1. Description

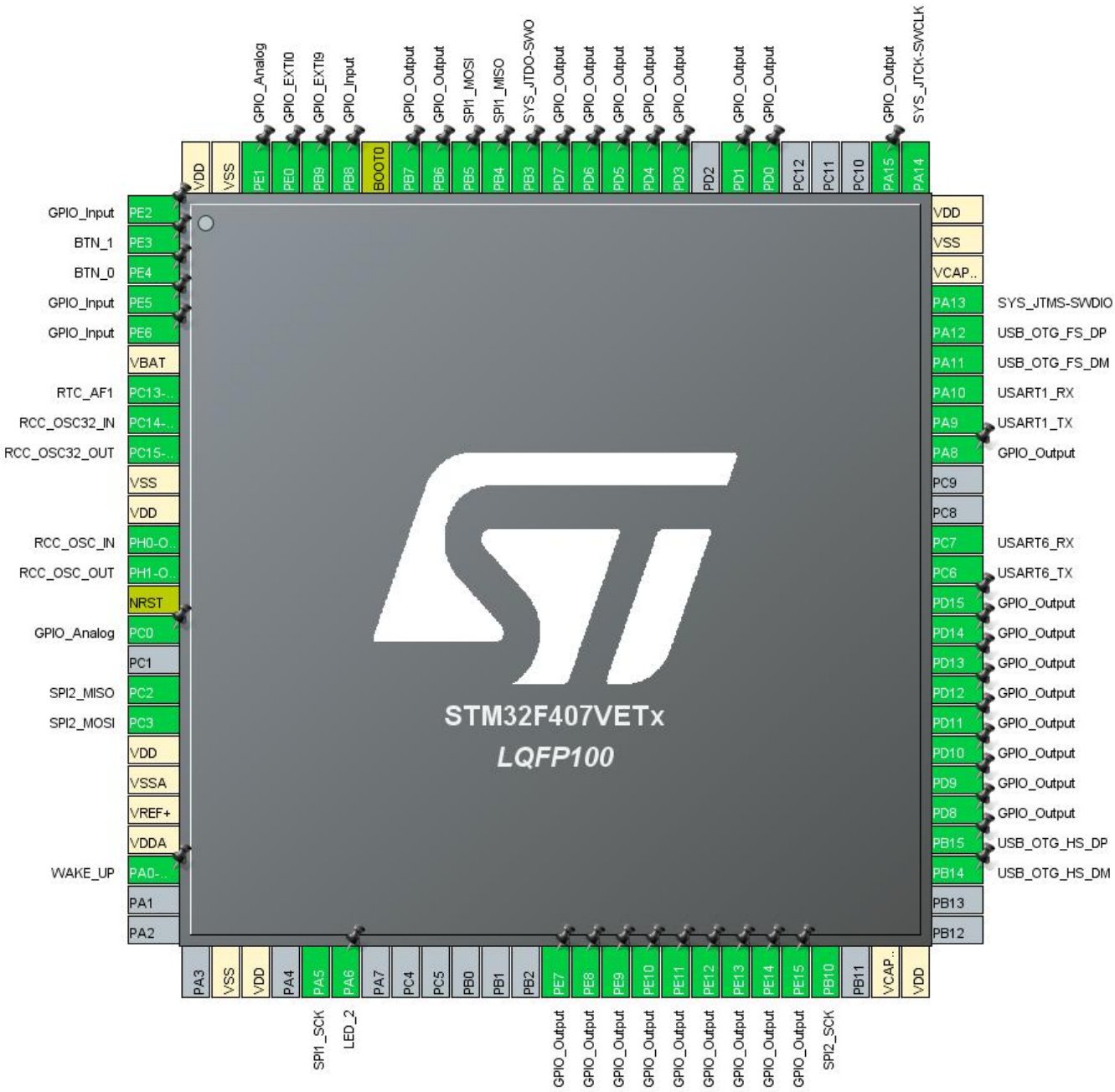
1.1. Project

Project Name	STM32F407VET6-100P
Board Name	custom
Generated with:	STM32CubeMX 5.3.0
Date	12/17/2019

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VETx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



3. Pins Configuration

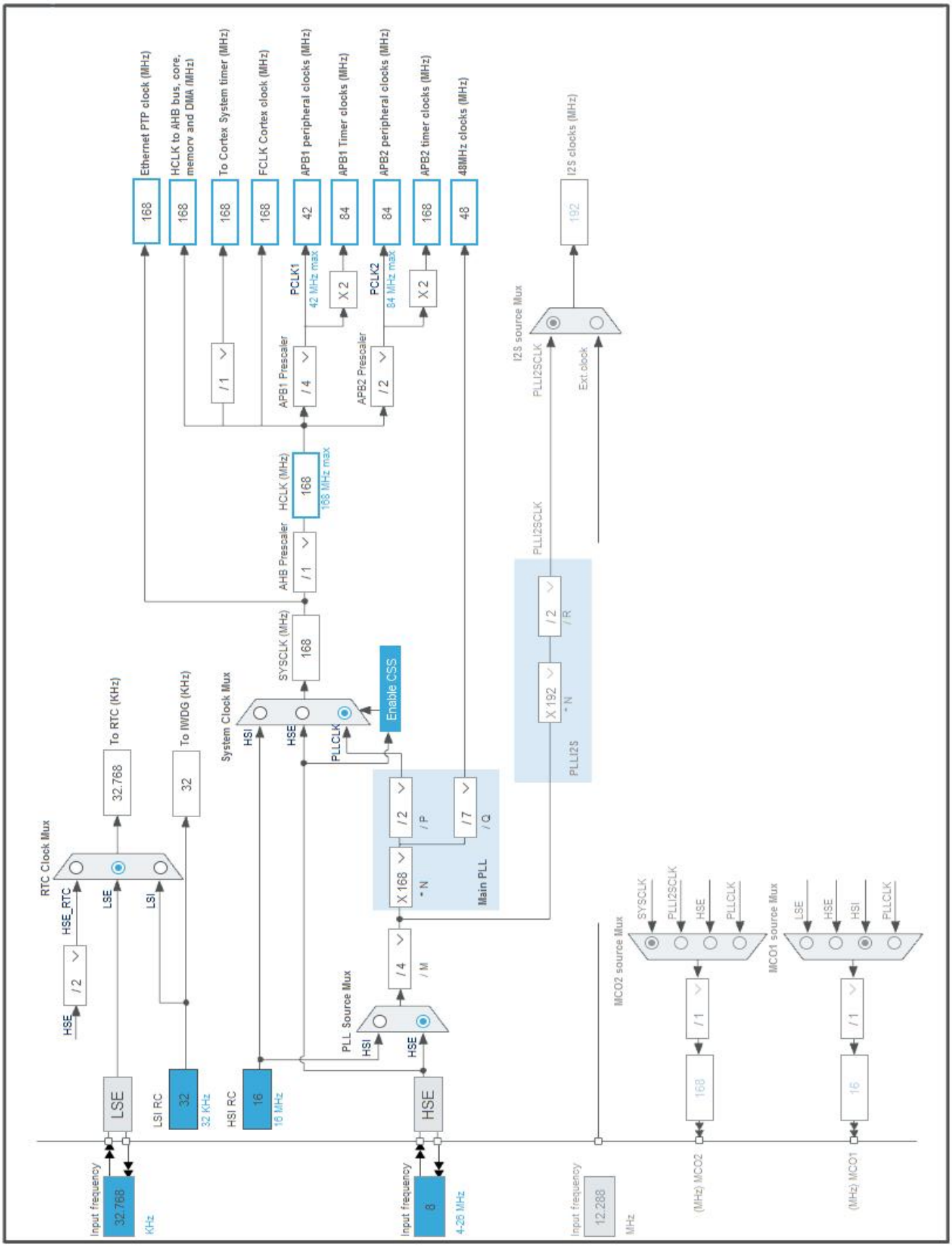
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2 *	I/O	GPIO_Input	
2	PE3 *	I/O	GPIO_Input	BTN_1
3	PE4 *	I/O	GPIO_Input	BTN_0
4	PE5 *	I/O	GPIO_Input	
5	PE6 *	I/O	GPIO_Input	
6	VBAT	Power		
7	PC13-ANTI_TAMP	I/O	RTC_AF1	
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN	I/O	RCC_OSC_IN	
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
15	PC0 *	I/O	GPIO_Analog	
17	PC2	I/O	SPI2_MISO	
18	PC3	I/O	SPI2_MOSI	
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0-WKUP *	I/O	GPIO_Input	WAKE_UP
27	VSS	Power		
28	VDD	Power		
30	PA5	I/O	SPI1_SCK	
31	PA6 *	I/O	GPIO_Output	LED_2
38	PE7 *	I/O	GPIO_Output	
39	PE8 *	I/O	GPIO_Output	
40	PE9 *	I/O	GPIO_Output	
41	PE10 *	I/O	GPIO_Output	
42	PE11 *	I/O	GPIO_Output	
43	PE12 *	I/O	GPIO_Output	
44	PE13 *	I/O	GPIO_Output	
45	PE14 *	I/O	GPIO_Output	
46	PE15 *	I/O	GPIO_Output	
47	PB10	I/O	SPI2_SCK	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
49	VCAP_1	Power		
50	VDD	Power		
53	PB14	I/O	USB_OTG_HS_DM	
54	PB15	I/O	USB_OTG_HS_DP	
55	PD8 *	I/O	GPIO_Output	
56	PD9 *	I/O	GPIO_Output	
57	PD10 *	I/O	GPIO_Output	
58	PD11 *	I/O	GPIO_Output	
59	PD12 *	I/O	GPIO_Output	
60	PD13 *	I/O	GPIO_Output	
61	PD14 *	I/O	GPIO_Output	
62	PD15 *	I/O	GPIO_Output	
63	PC6	I/O	USART6_TX	
64	PC7	I/O	USART6_RX	
67	PA8 *	I/O	GPIO_Output	
68	PA9	I/O	USART1_TX	
69	PA10	I/O	USART1_RX	
70	PA11	I/O	USB_OTG_FS_DM	
71	PA12	I/O	USB_OTG_FS_DP	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
77	PA15 *	I/O	GPIO_Output	
81	PD0 *	I/O	GPIO_Output	
82	PD1 *	I/O	GPIO_Output	
84	PD3 *	I/O	GPIO_Output	
85	PD4 *	I/O	GPIO_Output	
86	PD5 *	I/O	GPIO_Output	
87	PD6 *	I/O	GPIO_Output	
88	PD7 *	I/O	GPIO_Output	
89	PB3	I/O	SYS_JTDO-SWO	
90	PB4	I/O	SPI1_MISO	
91	PB5	I/O	SPI1_MOSI	
92	PB6 *	I/O	GPIO_Output	
93	PB7 *	I/O	GPIO_Output	
94	BOOT0	Boot		
95	PB8 *	I/O	GPIO_Input	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
96	PB9	I/O	GPIO_EXTI9	
97	PE0	I/O	GPIO_EXTI0	
98	PE1 *	I/O	GPIO_Analog	
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	STM32F407VET6-100P
Project Folder	D:\JACK\STM32F4\STM32F4_Blackboard_Test2
Toolchain / IDE	MDK-ARM V5
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	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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407VETx
Datasheet	022152_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. CRC

mode: Activated

7.2. IWDG

mode: Activated

7.2.1. Parameter Settings:

Clocking:

IWDG counter clock prescaler	**8 ***
IWDG down-counter reload value	4095

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

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)	5 WS (6 CPU cycle)

RCC Parameters:

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

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 1

7.4. RTC

mode: Activate Clock Source

mode: Activate Calendar

Alarm A: Routed to AF1

7.4.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255
Output Polarity	Output Polarity High
Output Type	Output Type Opendrain

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

7.5. SPI1

Mode: Full-Duplex Master

7.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**42.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.6. SPI2

Mode: Full-Duplex Master

7.6.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**21.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.7. SYS

Debug: Trace Asynchronous Sw

Timebase Source: SysTick

7.8. USART1

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

7.9. USART6

Mode: Asynchronous

7.9.1. 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

7.10. USB_OTG_FS

Mode: Device_Only

7.10.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Low power	Disabled
Link Power Management	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

7.11. USB_OTG_HS

Internal FS Phy: Device_Only

7.11.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Enable internal IP DMA	Disabled
Physical interface	Internal Phy
Low power	Disabled
Link Power Management	Disabled
Use dedicated end point 1 interrupt	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

7.12. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

7.12.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USB CDC Rx Buffer Size	2048
USB CDC Tx Buffer Size	2048

7.12.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
CONFIGURATION_STRING (Configuration Identifier)	CDC Config

INTERFACE_STRING (Interface Identifier)	CDC Interface

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
RTC	PC13-ANTI_TAMP	RTC_AF1	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB4	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB5	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
SPI2	PC2	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PC3	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
USART6	PC6	USART6_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PC7	USART6_RX	Alternate Function Push Pull	Pull-up	**Very High**	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
					*	
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
USB_OTG_HS	PB14	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB15	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
GPIO	PE2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_1
	PE4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_0
	PE5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PC0	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	
	PA0-WKUP	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	WAKE_UP
	PA6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_2
	PE7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PE15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB9	GPIO_EXTI9	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PE0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PE1	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART6_RX	DMA2_Stream1	Peripheral To Memory	Low
USART6_TX	DMA2_Stream6	Memory To Peripheral	Low
USART1_RX	DMA2_Stream2	Peripheral To Memory	Low
USART1_TX	DMA2_Stream7	Memory To Peripheral	Low

USART6_RX: DMA2_Stream1 DMA request Settings:

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

USART6_TX: DMA2_Stream6 DMA request Settings:

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

USART1_RX: DMA2_Stream2 DMA request Settings:

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

USART1_TX: DMA2_Stream7 DMA request Settings:

Mode:	Normal
Use fifo:	Disable

Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
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
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
SPI1 global interrupt	true	7	0
SPI2 global interrupt	true	3	0
USART1 global interrupt	true	6	0
RTC alarms A and B interrupt through EXTI line 17	true	0	0
DMA2 stream1 global interrupt	true	0	0
DMA2 stream2 global interrupt	true	0	0
USB On The Go FS global interrupt	true	5	0
DMA2 stream6 global interrupt	true	0	0
DMA2 stream7 global interrupt	true	0	0
USART6 global interrupt	true	6	0
USB On The Go HS End Point 1 Out global interrupt	true	6	0
USB On The Go HS End Point 1 In global interrupt	true	6	0
USB On The Go HS global interrupt	true	7	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line0 interrupt	unused		
EXTI line[9:5] interrupts	unused		
FPU global interrupt	unused		

*** User modified value**

9. Software Pack Report