Alpha | 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 | **480 *** |
| Layer 0 - Window Vertical Start | 0 |
| Layer 0 - Window Vertical Stop | **272 *** |
| Layer 1 - Window Horizontal Start | 0 |
| Layer 1 - Window Horizontal Stop | **480 *** |
| Layer 1 - Window Vertical Start | 0 |
| Layer 1 - Window Vertical Stop | **272 *** |

### Pixel Parameters:

| | |
|---|---|
| Layer 0 - Pixel Format | **RGB565 *** |
| Layer 1 - Pixel Format | **RGB565 *** |

### Blending:

| | |
|---|---|
| Layer 0 - Alpha constant for blending | **255 *** |
| Layer 0 - Blending Factor1 | Alpha constant |
| Layer 0 - Blending Factor2 | Alpha constant |
| Layer 1 - Alpha constant for blending | **255 *** |
| Layer 1 - Blending Factor1 | Alpha constant |
| Layer 1 - 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 *** |
| Layer 1 - Color Frame Buffer Start Adress | **0xC003FC00 *** |
| Layer 1 - Color Frame Buffer Line Length (Image Width) | **480 *** |
| Layer 1 - Color Frame Buffer Number of Lines (Image Height) | **272 *** |

## 2.7. QUADSPI

### QuadSPI Mode: Bank1 with Quad SPI Lines

2.7.1. 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 |

## 2.8. RCC

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

### Low Speed Clock (LSE) : Crystal/Ceramic Resonator

2.8.1. 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 |

## 2.9. RTC

### mode: Activate Clock Source

### mode: Activate Calendar

## Alarm A: Internal Alarm A
## Alarm B: Internal Alarm B
## mode: Timestamp

### 2.9.1. Parameter Settings:

**General:**

| | |
|---|---|
| Hour Format | Hourformat 24 |
| Asynchronous Predivider value | 127 |
| Synchronous Predivider value | 255 |

**Calendar Time:**

| | |
|---|---|
| Data Format | BCD data format |
| Hours | 0 |
| Minutes | 0 |
| Seconds | 0 |
| Day Light Saving: value of hour adjustment | Daylightsaving None |
| Store Operation | Storeoperation Reset |

**Calendar Date:**

| | |
|---|---|
| Week Day | Monday |
| Month | January |
| Date | 1 |
| Year | 0 |

**Alarm A:**

| | |
|---|---|
| Hours | 0 |
| Minutes | 0 |
| Seconds | 0 |
| Sub Seconds | 0 |
| Alarm Mask Date Week day | Disable |
| Alarm Mask Hours | Disable |
| Alarm Mask Minutes | Disable |
| Alarm Mask Seconds | Disable |
| Alarm Sub Second Mask | All Alarm SS fields are masked. |
| Alarm Date Week Day Sel | Date |
| Alarm Date | 1 |

**Alarm B:**

| | |
|---|---|
| Hours | 0 |
| Minutes | 0 |
| Seconds | 0 |
| Sub Seconds | 0 |
| Alarm Mask Date Week day | Disable |
| Alarm Mask Hours | Disable |
| Alarm Mask Minutes | Disable |

| | |
|---|---|
| Alarm Mask Seconds | Disable |
| Alarm Sub Second Mask | All Alarm SS fields are masked. |
| Alarm Date Week Day Sel | Date |
| Alarm Date | 1 |

**Time Stamp:**

| | |
|---|---|
| Time Stamp Pin Edge | Time Stamp occurs on the Rising edge |

## 2.10. SAI2

## Mode: Master with Master Clock Out

## Mode: Synchronous Slave

### 2.10.1. Parameter Settings:

**SAI A:**

| | |
|---|---|
| Synchronization Inputs | Asynchronous |
| Basic Parameters | |
| Protocol | Free |
| Audio Mode | Master Transmit |
| Frame Length | 8 bits |
| Data Size | 8 Bits |
| Slot Size | DataSize |
| Output Mode | Stereo |
| Companding Mode | No companding mode |
| SAI SD Line Output Mode | Driven |
| Frame Parameters | |
| First Bit | MSB First |
| Frame Synchro Active Level Length | 1 |
| Frame Synchro Definition | Start Frame |
| Frame Synchro Polarity | Active Low |
| Frame Synchro Offset | First Bit |
| Slot Parameters | |
| First Bit Offset | 0 |
| Number of Slots | 1 |
| Slot Active Final Value | 0x00000000 |
| Slot Active | Neither |
| Clock Parameters | |
| Master Clock Divider | Enabled |
| Audio Frequency | 192 KHz |
| Real Audio Frequency | 0 |
| Error between Selected | 0 |
| Clock Strobing | Falling Edge |

| | |
|---|---|
| Advanced Parameters | |
| Fifo Threshold | Empty |
| Output Drive | Disabled |

**SAI B:**

| | |
|---|---|
| Synchronization Inputs | Synchronous with other block of same SAI |
| Basic Parameters | |
| Protocol | Free |
| Audio Mode | Slave Receive |
| Frame Length (only Even Values) | 8 |
| Data Size | 8 Bits |
| Slot Size | DataSize |
| Output Mode | Stereo |
| Companding Mode | No companding mode |
| SAI SD Line Output Mode | Driven |
| Frame Parameters | |
| First Bit | MSB First |
| Frame Synchro Active Level Length | 1 |
| Frame Synchro Definition | Start Frame |
| Frame Synchro Polarity | Active Low |
| Frame Synchro Offset | First Bit |
| Slot Parameters | |
| First Bit Offset | 0 |
| Number of Slots | 1 |
| Slot Active Final Value | 0x00000000 |
| Slot Active | Neither |
| Clock Parameters | |
| Real Audio Frequency | 0 |
| Error between Selected | 0 |
| Clock Strobing | Falling Edge |
| Advanced Parameters | |
| Fifo Threshold | Empty |
| Output Drive | Disabled |

## 2.11. SPI2

## Mode: Full-Duplex Master

### 2.11.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Frame Format | Motorola |
| Data Size | 4 Bits |

| | |
|---|---|
| First Bit | MSB First |

**Clock Parameters:**

| | |
|---|---|
| Prescaler (for Baud Rate) | 2 |
| Baud Rate | **27.0 MBits/s *** |
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

**Advanced Parameters:**

| | |
|---|---|
| CRC Calculation | Disabled |
| NSSP Mode | Enabled |
| NSS Signal Type | Software |

## 2.12. SYS

**Debug: Serial Wire**

**Timebase Source: TIM2**

## 2.13. TIM1

**Clock Source : Internal Clock**

**Channel1: PWM Generation CH1**

### 2.13.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| Internal Clock Division (CKD) | No Division |
| Repetition Counter (RCR - 16 bits value) | 0 |
| auto-reload preload | Disable |

**Trigger Output (TRGO) Parameters:**

| | |
|---|---|
| Master/Slave Mode (MSM bit) | Disable (Trigger input effect not delayed) |
| Trigger Event Selection TRGO | Reset (UG bit from TIMx_EGR) |
| Trigger Event Selection TRGO2 | Reset (UG bit from TIMx_EGR) |

**Break And Dead Time management - BRK Configuration:**

| | |
|---|---|
| BRK State | Disable |
| BRK Polarity | High |
| BRK Filter (4 bits value) | 0 |

**Break And Dead Time management - BRK2 Configuration:**

| | |
|---|---|
| BRK2 State | Disable |
| BRK2 Polarity | High |

| | |
|---|---|
| BRK2 Filter (4 bits value) | 0 |

**Break And Dead Time management - Output Configuration:**

| | |
|---|---|
| Automatic Output State | Disable |
| Off State Selection for Run Mode (OSSR) | Disable |
| Off State Selection for Idle Mode (OSSI) | Disable |
| Lock Configuration | Off |

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

## 2.14. TIM3

## Clock Source : Internal Clock

## Channel1: PWM Generation CH1

### 2.14.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| 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 TRGO | Reset (UG bit from TIMx_EGR) |

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

## 2.15. TIM5

## mode: Clock Source

### Channel4: PWM Generation CH4

#### 2.15.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 32 bits value ) | 4294967295 |
| 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 TRGO | Reset (UG bit from TIMx_EGR) |

**PWM Generation Channel 4:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (32 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

## 2.16. TIM8

### Clock Source : Internal Clock

#### 2.16.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| Internal Clock Division (CKD) | No Division |
| Repetition Counter (RCR - 16 bits value) | 0 |
| auto-reload preload | Disable |

**Trigger Output (TRGO) Parameters:**

| | |
|---|---|
| Master/Slave Mode (MSM bit) | Disable (Trigger input effect not delayed) |
| Trigger Event Selection TRGO | Reset (UG bit from TIMx_EGR) |
| Trigger Event Selection TRGO2 | Reset (UG bit from TIMx_EGR) |

## 2.17. TIM12

### Channel1: PWM Generation CH1

#### 2.17.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| Internal Clock Division (CKD) | No Division |
| auto-reload preload | Disable |

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

## 2.18. USART1

### Mode: Asynchronous

#### 2.18.1. 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 |

## 2.19. USART6

## Mode: Asynchronous

### 2.19.1. 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 |

## 2.20. FREERTOS

## Interface: CMSIS_V2

### 2.20.1. 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 | Disabled |
| ENABLE_BACKWARD_COMPATIBILITY | Enabled |
| 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 | **2048 *** |
| 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 | **Enabled *** |
| USE_TRACE_FACILITY | Enabled |
| USE_STATS_FORMATTING_FUNCTIONS | Disabled |

### 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 |

## 2.20.2. 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 | Disabled |
| uxTaskGetStackHighWaterMark | Enabled |
| xTaskGetCurrentTaskHandle | Disabled |
| eTaskGetState | Enabled |
| xEventGroupSetBitFromISR | Disabled |
| xTimerPendFunctionCall | Enabled |
| xTaskAbortDelay | Disabled |
| xTaskGetHandle | Disabled |
| uxTaskGetStackHighWaterMark2 | Disabled |

## 2.20.3. Advanced settings:

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

| | |
|---|---|
| USE_NEWLIB_REENTRANT | **Enabled *** |

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

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

*** User modified value**

# 3. System Configuration

## 3.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| ADC3 | PF7 | ADC3_IN5 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A4 |
| | PF6 | ADC3_IN4 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A5 |
| | PF10 | ADC3_IN8 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A1 |
| | PF9 | ADC3_IN7 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A2 |
| | PF8 | ADC3_IN6 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A3 |
| | PA0/WKUP | ADC3_IN0 | Analog mode | No pull-up and no pull-down | n/a | ARDUINO A0 |
| FMC | PE1 | FMC_NBL1 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_NBL1 [MT48LC4M32B2B5-6A_DQM1] |
| | PE0 | FMC_NBL0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_NBL0 [MT48LC4M32B2B5-6A_DQM0] |
| | PG15 | FMC_SDNCAS | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDNCAS [MT48LC4M32B2B5-6A_CAS] |
| | PD0 | FMC_D2 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D2 [MT48LC4M32B2B5-6A_DQ2] |
| | PD1 | FMC_D3 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D3 [MT48LC4M32B2B5-6A_DQ3] |
| | PF0 | FMC_A0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A0 [MT48LC4M32B2B5-6A_A0] |
| | PF1 | FMC_A1 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A1 [MT48LC4M32B2B5-6A_A1] |
| | PF2 | FMC_A2 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A2 [MT48LC4M32B2B5-6A_A2] |
| | PF3 | FMC_A3 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A3 [MT48LC4M32B2B5-6A_A3] |
| | PG8 | FMC_SDCLK | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDCLK [MT48LC4M32B2B5-6A_CLK] |
| | PF4 | FMC_A4 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A4 [MT48LC4M32B2B5-6A_A4] |
| | PH5 | FMC_SDNWE | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDNME [MT48LC4M32B2B5- |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | | | | | | 6A_WE] |
| | PH3 | FMC_SDNE0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDNE0 [MT48LC4M32B2B5-6A_CS] |
| | PF5 | FMC_A5 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A5 [MT48LC4M32B2B5-6A_A5] |
| | PD15 | FMC_D1 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D1 [MT48LC4M32B2B5-6A_DQ1] |
| | PD10 | FMC_D15 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D15 [MT48LC4M32B2B5-6A_DQ15] |
| | PC3 | FMC_SDCKE0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDCKE0 [MT48LC4M32B2B5-6A_CKE] |
| | PD14 | FMC_D0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D0 [MT48LC4M32B2B5-6A_DQ0] |
| | PD9 | FMC_D14 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D14 [MT48LC4M32B2B5-6A_DQ14] |
| | PD8 | FMC_D13 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D13 [MT48LC4M32B2B5-6A_DQ13] |
| | PF12 | FMC_A6 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A6 [MT48LC4M32B2B5-6A_A6] |
| | PG1 | FMC_A11 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A11 [MT48LC4M32B2B5-6A_A11] |
| | PF15 | FMC_A9 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A9 [MT48LC4M32B2B5-6A_A9] |
| | PF13 | FMC_A7 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A7 [MT48LC4M32B2B5-6A_A7] |
| | PG0 | FMC_A10 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A10 [MT48LC4M32B2B5-6A_A10] |
| | PE8 | FMC_D5 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D5 [MT48LC4M32B2B5-6A_DQ5] |
| | PG5 | FMC_BA1 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_BA1 [MT48LC4M32B2B5-6A_BA1] |
| | | | | | | |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | PG4 | FMC_BA0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_BA0 [MT48LC4M32B2B5-6A_BA0] |
| | PF14 | FMC_A8 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_A8 [MT48LC4M32B2B5-6A_A8] |
| | PF11 | FMC_SDNRAS | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_SDNRAS [MT48LC4M32B2B5-6A_RAS] |
| | PE9 | FMC_D6 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D6 [MT48LC4M32B2B5-6A_DQ6] |
| | PE11 | FMC_D8 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D8 [MT48LC4M32B2B5-6A_DQ8] |
| | PE14 | FMC_D11 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D11 [MT48LC4M32B2B5-6A_DQ11] |
| | PE7 | FMC_D4 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D4 [MT48LC4M32B2B5-6A_DQ4] |
| | PE10 | FMC_D7 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D7 [MT48LC4M32B2B5-6A_DQ7] |
| | PE12 | FMC_D9 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D9 [MT48LC4M32B2B5-6A_DQ9] |
| | PE15 | FMC_D12 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D12 [MT48LC4M32B2B5-6A_DQ12] |
| | PE13 | FMC_D10 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | FMC_D10 [MT48LC4M32B2B5-6A_DQ10] |
| I2C1 | PB8 | I2C1_SCL | Alternate Function Open Drain | **Pull-up *** | Low | ARDUINO SCL/D15 |
| | PB9 | I2C1_SDA | Alternate Function Open Drain | **Pull-up *** | Low | ARDUINO SDA/D14 |
| I2C3 | PH7 | I2C3_SCL | Alternate Function Open Drain | **Pull-up *** | **Very High *** | LCD_SCL [RK043FN48H-CT672B_SCL] |
| | PH8 | I2C3_SDA | Alternate Function Open Drain | **Pull-up *** | **Very High *** | LCD_SDA [RK043FN48H-CT672B_SDA] |
| LTDC | PE4 | LTDC_B0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B0 [RK043FN48H-CT672B_B0] |
| | PJ13 | LTDC_B1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B1 [RK043FN48H-CT672B_B1] |
| | | | | | | |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | PK7 | LTDC_DE | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_DE [RK043FN48H-CT672B_DE] |
| | PK6 | LTDC_B7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B7 [RK043FN48H-CT672B_B7] |
| | PK5 | LTDC_B6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B6 [RK043FN48H-CT672B_B6] |
| | PG12 | LTDC_B4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B4 [RK043FN48H-CT672B_B4] |
| | PJ14 | LTDC_B2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B2 [RK043FN48H-CT672B_B2] |
| | PI10 | LTDC_HSYNC | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_HSYNC [RK043FN48H-CT672B_HSYNC] |
| | PK4 | LTDC_B5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B5 [RK043FN48H-CT672B_B5] |
| | PJ15 | LTDC_B3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_B3 [RK043FN48H-CT672B_B3] |
| | PI9 | LTDC_VSYNC | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_VSYNC [RK043FN48H-CT672B_VSYNC] |
| | PK1 | LTDC_G6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G6 [RK043FN48H-CT672B_G6] |
| | PK2 | LTDC_G7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G7 [RK043FN48H-CT672B_G7] |
| | PI15 | LTDC_R0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R0 [RK043FN48H-CT672B_R0] |
| | PJ11 | LTDC_G4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G4 [RK043FN48H-CT672B_G4] |
| | PK0 | LTDC_G5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G5 [RK043FN48H-CT672B_G5] |
| | PI14 | LTDC_CLK | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_CLK [RK043FN48H-CT672B_CLK] |
| | PJ8 | LTDC_G1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G1 [RK043FN48H-CT672B_G1] |
| | PJ10 | LTDC_G3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G3 [RK043FN48H-CT672B_G3] |
| | PJ7 | LTDC_G0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G0 [RK043FN48H-CT672B_G0] |
| | PJ9 | LTDC_G2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_G2 [RK043FN48H-CT672B_G2] |
| | PJ6 | LTDC_R7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R7 [RK043FN48H-CT672B_R7] |
| | PJ4 | LTDC_R5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R5 [RK043FN48H-CT672B_R5] |
| | PJ5 | LTDC_R6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R6 [RK043FN48H- |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | | | | | | CT672B_R6] |
| | PJ3 | LTDC_R4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R4 [RK043FN48H-CT672B_R4] |
| | PJ2 | LTDC_R3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R3 [RK043FN48H-CT672B_R3] |
| | PJ0 | LTDC_R1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R1 [RK043FN48H-CT672B_R1] |
| | PJ1 | LTDC_R2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | LCD_R2 [RK043FN48H-CT672B_R2] |
| QUADSPI | PE2 | QUADSPI_BK1_IO2 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | QSPI_D2 [N25Q128A13EF840E_DQ2] |
| | PB6 | QUADSPI_BK1_NCS | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | QSPI_NCS [N25Q128A13EF840E_S] |
| | PB2 | QUADSPI_CLK | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | |
| | PD12 | QUADSPI_BK1_IO1 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | QSPI_D1 [N25Q128A13EF840E_DQ1] |
| | PD13 | QUADSPI_BK1_IO3 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | QSPI_D3 [N25Q128A13EF840E_DQ3] |
| | PD11 | QUADSPI_BK1_IO0 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | QSPI_D0 [N25Q128A13EF840E_DQ0] |
| RCC | PC14/OSC32_IN | RCC_OSC32_IN | n/a | n/a | n/a | RCC_OSC32_IN |
| | PC15/OSC32_OUT | RCC_OSC32_OUT | n/a | n/a | n/a | RCC_OSC32_OUT |
| | PH0/OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | OSC_25M [NZ2520SB-25.00M_OUT] |
| | PH1/OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| RTC | PI8 | RTC_TS | n/a | n/a | n/a | NC1 [TP2] |
| SAI2 | PI4 | SAI2_MCLK_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | SAI2_MCLKA [WM8994ECS/R_MCLK1] |
| | PG10 | SAI2_SD_B | Alternate Function Push Pull | No pull-up and no pull-down | Low | SAI2_SDB [WM8994ECS/R_ADCDAT1] |
| | PI5 | SAI2_SCK_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | SAI2_SCKA [WM8994ECS/R_BCLK1] |
| | PI7 | SAI2_FS_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | SAI2_FSA [WM8994ECS/R_LRCLK1] |
| | PI6 | SAI2_SD_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | SAI2_SDA |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | | | | | | [WM8994ECS/R_DACDAT1] |
| SPI2 | PI1 | SPI2_SCK | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO SCK/D13 |
| | PB14 | SPI2_MISO | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO MISO/D12 |
| | PB15 | SPI2_MOSI | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO MOSI/PWM/D11 |
| SYS | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | SWCLK |
| | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | SWDIO |
| TIM1 | PA8 | TIM1_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO PWM/D10 |
| TIM3 | PB4 | TIM3_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO PWM/D3 |
| TIM5 | PI0 | TIM5_CH4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO PWM/CS/D5 |
| TIM12 | PH6 | TIM12_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO PWM/D6 |
| USART1 | PB7 | USART1_RX | Alternate Function Push Pull | No pull-up and no pull-down | Low | VCP_RX [STM32F103CBT6_PA2] |
| | PA9 | USART1_TX | Alternate Function Push Pull | No pull-up and no pull-down | Low | VCP_TX [STM32F103CBT6_PA3] |
| USART6 | PC7 | USART6_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | ARDUINO RX/D0 |
| | PC6 | USART6_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | ARDUINO TX/D1 |
| Single Mapped Signals | PG14 | ETH_TXD1 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_TXD1 [LAN8742A-CZ-TR_TXD1] |
| | PB3 | SYS_JTDO-SWO | n/a | n/a | **n/a** | SWO |
| | PD7 | SPDIFRX_IN0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | SPDIF_RX0 [74LVC1G04SE_4] |
| | PC12 | SDMMC1_CK | Alternate Function Push Pull | No pull-up and no pull-down | Very High | SDMMC_CK |
| | PA15 | TIM2_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | ARDUINO PWM/D9 |
| | PE5 | DCMI_D6 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D6 |
| | PE6 | DCMI_D7 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D7 |
| | PG13 | ETH_TXD0 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_TXD0 [LAN8742A-CZ-TR_TXD0] |
| | PG11 | ETH_TX_EN | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_TX_EN [LAN8742A-CZ-TR_TXEN] |
| | PC11 | SDMMC1_D3 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | SDMMC_D3 |
| | PC10 | SDMMC1_D2 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | SDMMC_D2 |
| | PA12 | USB_OTG_FS_DP | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | OTG_FS_P |
| | PD3 | DCMI_D5 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D5 |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | PA11 | USB_OTG_FS_DM | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | OTG_FS_N |
| | PG9 | DCMI_VSYNC | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_VSYNC |
| | PD2 | SDMMC1_CMD | Alternate Function Push Pull | No pull-up and no pull-down | Very High | SDMMC_CMD |
| | PA10 | USB_OTG_FS_ID | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | OTG_FS_ID |
| | PH14 | DCMI_D4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D4 |
| | PC9 | SDMMC1_D1 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | |
| | PC8 | SDMMC1_D0 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | |
| | PC1 | ETH_MDC | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_MDC [LAN8742A-CZ-TR_MDC] |
| | PH12 | DCMI_D3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D3 |
| | PA1 | ETH_REF_CLK | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_REF_CLK [LAN8742A-CZ-TR_REFCLK0] |
| | PA4 | DCMI_HSYNC | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_HSYNC |
| | PC4 | ETH_RXD0 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_RXD0 [LAN8742A-CZ-TR_RXD0] |
| | PH9 | DCMI_D0 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D0 |
| | PH11 | DCMI_D2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D2 |
| | PA2 | ETH_MDIO | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_MDIO [LAN8742A-CZ-TR_MDIO] |
| | PA6 | DCMI_PIXCLK | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PC5 | ETH_RXD1 | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_RXD1 [LAN8742A-CZ-TR_RXD1] |
| | PB10 | USB_OTG_HS_ULPI_D3 | Alternate Function Push Pull | No pull-up and no pull-down | Very High | ULPI_D3 [USB3320C-EZK_D3] |
| | PH10 | DCMI_D1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | DCMI_D1 |
| | PA7 | ETH_CRS_DV | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | RMII_CRS_DV [LAN8742A-CZ-TR_CRS_DV] |
| GPIO | PE3 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | OTG_HS_OverCurrent [STMPS2151STR_FAULT] |
| | PJ12 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | OTG_FS_VBUS |
| | PD6 | GPIO_EXTI6 | **External Event Mode with Rising edge trigger detection *** | No pull-up and no pull-down | n/a | Audio_INT |
| | PD5 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | OTG_FS_PowerSwitchOn [STMPS2141STR_EN] |
| | PI3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ARDUINO D7 |
| | | | | | | |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | PI2 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ARDUINO D8 |
| | PC13 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | uSD_Detect |
| | PK3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LCD_BL_CTRL [STLD40DPUR_EN] |
| | PD4 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | OTG_FS_OverCurrent [STMPS2141STR_Fault] |
| | PH15 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | TP3 |
| | PI12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LCD_DISP [RK043FN48H-CT672B_DISP] |
| | PH13 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DCMI_PWR_EN |
| | PI13 | GPIO_EXTI13 | **External Event Mode with Rising edge trigger detection *** | No pull-up and no pull-down | n/a | LCD_INT |
| | PG7 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ARDUINO D4 |
| | PG6 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ARDUINO D2 |
| | PH2 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | NC2 |
| | PG3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | EXT_RST |
| | PG2 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | RMII_RXER |

### 3.2. DMA configuration

nothing configured in DMA service

## 3.3. NVIC configuration

### 3.3.1. 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 |
| TIM2 global interrupt | true | 15 | 0 |
| LTDC global interrupt | true | 5 | 0 |
| DMA2D global interrupt | true | 5 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| RTC tamper and timestamp interrupts through EXTI line 21 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| ADC1, ADC2 and ADC3 global interrupts | unused | | |
| TIM1 break interrupt and TIM9 global interrupt | unused | | |
| TIM1 update interrupt and TIM10 global interrupt | unused | | |
| TIM1 trigger and commutation interrupts and TIM11 global interrupt | unused | | |
| TIM1 capture compare interrupt | unused | | |
| TIM3 global interrupt | unused | | |
| I2C1 event interrupt | unused | | |
| I2C1 error interrupt | unused | | |
| SPI2 global interrupt | unused | | |
| USART1 global interrupt | unused | | |
| RTC alarms (A and B) interrupt through EXTI line 17 | unused | | |
| TIM8 break interrupt and TIM12 global interrupt | unused | | |
| TIM8 update interrupt and TIM13 global interrupt | unused | | |
| TIM8 trigger and commutation interrupts and TIM14 global interrupt | unused | | |
| TIM8 capture compare interrupt | unused | | |
| FMC global interrupt | unused | | |
| TIM5 global interrupt | unused | | |
| | | | |

| Interrupt Table | Enable | Preenmption Priority | SubPriority |
|---|---|---|---|
| USART6 global interrupt | unused | | |
| I2C3 event interrupt | unused | | |
| I2C3 error interrupt | unused | | |
| FPU global interrupt | unused | | |
| LTDC global error interrupt | unused | | |
| SAI2 global interrupt | unused | | |
| QUADSPI global interrupt | unused | | |

### 3.3.2. NVIC Code generation

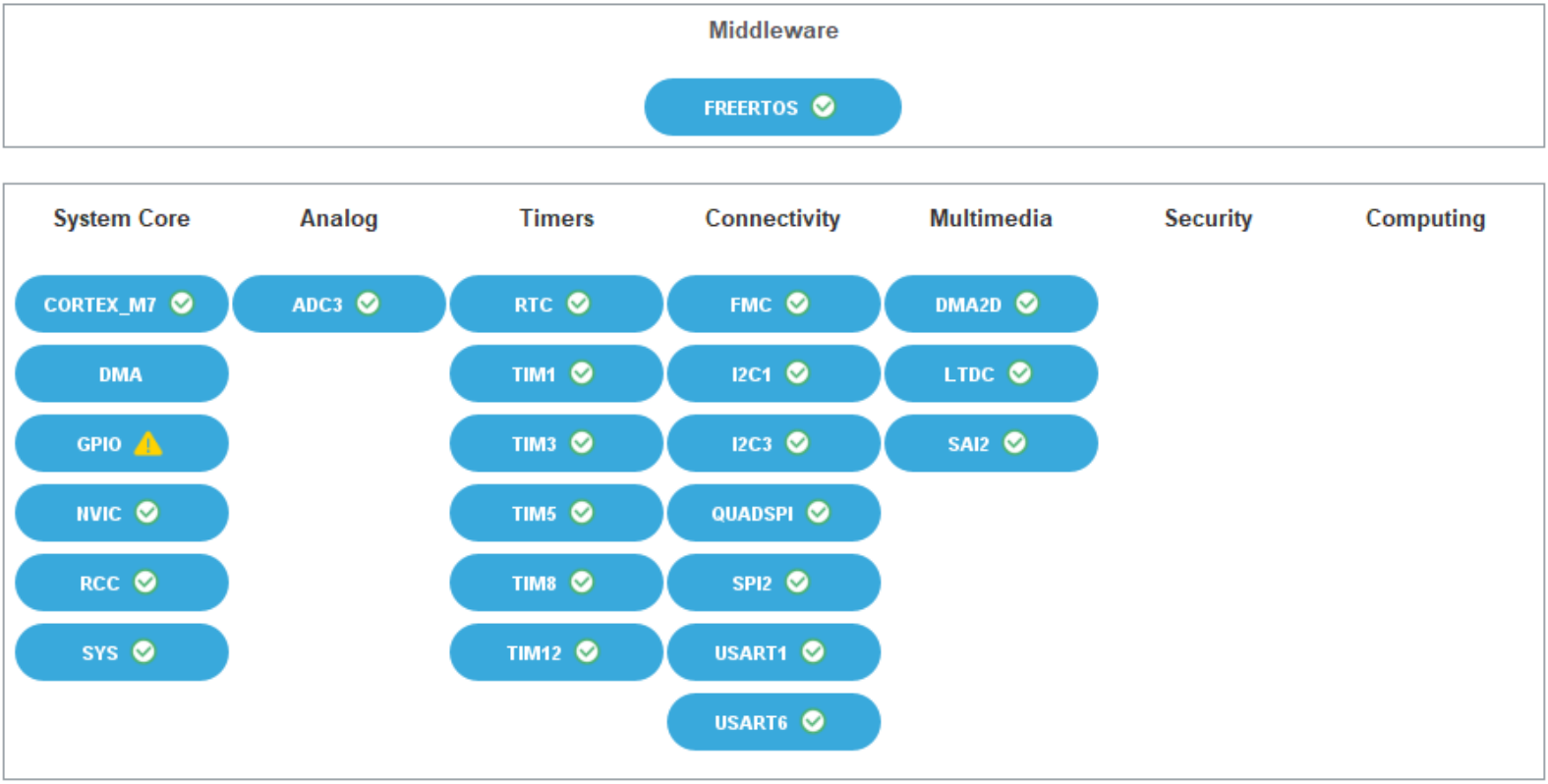
| Enabled interrupt Table | Select for init sequence ordering | Generate IRQ handler | Call HAL handler |
|---|---|---|---|
| Non maskable interrupt | false | true | false |
| Hard fault interrupt | false | true | false |
| Memory management fault | false | true | false |
| Pre-fetch fault, memory access 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 |
| TIM2 global interrupt | false | true | true |
| LTDC global interrupt | false | true | true |
| DMA2D global interrupt | false | true | true |

*** User modified value**

# 4. System Views

4.1. Category view

*4.1.1. Current*



# 5. Docs & Resources

| Type | Link |
|---|---|
| BSDL files | https://www.st.com/resource/en/bsdl_model/stm32f7_bsdl.zip |
| IBIS models | https://www.st.com/resource/en/ibis_model/stm32f7_ibis.zip |
| System View Description | https://www.st.com/resource/en/svd/stm32f7-svd.zip |
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