# 1. Description

## 1.1. Project

| Project Name | TOUCH |
|---|---|
| Board Name | TOUCH |
| Generated with: | STM32CubeMX 4.17.0 |
| Date | 12/19/2016 |

## 1.2. MCU

| MCU Series | STM32F1 |
|---|---|
| MCU Line | STM32F103 |
| MCU name | STM32F103ZETx |
| MCU Package | LQFP144 |
| MCU Pin number | 144 |

# 2. Pinout Configuration



STM32F103ZETx
LQFP144
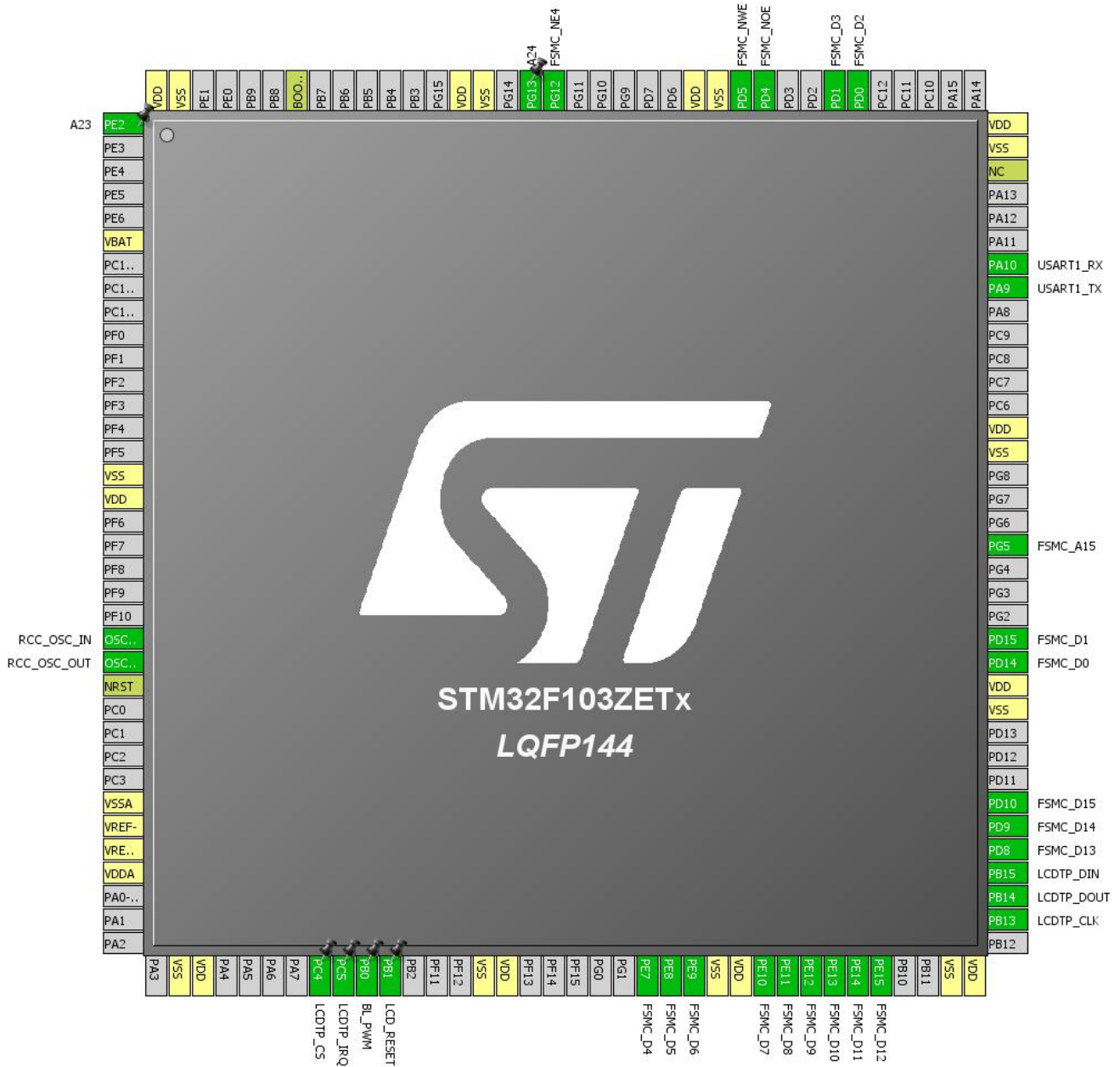
# 3. Pins Configuration

| Pin Number LQFP144 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | PE2 * | I/O | GPIO_Output | A23 |
| 6 | VBAT | Power | | |
| 16 | VSS | Power | | |
| 17 | VDD | Power | | |
| 23 | OSC_IN | I/O | RCC_OSC_IN | |
| 24 | OSC_OUT | I/O | RCC_OSC_OUT | |
| 25 | NRST | Reset | | |
| 30 | VSSA | Power | | |
| 31 | VREF- | Power | | |
| 32 | VREF+ | Power | | |
| 33 | VDDA | Power | | |
| 38 | VSS | Power | | |
| 39 | VDD | Power | | |
| 44 | PC4 * | I/O | GPIO_Output | LCDTP_CS |
| 45 | PC5 * | I/O | GPIO_Input | LCDTP_IRQ |
| 46 | PB0 * | I/O | GPIO_Output | BL_PWM |
| 47 | PB1 * | I/O | GPIO_Output | LCD_RESET |
| 51 | VSS | Power | | |
| 52 | VDD | Power | | |
| 58 | PE7 | I/O | FSMC_D4 | |
| 59 | PE8 | I/O | FSMC_D5 | |
| 60 | PE9 | I/O | FSMC_D6 | |
| 61 | VSS | Power | | |
| 62 | VDD | Power | | |
| 63 | PE10 | I/O | FSMC_D7 | |
| 64 | PE11 | I/O | FSMC_D8 | |
| 65 | PE12 | I/O | FSMC_D9 | |
| 66 | PE13 | I/O | FSMC_D10 | |
| 67 | PE14 | I/O | FSMC_D11 | |
| 68 | PE15 | I/O | FSMC_D12 | |
| 71 | VSS | Power | | |
| 72 | VDD | Power | | |
| 74 | PB13 | I/O | SPI2_SCK | LCDTP_CLK |
| 75 | PB14 | I/O | SPI2_MISO | LCDTP_DOUT |
| 76 | PB15 | I/O | SPI2_MOSI | LCDTP_DIN |
| 77 | PD8 | I/O | FSMC_D13 | |

| Pin Number LQFP144 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 78 | PD9 | I/O | FSMC_D14 | |
| 79 | PD10 | I/O | FSMC_D15 | |
| 83 | VSS | Power | | |
| 84 | VDD | Power | | |
| 85 | PD14 | I/O | FSMC_D0 | |
| 86 | PD15 | I/O | FSMC_D1 | |
| 90 | PG5 | I/O | FSMC_A15 | |
| 94 | VSS | Power | | |
| 95 | VDD | Power | | |
| 101 | PA9 | I/O | USART1_TX | |
| 102 | PA10 | I/O | USART1_RX | |
| 106 | NC | NC | | |
| 107 | VSS | Power | | |
| 108 | VDD | Power | | |
| 114 | PD0 | I/O | FSMC_D2 | |
| 115 | PD1 | I/O | FSMC_D3 | |
| 118 | PD4 | I/O | FSMC_NOE | |
| 119 | PD5 | I/O | FSMC_NWE | |
| 120 | VSS | Power | | |
| 121 | VDD | Power | | |
| 127 | PG12 | I/O | FSMC_NE4 | |
| 128 | PG13 * | I/O | GPIO_Output | A24 |
| 130 | VSS | Power | | |
| 131 | VDD | Power | | |
| 138 | BOOT0 | Boot | | |
| 143 | VSS | Power | | |
| 144 | VDD | Power | | |

* The pin is affected with an I/O function

# 4. Clock Tree Configuration
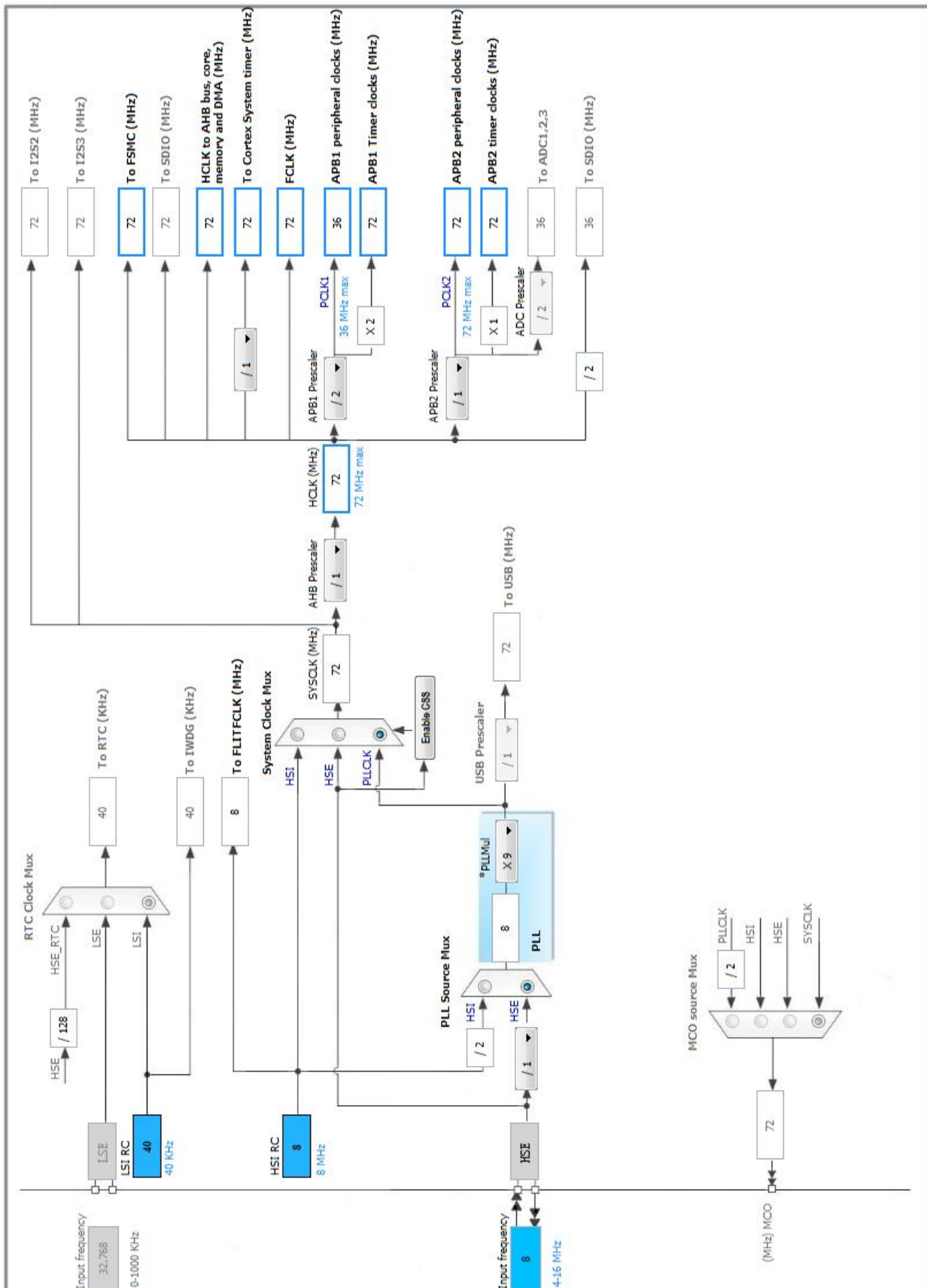
# 5. IPs and Middleware Configuration

## 5.1. FSMC

*NOR Flash/PSRAM/SRAM/ROM/LCD 1*

**Chip Select: NE4**

**Memory type: LCD Interface**

**LCD Register Select: A15**

**Data: 16 bits**

### 5.1.1. NOR/PSRAM 1:

**NOR/PSRAM control:**

| | |
|---|---|
| Memory type | LCD Interface |
| Bank | Bank 1 NOR/PSRAM 4 |
| Write operation | Enabled |
| Extended mode | Disabled |

**NOR/PSRAM timing:**

| | |
|---|---|
| Address setup time in HCLK clock cycles | **0x02 *** |
| Data setup time in HCLK clock cycles | **0x05 *** |
| Bus turn around time in HCLK clock cycles | **0x00 *** |

## 5.2. RCC

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

### 5.2.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Prefetch Buffer | Enabled |
| Flash Latency(WS) | 2 WS (3 CPU cycle) |

**RCC Parameters:**

| | |
|---|---|
| HSI Calibration Value | 16 |
| HSE Startup Timout Value (ms) | 100 |
| LSE Startup Timout Value (ms) | 5000 |

## 5.3. SPI2

**Mode: Full-Duplex Master**

### 5.3.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Frame Format | Motorola |
| Data Size | 8 Bits |
| First Bit | MSB First |

**Clock Parameters:**

| | |
|---|---|
| Prescaler (for Baud Rate) | **32 *** |
| Baud Rate | **1.125 MBits/s *** |
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

**Advanced Parameters:**

| | |
|---|---|
| CRC Calculation | Disabled |
| NSS Signal Type | Software |

## 5.4. SYS

**Debug: No Debug**
**Timebase Source: SysTick**

## 5.5. USART1

**Mode: Asynchronous**

### 5.5.1. 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

**\* User modified value**

# 6. System Configuration

## 6.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| FSMC | PE7 | FSMC_D4 | Alternate Function Push Pull | n/a | High | |
| | PE8 | FSMC_D5 | Alternate Function Push Pull | n/a | High | |
| | PE9 | FSMC_D6 | Alternate Function Push Pull | n/a | High | |
| | PE10 | FSMC_D7 | Alternate Function Push Pull | n/a | High | |
| | PE11 | FSMC_D8 | Alternate Function Push Pull | n/a | High | |
| | PE12 | FSMC_D9 | Alternate Function Push Pull | n/a | High | |
| | PE13 | FSMC_D10 | Alternate Function Push Pull | n/a | High | |
| | PE14 | FSMC_D11 | Alternate Function Push Pull | n/a | High | |
| | PE15 | FSMC_D12 | Alternate Function Push Pull | n/a | High | |
| | PD8 | FSMC_D13 | Alternate Function Push Pull | n/a | High | |
| | PD9 | FSMC_D14 | Alternate Function Push Pull | n/a | High | |
| | PD10 | FSMC_D15 | Alternate Function Push Pull | n/a | High | |
| | PD14 | FSMC_D0 | Alternate Function Push Pull | n/a | High | |
| | PD15 | FSMC_D1 | Alternate Function Push Pull | n/a | High | |
| | PG5 | FSMC_A15 | Alternate Function Push Pull | n/a | High | |
| | PD0 | FSMC_D2 | Alternate Function Push Pull | n/a | High | |
| | PD1 | FSMC_D3 | Alternate Function Push Pull | n/a | High | |
| | PD4 | FSMC_NOE | Alternate Function Push Pull | n/a | High | |
| | PD5 | FSMC_NWE | Alternate Function Push Pull | n/a | High | |
| | PG12 | FSMC_NE4 | Alternate Function Push Pull | n/a | High | |
| RCC | OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SPI2 | PB13 | SPI2_SCK | Alternate Function Push Pull | n/a | **High *** | LCDTP_CLK |
| | PB14 | SPI2_MISO | Input mode | No pull-up and no pull-down | **n/a** | LCDTP_DOUT |
| | PB15 | SPI2_MOSI | Alternate Function Push Pull | n/a | **High *** | LCDTP_DIN |
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | n/a | **High *** | |
| | PA10 | USART1_RX | Input mode | No pull-up and no pull-down | **n/a** | |
| GPIO | PE2 | GPIO_Output | Output Push Pull | n/a | Low | A23 |
| | PC4 | GPIO_Output | Output Push Pull | n/a | Low | LCDTP_CS |
| | PC5 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | LCDTP_IRQ |
| | PB0 | GPIO_Output | Output Push Pull | n/a | Low | BL_PWM |
| | PB1 | GPIO_Output | Output Push Pull | n/a | Low | LCD_RESET |
| | PG13 | GPIO_Output | Output Push Pull | n/a | Low | A24 |

## 6.2. DMA configuration

nothing configured in DMA service

## *6.3. NVIC configuration*

| Interrupt Table | Enable | Preenmption Priority | SubPriority |
|---|---|---|---|
| Non maskable interrupt | true | 0 | 0 |
| Hard fault interrupt | true | 0 | 0 |
| Memory management fault | true | 0 | 0 |
| Prefetch fault, memory access fault | true | 0 | 0 |
| Undefined instruction or illegal state | true | 0 | 0 |
| System service call via SWI instruction | true | 0 | 0 |
| Debug monitor | true | 0 | 0 |
| Pendable request for system service | true | 0 | 0 |
| System tick timer | true | 0 | 0 |
| SPI2 global interrupt | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| USART1 global interrupt | unused | | |

**\* User modified value**

# *7. Power Consumption Calculator report*

## 7.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F1 |
| Line | STM32F103 |
| MCU | STM32F103ZETx |
| Datasheet | 14611_Rev12 |

## 7.2. Parameter Selection

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

# 8. Software Project

## 8.1. Project Settings

| Name | Value |
|------|-------|
| Project Name | TOUCH |
| Project Folder | D:\Open103Z-Demo-HAL\21.TOUCH\TOUCH |
| Toolchain / IDE | MDK-ARM V5 |
| Firmware Package Name and Version | STM32Cube FW_F1 V1.4.0 |

## 8.2. Code Generation Settings

| Name | Value |
|------|-------|
| STM32Cube Firmware Library Package | Copy all used libraries into the project folder |
| Generate peripheral initialization as a pair of '.c/.h' files | Yes |
| Backup previously generated files when re-generating | No |
| Delete previously generated files when not re-generated | Yes |
| Set all free pins as analog (to optimize the power consumption) | No |