1. Description

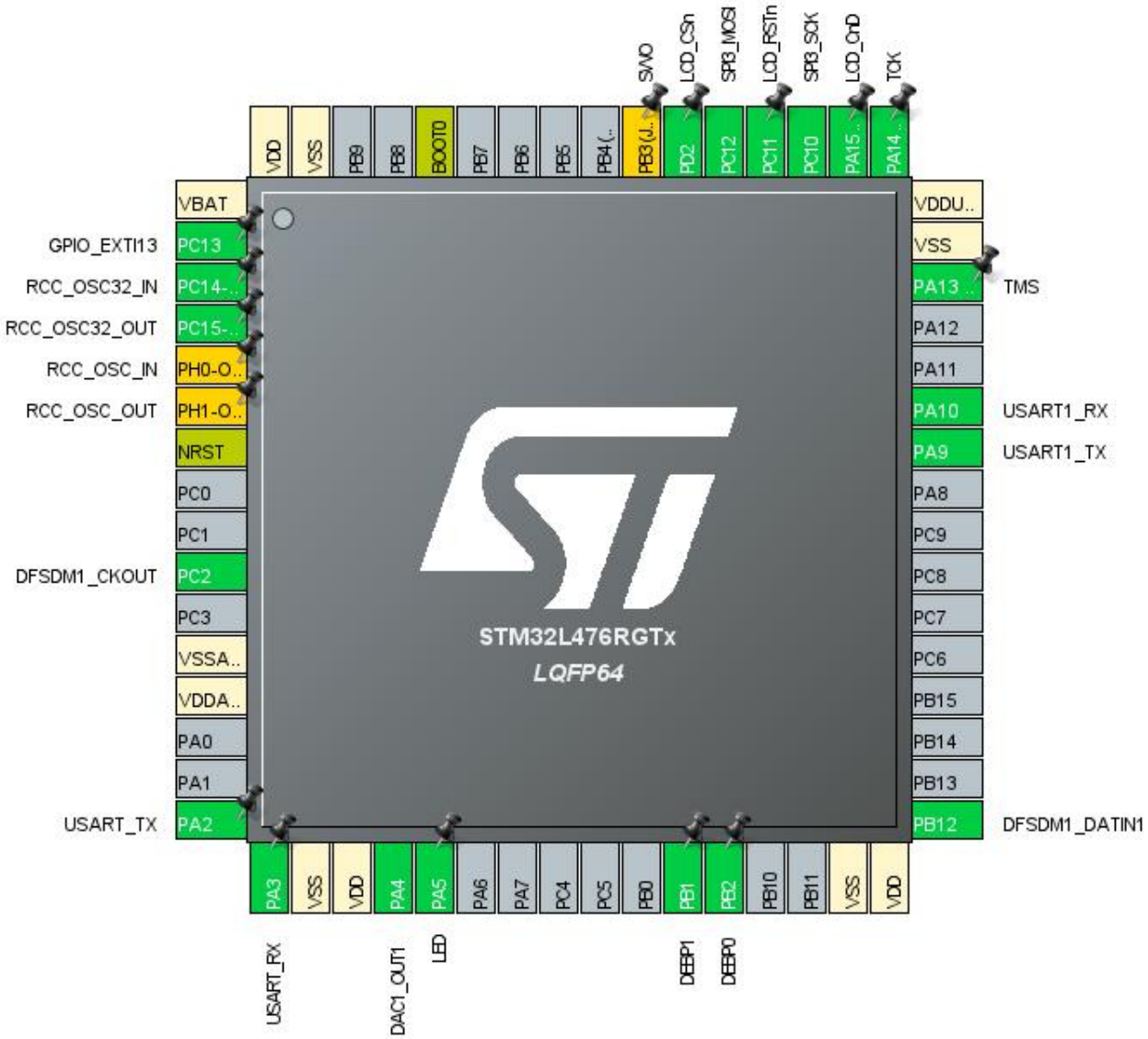
1.1. Project

Project Name	l476_pdm
Board Name	NUCLEO-L476RG
Generated with:	STM32CubeMX 5.2.0
Date	09/18/2019

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L476RGTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration

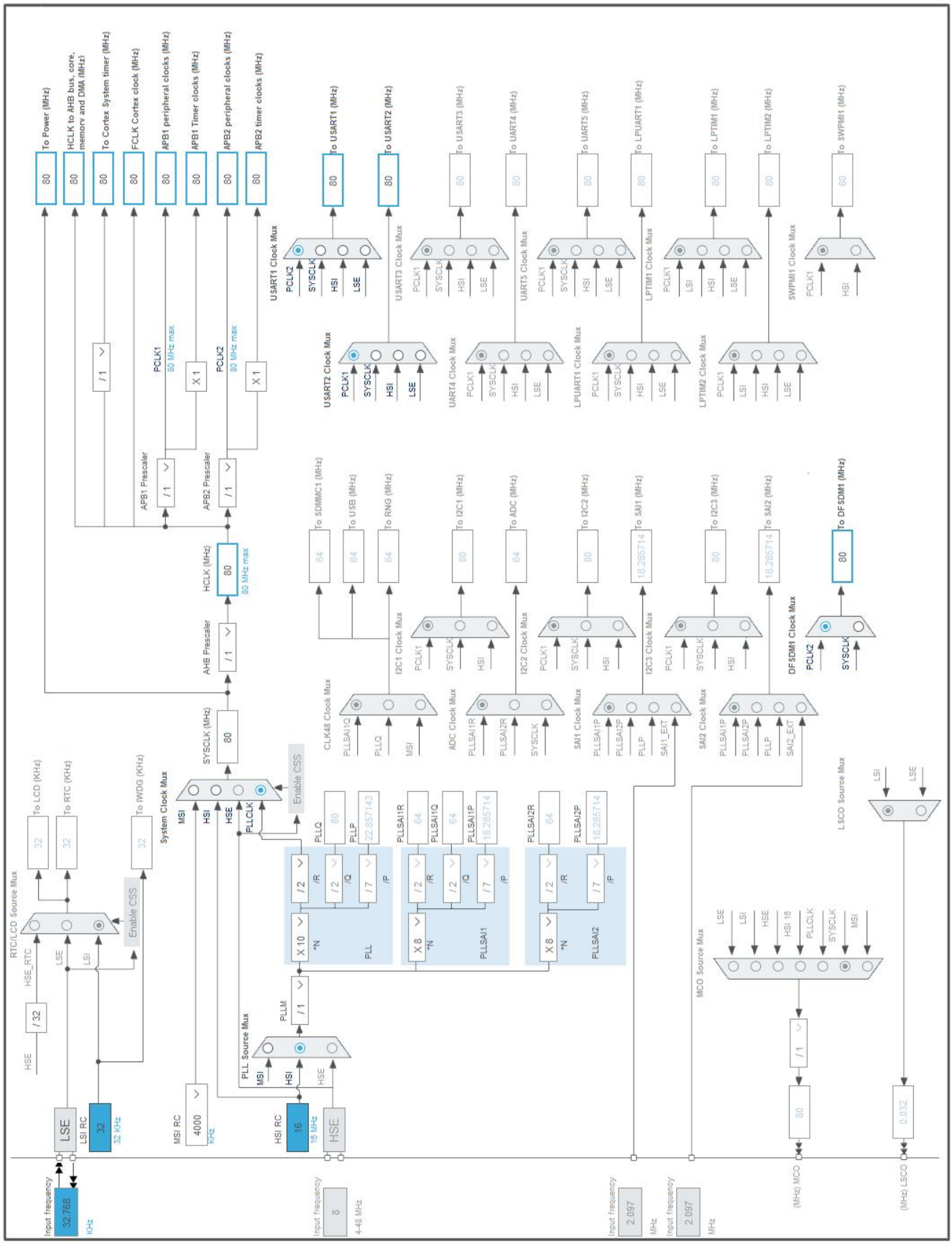


3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	GPIO_EXTI13	
3	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN (PH0) *	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT (PH1) *	I/O	RCC_OSC_OUT	
7	NRST	Reset		
10	PC2	I/O	DFSDM1_CKOUT	
12	VSSA/VREF-	Power		
13	VDDA/VREF+	Power		
16	PA2	I/O	USART2_TX	USART_TX
17	PA3	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	DAC1_OUT1	
21	PA5 **	I/O	GPIO_Output	LED
27	PB1 **	I/O	GPIO_Output	DEBP1
28	PB2 **	I/O	GPIO_Output	DEBP0
31	VSS	Power		
32	VDD	Power		
33	PB12	I/O	DFSDM1_DATIN1	
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
46	PA13 (JTMS-SWDIO)	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDDUSB	Power		
49	PA14 (JTCK-SWCLK)	I/O	SYS_JTCK-SWCLK	TCK
50	PA15 (JTDI) **	I/O	GPIO_Output	LCD_CnD
51	PC10	I/O	SPI3_SCK	
52	PC11 **	I/O	GPIO_Output	LCD_RSTn
53	PC12	I/O	SPI3_MOSI	
54	PD2 **	I/O	GPIO_Output	LCD_CSn
55	PB3 (JTDO-TRACESWO) *	I/O	SYS_JTDO-SWO	SWO
60	BOOT0	Boot		
63	VSS	Power		
64	VDD	Power		

** 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	l476_pdm
Project Folder	D:\CubeIDE_WORK\project\l476\l476_pdm
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_L4 V1.14.0

5.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	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	STM32L4
Line	STM32L4x6
MCU	STM32L476RGTx
Datasheet	025976_Rev4

6.2. Parameter Selection

Temperature	25
Vdd	3.0

7. IPs and Middleware Configuration

7.1. DAC1

OUT1 mode: Connected to external pin only

7.1.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	**Timer 2 Trigger Out event ***
Wave generation mode	Disabled
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable

7.2. DFSDM1

mode: PDM/SPI Input from ch1 and Internal Clock

mode: PDM/SPI input from ch1 and internal clock

7.2.1. Filter 0:

regular channel selection:

regular channel selection	**Channel 0 ***
Continuous Mode	Continuous Mode
Trigger to start regular conversion	Software trigger
Fast Mode	**Enable ***
Dma Mode	**Enable ***

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

Filter parameters:

Sinc Order	**Sinc 4 filter type ***
Fosr	**64 ***
Iosr	1

7.2.2. Filter 1:

regular channel selection:

regular channel selection	**Channel 1 ***
Continuous Mode	Continuous Mode
Trigger to start regular conversion	Software trigger
Fast Mode	**Enable ***
Dma Mode	**Enable ***

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

Filter parameters:

Sinc Order	**Sinc 4 filter type ***
Fosr	**64 ***
Iosr	1

7.2.3. Filter 2:

regular channel selection:

regular channel selection	- None -

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

7.2.4. Filter 3:

regular channel selection:

regular channel selection	- None -

injected channel selection:

Channel0 as injected channel	Disable
Channel1 as injected channel	Disable
Channel2 as injected channel	Disable
Channel3 as injected channel	Disable
Channel4 as injected channel	Disable
Channel5 as injected channel	Disable
Channel6 as injected channel	Disable
Channel7 as injected channel	Disable

7.2.5. Output Clock:

Output Clock parameters:

Selection	Source for ouput clock is system clock
Divider	**78 ***

7.2.6. Channel 0:

Channel 0 parameters:

Type	SPI with rising edge
Spi Clock	Internal SPI clock
Offset	0
Right Bit Shift	**0x00 ***

Analog watchdog parameters:

Filter Order	FastSinc filter type
Oversampling	1

7.2.7. Channel 1:

Analog watchdog parameters:

Filter Order	FastSinc filter type
Oversampling	1

Channel 1 parameters:

Type	**SPI with falling edge ***
Spi Clock	Internal SPI clock
Offset	0

Right Bit Shift	**0x00 ***

7.3. RCC

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	**Enabled ***
Data Cache	Enabled
Flash Latency(WS)	4 WS (5 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
MSI Auto Calibration	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

7.4. SPI3

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)	**16 ***
Baud Rate	**5.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled

NSSP Mode	Enabled
NSS Signal Type	Software

7.5. SYS

Debug: Serial Wire

Timebase Source: TIM17

7.6. TIM2

Clock Source : Internal Clock

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**4991 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	**Update Event ***

7.7. USART1

Mode: Asynchronous

7.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	**921600 ***
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	**Disable ***
MSB First	Disable

7.8. USART2

Mode: Asynchronous

7.8.1. 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

7.9. FREERTOS

Interface: CMSIS_V1

7.9.1. Config parameters:

API:

FreeRTOS API	CMSIS v1

Versions:

FreeRTOS version	10.0.1
CMSIS-RTOS version	1.02

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	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
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	**8192 ***
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	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

7.9.2. 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

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
DAC1	PA4	DAC1_OUT1	Analog mode	No pull-up and no pull-down	n/a	
DFSDM1	PC2	DFSDM1_CKOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB12	DFSDM1_DATIN1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
RCC	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
SYS	PA13 (JTMS-SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14 (JTCK-SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	USART_TX
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	USART_RX
Single Mapped Signals	PH0-OSC_IN (PH0)	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT (PH1)	RCC_OSC_OUT	n/a	n/a	n/a	
	PB3 (JTDO-TRACESWO)	SYS_JTDO-SWO	n/a	n/a	n/a	SWO
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with	No pull-up and no pull-down	n/a	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			Rising edge trigger detection			
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DEBP1
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DEBP0
	PA15 (JTDI)	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_CnD
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_RSTn
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_CSn

8.2. DMA configuration

DMA request	Stream	Direction	Priority
DFSDM1_FLT0	DMA1_Channel4	Peripheral To Memory	Low
DFSDM1_FLT1	DMA1_Channel5	Peripheral To Memory	Low
USART1_TX	DMA2_Channel6	Memory To Peripheral	Low
SPI3_TX	DMA2_Channel2	Memory To Peripheral	Low
DAC_CH1	DMA1_Channel3	Memory To Peripheral	Low

DFSDM1_FLT0: DMA1_Channel4 DMA request Settings:

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

DFSDM1_FLT1: DMA1_Channel5 DMA request Settings:

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

USART1_TX: DMA2_Channel6 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Byte
Memory Data Width: Byte

SPI3_TX: DMA2_Channel2 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***

Peripheral Data Width:	Byte
Memory Data Width:	Byte

DAC_CH1: DMA1_Channel3 DMA request Settings:

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

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	15	0
System tick timer	true	15	0
DMA1 channel3 global interrupt	true	5	0
DMA1 channel4 global interrupt	true	5	0
DMA1 channel5 global interrupt	true	5	0
TIM1 trigger and commutation interrupts and TIM17 global interrupt	true	0	0
TIM2 global interrupt	true	5	0
USART1 global interrupt	true	5	0
SPI3 global interrupt	true	5	0
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	true	5	0
DMA2 channel2 global interrupt	true	5	0
DFSDM1 filter0 global interrupt	true	5	0
DFSDM1 filter1 global interrupt	true	5	0
DMA2 channel6 global interrupt	true	5	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USART2 global interrupt	unused		
EXTI line[15:10] interrupts	unused		
FPU global interrupt	unused		

*** User modified value**

9. Software Pack Report