

## 1. Description

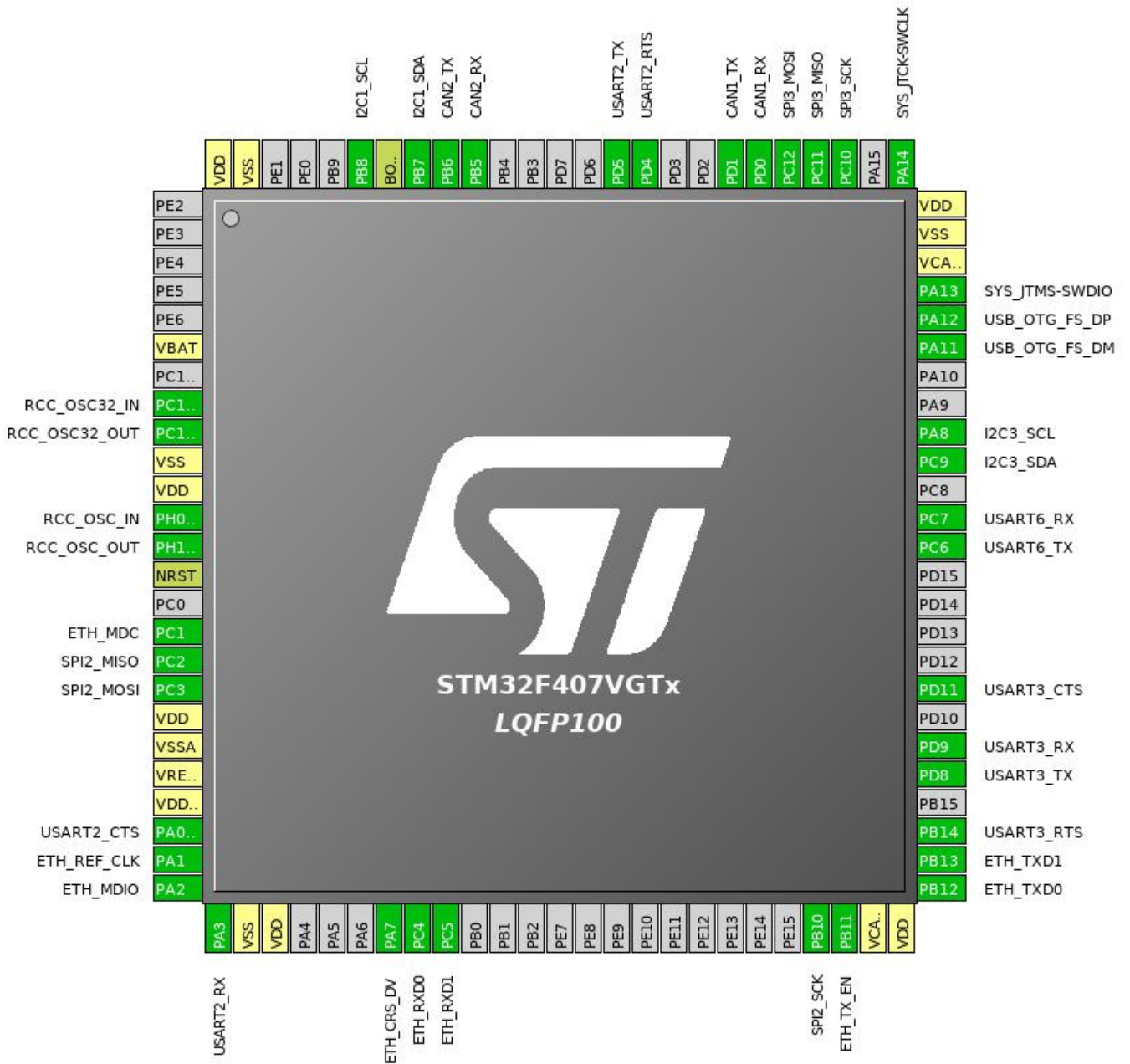
### 1.1. Project

Project Name	stmtest
Board Name	custom
Generated with:	STM32CubeMX 4.27.0
Date	10/01/2018

### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VGTx
MCU Package	LQFP100
MCU Pin number	100

## 2. Pinout Configuration

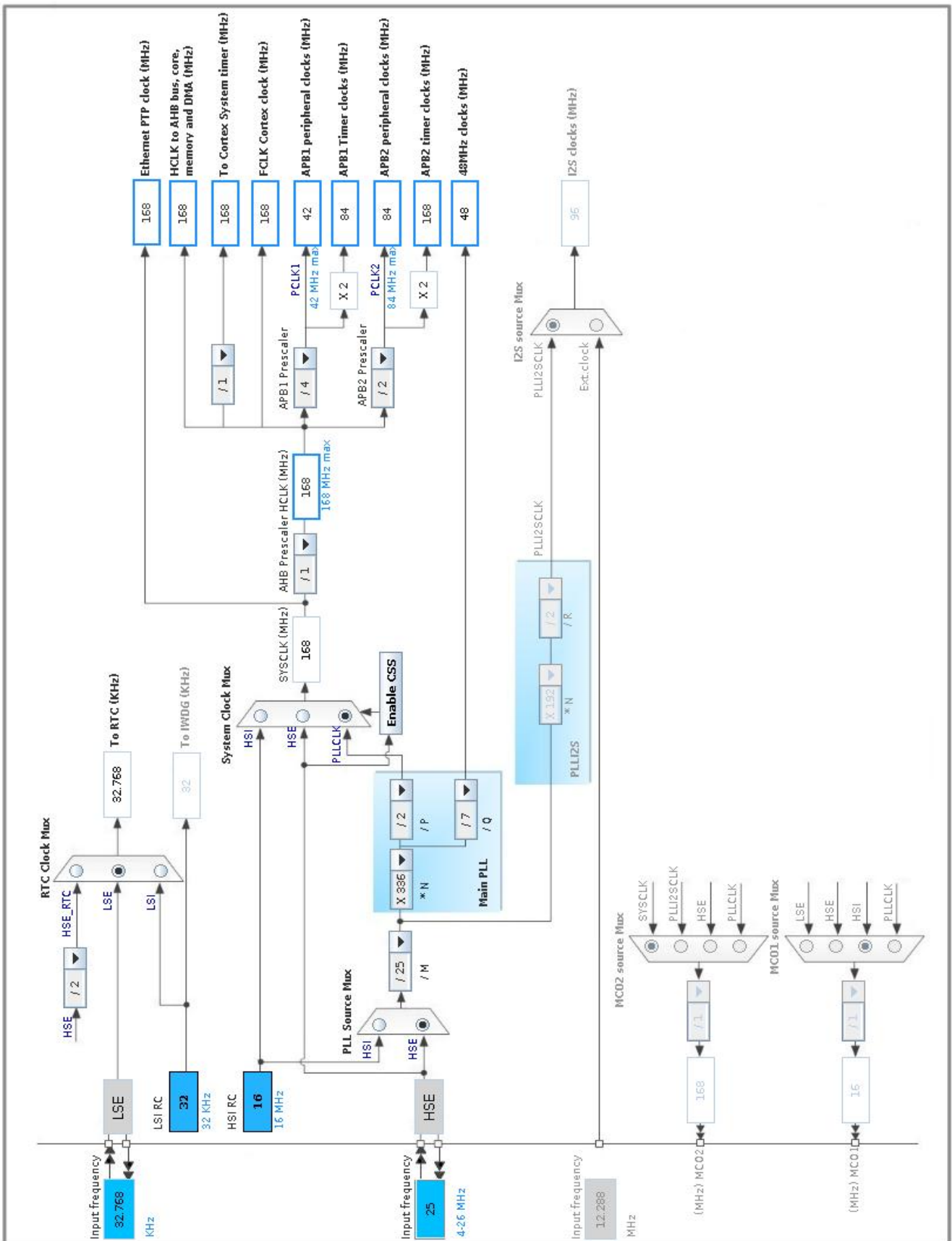


### 3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
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		
16	PC1	I/O	ETH_MDC	
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	USART2_CTS	
24	PA1	I/O	ETH_REF_CLK	
25	PA2	I/O	ETH_MDIO	
26	PA3	I/O	USART2_RX	
27	VSS	Power		
28	VDD	Power		
32	PA7	I/O	ETH_CRSDV	
33	PC4	I/O	ETH_RXD0	
34	PC5	I/O	ETH_RXD1	
47	PB10	I/O	SPI2_SCK	
48	PB11	I/O	ETH_TX_EN	
49	VCAP_1	Power		
50	VDD	Power		
51	PB12	I/O	ETH_TXD0	
52	PB13	I/O	ETH_TXD1	
53	PB14	I/O	USART3_RTS	
55	PD8	I/O	USART3_TX	
56	PD9	I/O	USART3_RX	
58	PD11	I/O	USART3_CTS	
63	PC6	I/O	USART6_TX	
64	PC7	I/O	USART6_RX	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
66	PC9	I/O	I2C3_SDA	
67	PA8	I/O	I2C3_SCL	
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	
78	PC10	I/O	SPI3_SCK	
79	PC11	I/O	SPI3_MISO	
80	PC12	I/O	SPI3_MOSI	
81	PD0	I/O	CAN1_RX	
82	PD1	I/O	CAN1_TX	
85	PD4	I/O	USART2_RTS	
86	PD5	I/O	USART2_TX	
91	PB5	I/O	CAN2_RX	
92	PB6	I/O	CAN2_TX	
93	PB7	I/O	I2C1_SDA	
94	BOOT0	Boot		
95	PB8	I/O	I2C1_SCL	
99	VSS	Power		
100	VDD	Power		

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. CAN1

mode: Mode

#### 5.1.1. Parameter Settings:

##### Bit Timings Parameters:

Prescaler (for Time Quantum)	16
Time Quantum	<b>380.95238095238096 *</b>
Time Quanta in Bit Segment 1	1 Time
Time Quanta in Bit Segment 2	1 Time
ReSynchronization Jump Width	1 Time

##### Basic Parameters:

Time Triggered Communication Mode	Disable
Automatic Bus-Off Management	Disable
Automatic Wake-Up Mode	Disable
No-Automatic Retransmission	Disable
Receive Fifo Locked Mode	Disable
Transmit Fifo Priority	Disable

##### Advanced Parameters:

Operating Mode	Normal
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### 5.2. CAN2

mode: Mode

#### 5.2.1. Parameter Settings:

##### Bit Timings Parameters:

Prescaler (for Time Quantum)	16
Time Quantum	<b>380.95238095238096 *</b>
Time Quanta in Bit Segment 1	1 Time
Time Quanta in Bit Segment 2	1 Time
ReSynchronization Jump Width	1 Time

##### Basic Parameters:

Time Triggered Communication Mode	Disable
Automatic Bus-Off Management	Disable
Automatic Wake-Up Mode	Disable
No-Automatic Retransmission	Disable
Receive Fifo Locked Mode	Disable



Restart auto-negotiation function	<b>0x0200 *</b>
Select the power down mode	<b>0x0800 *</b>
Isolate PHY from MII	<b>0x0400 *</b>
Auto-Negotiation process completed	<b>0x0020 *</b>
Valid link established	<b>0x0004 *</b>
Jabber condition detected	<b>0x0002 *</b>

**Extended : External PHY Configuration:**

PHY special control/status register Offset	<b>0x10 *</b>
PHY Speed mask	<b>0x0002 *</b>
PHY Duplex mask	<b>0x0004 *</b>
PHY Interrupt Source Flag register Offset	<b>0x000B *</b>
PHY Link down interrupt	<b>0x000B *</b>

## 5.4. I2C1

### I2C: I2C

#### 5.4.1. Parameter Settings:

**Master Features:**

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

**Slave Features:**

Clock No Stretch Mode	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

## 5.5. I2C3

### I2C: I2C

#### 5.5.1. Parameter Settings:

**Master Features:**

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

**Slave Features:**



Clock No Stretch Mode	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

## 5.6. RCC

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

**Low Speed Clock (LSE) : Crystal/Ceramic Resonator**

### 5.6.1. 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 Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

#### Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
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## 5.7. RTC

**mode: Activate Clock Source**

**mode: Activate Calendar**

### 5.7.1. Parameter Settings:

#### General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

#### 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

## 5.8. SPI2

### Mode: Full-Duplex Master

#### 5.8.1. Parameter Settings:

**Basic Parameters:**

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

**Clock Parameters:**

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

**Advanced Parameters:**

CRC Calculation	Disabled
NSS Signal Type	Software

## 5.9. SPI3

### Mode: Full-Duplex Master

#### 5.9.1. Parameter Settings:

**Basic Parameters:**

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

**Clock Parameters:**

Prescaler (for Baud Rate)	2
Baud Rate	<b>21.0 MBits/s *</b>

Clock Polarity (CPOL) Low  
Clock Phase (CPHA) 1 Edge

**Advanced Parameters:**

CRC Calculation Disabled  
NSS Signal Type Software

## 5.10. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 5.11. USART2

**Mode: Asynchronous**

**Hardware Flow Control (RS232): CTS/RTS**

### 5.11.1. 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

## 5.12. USART3

**Mode: Asynchronous**

**Hardware Flow Control (RS232): CTS/RTS**

### 5.12.1. 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

## 5.13. USART6

**Mode: Asynchronous**

### 5.13.1. 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

## 5.14. USB\_OTG\_FS

**Mode: Device\_Only**

### 5.14.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Enable internal IP DMA	Disabled
Low power	Disabled
Link Power Management	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

## 5.15. FREERTOS

**mode: Enabled**

### 5.15.1. Config parameters:

#### Versions:

FreeRTOS version	9.0.0
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

**Memory management settings:**

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	15360
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
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**Interrupt nesting behaviour configuration:**

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

### 5.15.2. 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

## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
CAN1	PD0	CAN1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PD1	CAN1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
CAN2	PB5	CAN2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB6	CAN2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
ETH	PC1	ETH_MDC	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA1	ETH_REF_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA2	ETH_MDIO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA7	ETH_CRS_DV	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC4	ETH_RXD0	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC5	ETH_RXD1	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB11	ETH_TX_EN	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB12	ETH_TXD0	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB13	ETH_TXD1	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
I2C1	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very High *	
	PB8	I2C1_SCL	Alternate Function Open Drain	Pull-up	Very High *	
I2C3	PC9	I2C3_SDA	Alternate Function Open Drain	Pull-up	Very High *	
	PA8	I2C3_SCL	Alternate Function Open	Pull-up		

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			Drain		<b>Very High</b> *	
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	
SPI2	PC2	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PC3	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PC11	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART2	PA0-WKUP	USART2_CTS	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
	PD4	USART2_RTS	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PD5	USART2_TX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
USART3	PB14	USART3_RTS	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PD8	USART3_TX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	



IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD9	USART3_RX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
	PD11	USART3_CTS	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
USART6	PC6	USART6_TX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
	PC7	USART6_RX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	<b>Very High</b> *	

## 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
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	15	0
System tick timer	true	15	0
PVD interrupt through EXTI line 16		unused	
Flash global interrupt		unused	
RCC global interrupt		unused	
CAN1 TX interrupts		unused	
CAN1 RX0 interrupts		unused	
CAN1 RX1 interrupt		unused	
CAN1 SCE interrupt		unused	
I2C1 event interrupt		unused	
I2C1 error interrupt		unused	
SPI2 global interrupt		unused	
USART2 global interrupt		unused	
USART3 global interrupt		unused	
SPI3 global interrupt		unused	
Ethernet global interrupt		unused	
Ethernet wake-up interrupt through EXTI line 19		unused	
CAN2 TX interrupts		unused	
CAN2 RX0 interrupts		unused	
CAN2 RX1 interrupt		unused	
CAN2 SCE interrupt		unused	
USB On The Go FS global interrupt		unused	
USART6 global interrupt		unused	
I2C3 event interrupt		unused	
I2C3 error interrupt		unused	
FPU global interrupt		unused	

\* User modified value

## 7. Power Consumption Calculator report

### 7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407VGTx
Datasheet	022152_Rev8

### 7.2. Parameter Selection

Temperature	25
Vdd	3.3

### 7.3. Sequence

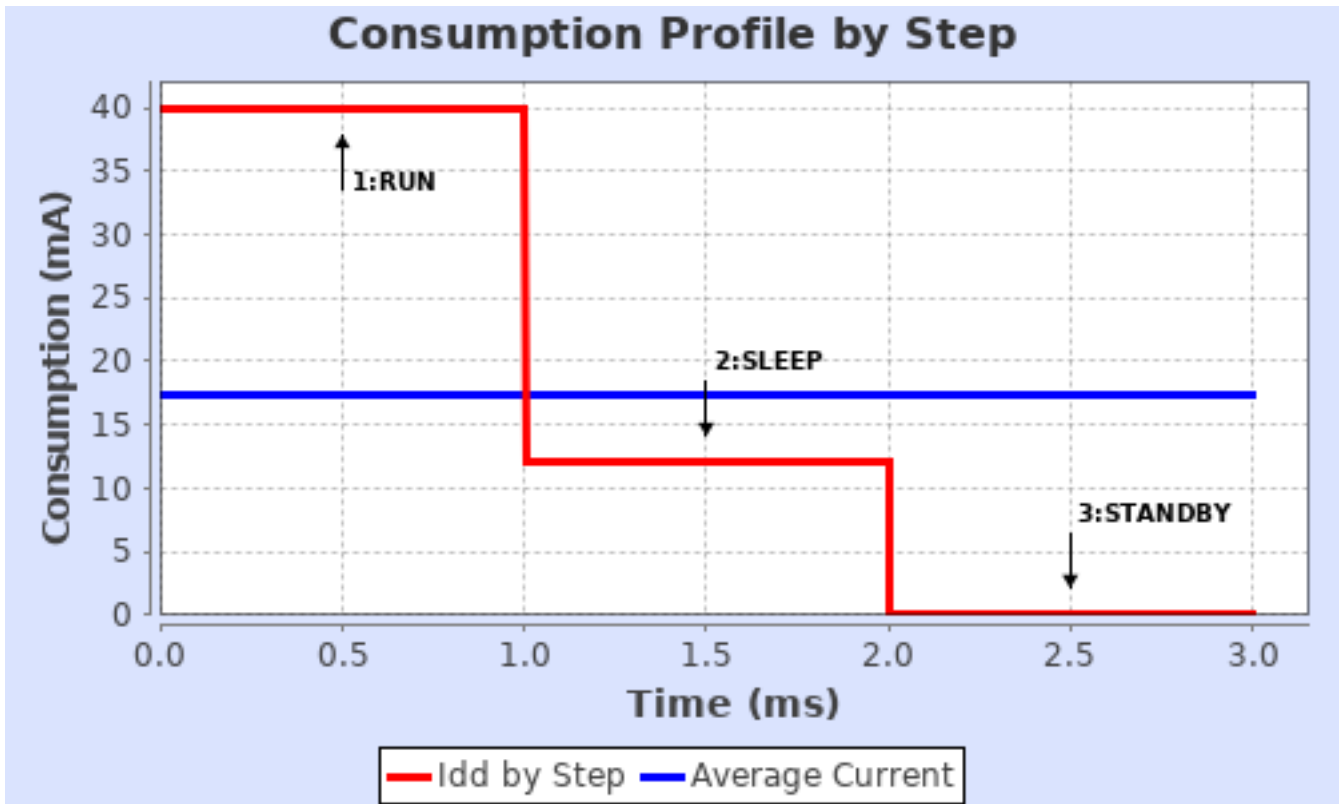
<b>Step</b>	Step1	Step2	Step3
<b>Mode</b>	RUN	SLEEP	STANDBY
<b>Vdd</b>	3.3	3.3	3.3
<b>Voltage Source</b>	Battery	Battery	Battery
<b>Range</b>	Scale1-High	Scale1-High	No Scale
<b>Fetch Type</b>	RAM/FLASH/ART	RAM/FLASH	n/a
<b>Clock Configuration</b>	HSE PLL	HSE PLL	LSE RTC
<b>Clock Source Frequency</b>	4 MHz	4 MHz	32.768 kHz
<b>CPU Frequency</b>	168 MHz	168 MHz	0 Hz
<b>Peripherals</b>			
<b>Additional Cons.</b>	0 mA	0 mA	0 mA
<b>Average Current</b>	40 mA	12 mA	3.3 $\mu$ A
<b>Duration</b>	1 ms	1 ms	1 ms
<b>DMIPS</b>	210.0	210.0	0.0
<b>Ta Max</b>	99.32	103.3	105
<b>Category</b>	In DS Table	In DS Table	In DS Table

### 7.4. RESULTS

Sequence Time	3 ms	Average Current	17.33 mA

Battery Life	0	Average DMIPS	210.0 DMIPS
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7.5. Chart



## **8. Software Pack Report**