

1. Description

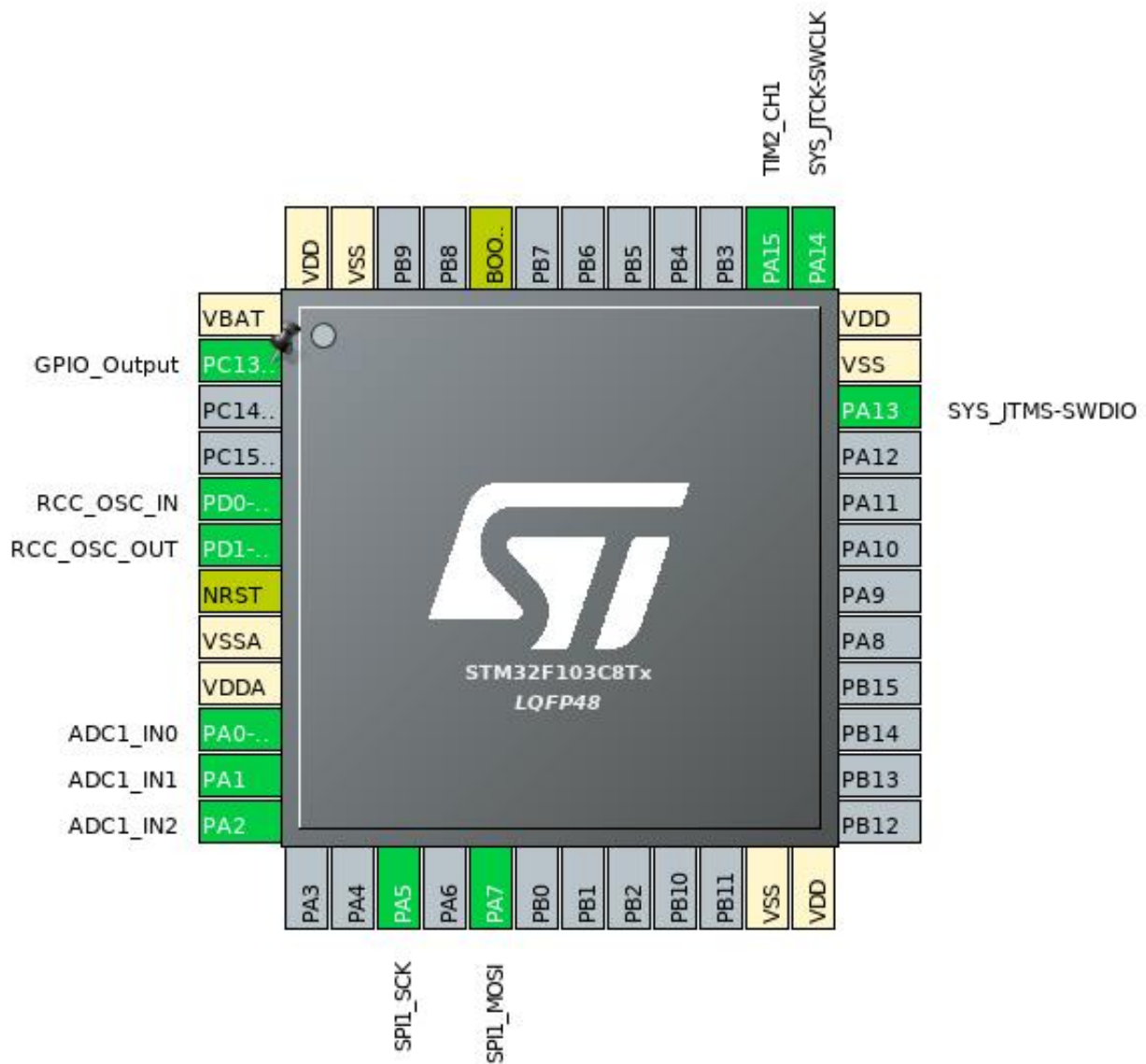
1.1. Project

| | |
|-----------------|-------------------|
| Project Name | STM32-LedPanel |
| Board Name | custom |
| Generated with: | STM32CubeMX 5.3.0 |
| Date | 10/12/2019 |

1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32F1 |
| MCU Line | STM32F103 |
| MCU name | STM32F103C8Tx |
| MCU Package | LQFP48 |
| MCU Pin number | 48 |

2. Pinout Configuration



3. Pins Configuration

| Pin Number LQFP48 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|----------------------|---------------------------------------|----------|--------------------------|-------|
| 1 | VBAT | Power | | |
| 2 | PC13-TAMPER-RTC * | I/O | GPIO_Output | |
| 5 | PD0-OSC_IN | I/O | RCC_OSC_IN | |
| 6 | PD1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 7 | NRST | Reset | | |
| 8 | VSSA | Power | | |
| 9 | VDDA | Power | | |
| 10 | PA0-WKUP | I/O | ADC1_IN0 | |
| 11 | PA1 | I/O | ADC1_IN1 | |
| 12 | PA2 | I/O | ADC1_IN2 | |
| 15 | PA5 | I/O | SPI1_SCK | |
| 17 | PA7 | I/O | SPI1_MOSI | |
| 23 | VSS | Power | | |
| 24 | VDD | Power | | |
| 34 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 35 | VSS | Power | | |
| 36 | VDD | Power | | |
| 37 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 38 | PA15 | I/O | TIM2_CH1 | |
| 44 | BOOT0 | Boot | | |
| 47 | VSS | Power | | |
| 48 | VDD | Power | | |

* The pin is affected with an I/O function

5. Software Project

5.1. Project Settings

| Name | Value |
|-----------------------------------|------------------------|
| Project Name | STM32-LedPanel |
| Project Folder | /work/STM32-LedPanel |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F1 V1.8.0 |

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 | STM32F1 |
| Line | STM32F103 |
| MCU | STM32F103C8Tx |
| Datasheet | 13587_Rev17 |

6.2. Parameter Selection

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

7. IPs and Middleware Configuration

7.1. ADC1

mode: IN0

mode: IN1

mode: IN2

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Data Alignment Right alignment

Scan Conversion Mode Enabled

Continuous Conversion Mode **Enabled ***

Discontinuous Conversion Mode Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion **3 ***

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 0

Sampling Time **71.5 Cycles ***

Rank **2 ***

Channel **Channel 1 ***

Sampling Time **71.5 Cycles ***

Rank **3 ***

Channel **Channel 2 ***

Sampling Time **71.5 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

7.2. IWDG

mode: Activated

7.2.1. Parameter Settings:

Clocking:

| | |
|--------------------------------|--------------|
| IWDG counter clock prescaler | 256 * |
| IWDG down-counter reload value | 4095 |

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. 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 Timeout Value (ms) | 100 |
| LSE Startup Timeout Value (ms) | 5000 |

7.4. SPI1

Mode: Transmit Only Master

7.4.1. Parameter Settings:

Basic Parameters:

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

Clock Parameters:

| | |
|---------------------------|-----------------------|
| Prescaler (for Baud Rate) | 32 * |
| Baud Rate | 2.25 MBits/s * |
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

Advanced Parameters:

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

7.5. SYS

Debug: Serial Wire

Timebase Source: TIM1

7.6. TIM2

Channel1: PWM Generation CH1

7.6.1. Parameter Settings:

Counter Settings:

| | |
|---|---------------|
| Prescaler (PSC - 16 bits value) | 1 * |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value) | 45-1 * |
| 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 | Reset (UG bit from TIMx_EGR) |

PWM Generation Channel 1:

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

*** User modified value**

8. System Configuration

8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|------|-----------------|----------------|------------------------------|-----------------------------|---------------|------------|
| ADC1 | PA0-WKUP | ADC1_IN0 | Analog mode | n/a | n/a | |
| | PA1 | ADC1_IN1 | Analog mode | n/a | n/a | |
| | PA2 | ADC1_IN2 | Analog mode | n/a | n/a | |
| RCC | PD0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PD1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SPI1 | PA5 | SPI1_SCK | Alternate Function Push Pull | n/a | High * | |
| | PA7 | SPI1_MOSI | Alternate Function Push Pull | n/a | High * | |
| SYS | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | |
| | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | |
| TIM2 | PA15 | TIM2_CH1 | Alternate Function Push Pull | n/a | Low | |
| GPIO | PC13-TAMPER-RTC | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | |

8.2. DMA configuration

| DMA request | Stream | Direction | Priority |
|-------------|---------------|----------------------|---------------|
| ADC1 | DMA1_Channel1 | Peripheral To Memory | Low |
| TIM2_CH1 | DMA1_Channel5 | Memory To Peripheral | High * |

ADC1: DMA1_Channel1 DMA request Settings:

Mode: **Circular ***
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Half Word
 Memory Data Width: Half Word

TIM2_CH1: DMA1_Channel5 DMA request Settings:

Mode: **Circular ***
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: **Word ***
 Memory Data Width: **Byte ***

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 |
| 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 |
| DMA1 channel1 global interrupt | true | 0 | 0 |
| DMA1 channel5 global interrupt | true | 0 | 0 |
| TIM1 update interrupt | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| ADC1 and ADC2 global interrupts | unused | | |
| TIM2 global interrupt | unused | | |
| SPI1 global interrupt | unused | | |

* User modified value

9. Software Pack Report