

## 1. Description

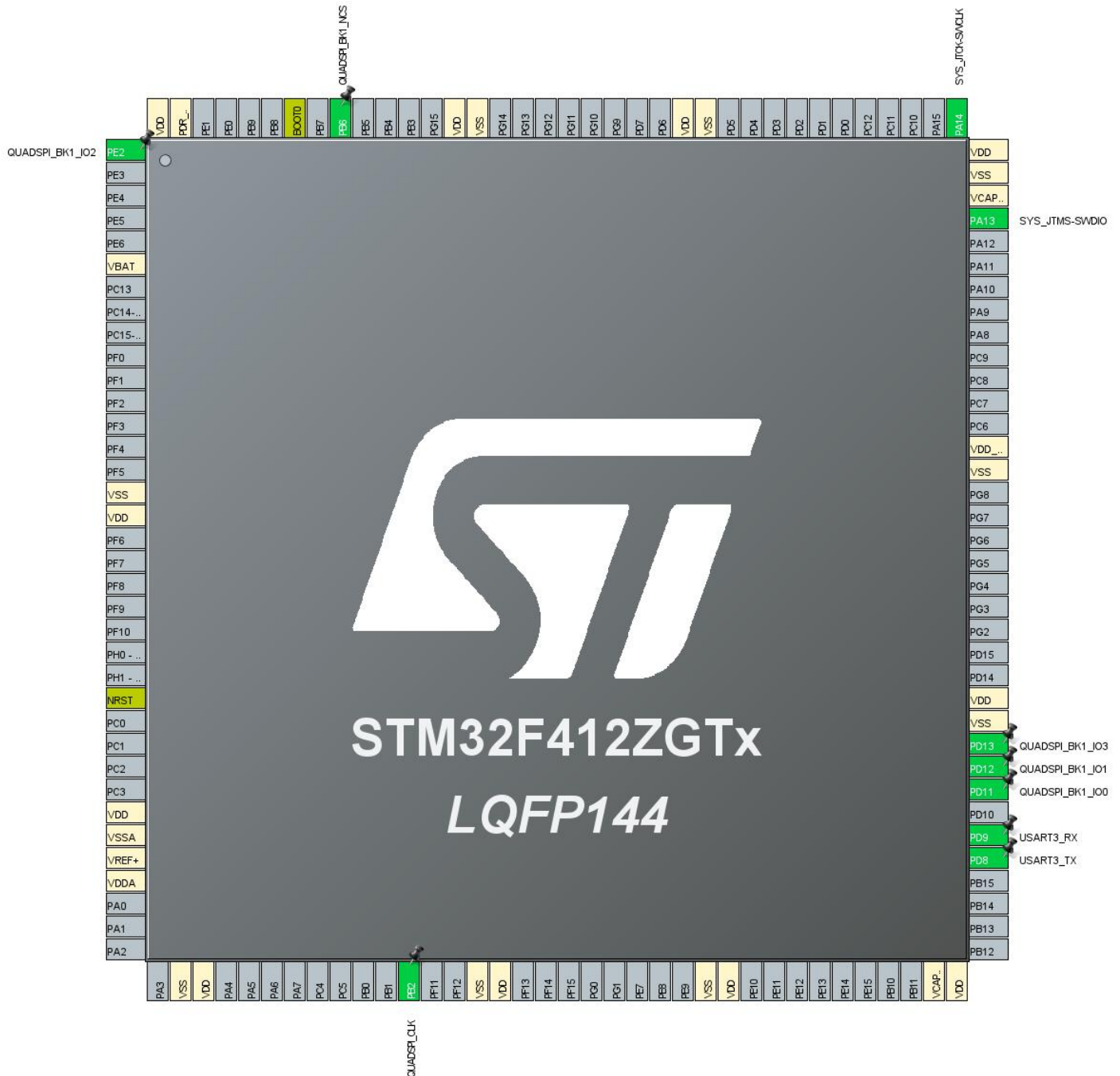
### 1.1. Project

|                 |                   |
|-----------------|-------------------|
| Project Name    | QSPITest          |
| Board Name      | custom            |
| Generated with: | STM32CubeMX 5.5.0 |
| Date            | 01/31/2020        |

### 1.2. MCU

|                |               |
|----------------|---------------|
| MCU Series     | STM32F4       |
| MCU Line       | STM32F412     |
| MCU name       | STM32F412ZGTx |
| MCU Package    | LQFP144       |
| MCU Pin number | 144           |

## 2. Pinout Configuration

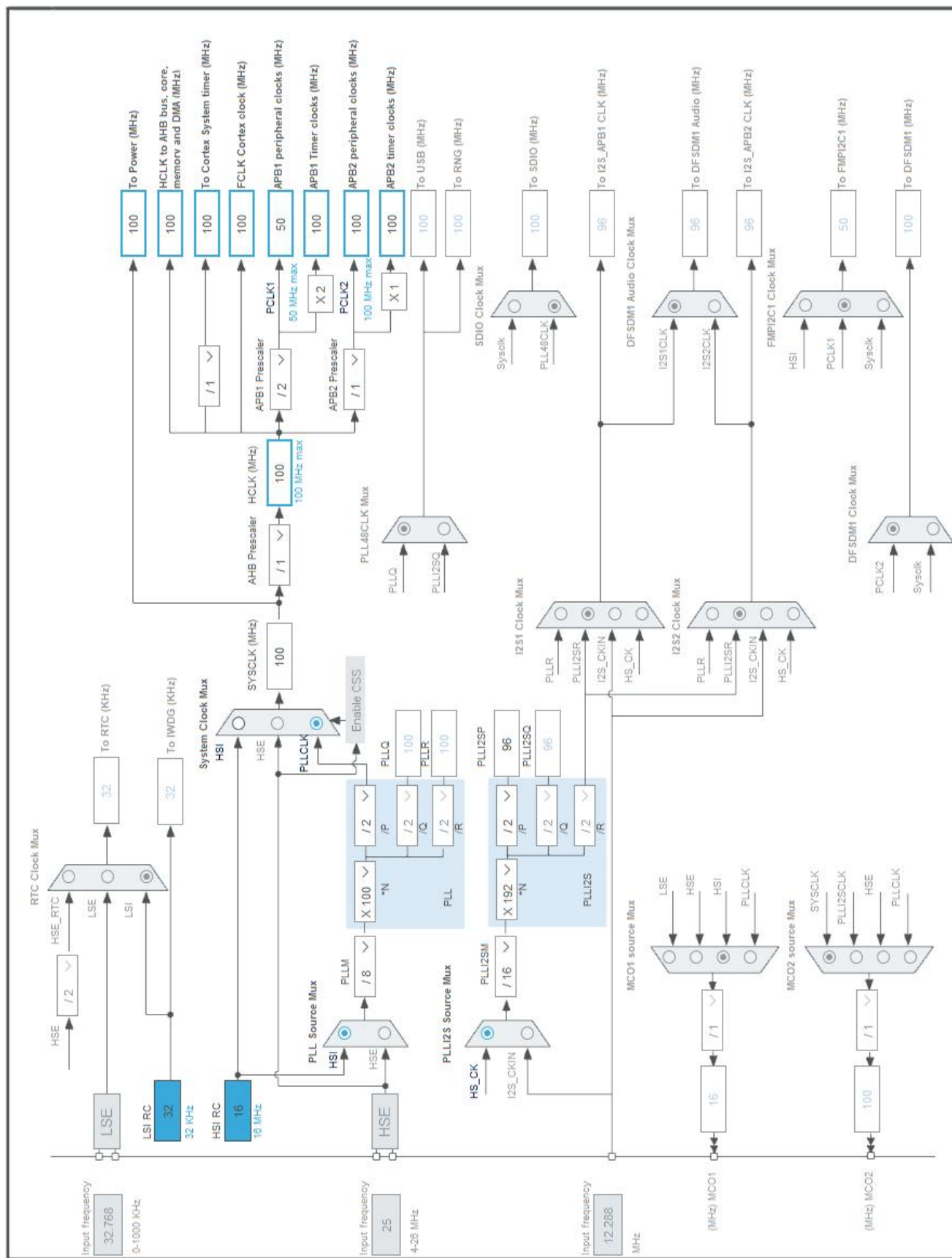


### 3. Pins Configuration

| Pin Number<br>LQFP144 | Pin Name<br>(function after<br>reset) | Pin Type | Alternate<br>Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|-------|
| 1                     | PE2                                   | I/O      | QUADSPI_BK1_IO2          |       |
| 6                     | VBAT                                  | Power    |                          |       |
| 16                    | VSS                                   | Power    |                          |       |
| 17                    | VDD                                   | Power    |                          |       |
| 25                    | NRST                                  | Reset    |                          |       |
| 30                    | VDD                                   | Power    |                          |       |
| 31                    | VSSA                                  | Power    |                          |       |
| 32                    | VREF+                                 | Power    |                          |       |
| 33                    | VDDA                                  | Power    |                          |       |
| 38                    | VSS                                   | Power    |                          |       |
| 39                    | VDD                                   | Power    |                          |       |
| 48                    | PB2                                   | I/O      | QUADSPI_CLK              |       |
| 51                    | VSS                                   | Power    |                          |       |
| 52                    | VDD                                   | Power    |                          |       |
| 61                    | VSS                                   | Power    |                          |       |
| 62                    | VDD                                   | Power    |                          |       |
| 71                    | VCAP_1                                | Power    |                          |       |
| 72                    | VDD                                   | Power    |                          |       |
| 77                    | PD8                                   | I/O      | USART3_TX                |       |
| 78                    | PD9                                   | I/O      | USART3_RX                |       |
| 80                    | PD11                                  | I/O      | QUADSPI_BK1_IO0          |       |
| 81                    | PD12                                  | I/O      | QUADSPI_BK1_IO1          |       |
| 82                    | PD13                                  | I/O      | QUADSPI_BK1_IO3          |       |
| 83                    | VSS                                   | Power    |                          |       |
| 84                    | VDD                                   | Power    |                          |       |
| 94                    | VSS                                   | Power    |                          |       |
| 95                    | VDD_USB                               | Power    |                          |       |
| 105                   | PA13                                  | I/O      | SYS_JTMS-SWDIO           |       |
| 106                   | VCAP_2                                | Power    |                          |       |
| 107                   | VSS                                   | Power    |                          |       |
| 108                   | VDD                                   | Power    |                          |       |
| 109                   | PA14                                  | I/O      | SYS_JTCK-SWCLK           |       |
| 120                   | VSS                                   | Power    |                          |       |
| 121                   | VDD                                   | Power    |                          |       |
| 130                   | VSS                                   | Power    |                          |       |
| 131                   | VDD                                   | Power    |                          |       |

| Pin Number<br>LQFP144 | Pin Name<br>(function after<br>reset) | Pin Type | Alternate<br>Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|-------|
| 136                   | PB6                                   | I/O      | QUADSPI_BK1_NCS          |       |
| 138                   | BOOT0                                 | Boot     |                          |       |
| 143                   | PDR_ON                                | Power    |                          |       |
| 144                   | VDD                                   | Power    |                          |       |

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

| Name                              | Value                       |
|-----------------------------------|-----------------------------|
| Project Name                      | QSPITest                    |
| Project Folder                    | D:\ST\TouchGFXDemo\QSPITest |
| Toolchain / IDE                   | STM32CubeIDE                |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.24.2     |

### 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                                    |
| Delete previously generated files when not re-generated         | Yes                                   |
| Set all free pins as analog (to optimize the power consumption) | No                                    |

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

|           |               |
|-----------|---------------|
| Series    | STM32F4       |
| Line      | STM32F412     |
| MCU       | STM32F412ZGTx |
| Datasheet | 028087_Rev5   |

### 6.2. Parameter Selection

|             |      |
|-------------|------|
| Temperature | 25   |
| Vdd         | null |

## 7. IPs and Middleware Configuration

### 7.1. GPIO

### 7.2. QUADSPI

#### QuadSPI Mode: Bank1 with Quad SPI Lines

##### 7.2.1. Parameter Settings:

###### General Parameters:

|                       |                              |
|-----------------------|------------------------------|
| Clock Prescaler       | 0 *                          |
| Fifo Threshold        | 4 *                          |
| Sample Shifting       | Sample Shifting Half Cycle * |
| Flash Size            | 23 *                         |
| Chip Select High Time | 8 Cycles *                   |
| Clock Mode            | Low                          |
| Flash ID              | Flash ID 1                   |
| Dual Flash            | Disabled                     |

### 7.3. RCC

##### 7.3.1. Parameter Settings:

###### System Parameters:

|                   |                    |
|-------------------|--------------------|
| VDD voltage (V)   | 3.3                |
| Instruction Cache | Enabled            |
| Prefetch Buffer   | Enabled            |
| Data Cache        | Enabled            |
| Flash Latency(WS) | 3 WS (4 CPU cycle) |

###### RCC Parameters:

|                                |          |
|--------------------------------|----------|
| HSI Calibration Value          | 16       |
| TIM Prescaler Selection        | Disabled |
| HSE Startup Timeout Value (ms) | 100      |
| LSE Startup Timeout Value (ms) | 5000     |

###### Power Parameters:

|                               |                                 |
|-------------------------------|---------------------------------|
| Power Regulator Voltage Scale | Power Regulator Voltage Scale 1 |
|-------------------------------|---------------------------------|



## 7.4. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 7.5. USART3

**Mode: Asynchronous**

### 7.5.1. 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**

## 8. System Configuration

### 8.1. GPIO configuration

| IP      | Pin  | Signal          | GPIO mode                    | GPIO pull/up pull down      | Max Speed   | User Label |
|---------|------|-----------------|------------------------------|-----------------------------|-------------|------------|
| QUADSPI | PE2  | QUADSPI_BK1_I02 | 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 * |            |
|         | PD11 | QUADSPI_BK1_I00 | Alternate Function Push Pull | No pull-up and no pull-down | Very High * |            |
|         | PD12 | QUADSPI_BK1_I01 | Alternate Function Push Pull | No pull-up and no pull-down | Very High * |            |
|         | PD13 | QUADSPI_BK1_I03 | Alternate Function Push Pull | No pull-up and no pull-down | Very High * |            |
|         | PB6  | QUADSPI_BK1_NCS | Alternate Function Push Pull | Pull-up *                   | Very High * |            |
| SYS     | PA13 | SYS_JTMS-SWDIO  | n/a                          | n/a                         | n/a         |            |
|         | PA14 | SYS_JTCK-SWCLK  | n/a                          | n/a                         | n/a         |            |
| USART3  | PD8  | USART3_TX       | Alternate Function Push Pull | No pull-up and no pull-down | Very High * |            |
|         | PD9  | USART3_RX       | Alternate Function Push Pull | No pull-up and no pull-down | Very High * |            |

### 8.2. DMA configuration

nothing configured in DMA service

### 8.3. NVIC configuration

| Interrupt Table                         | Enable | Preenmption Priority | SubPriority |
|---|--------|----------------------|-------------|
| Non maskable interrupt                  | true   | 0                    | 0           |
| Hard fault interrupt                    | true   | 0                    | 0           |
| Memory management fault                 | true   | 0                    | 0           |
| Pre-fetch fault, memory access fault    | true   | 0                    | 0           |
| Undefined instruction or illegal state  | true   | 0                    | 0           |
| System service call via SWI instruction | true   | 0                    | 0           |
| Debug monitor                           | true   | 0                    | 0           |
| Pendable request for system service     | true   | 0                    | 0           |
| System tick timer                       | true   | 0                    | 0           |
| QUADSPI global interrupt                | true   | 1                    | 0           |
| PVD interrupt through EXTI line 16      | unused |                      |             |
| Flash global interrupt                  | unused |                      |             |
| RCC global interrupt                    | unused |                      |             |
| USART3 global interrupt                 | unused |                      |             |
| FPU global interrupt                    | unused |                      |             |

\* User modified value

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