

1. Description

1.1. Project

Project Name	F407VET6_25MHz
Board Name	custom
Generated with:	STM32CubeMX 6.1.1
Date	02/15/2021

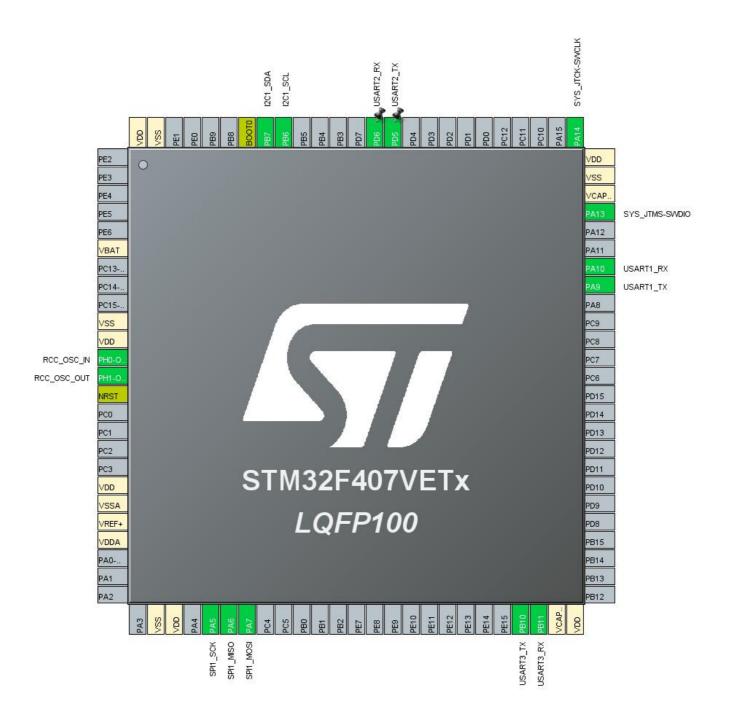
1.2. MCU

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

1.3. Core(s) information

Core(s)	Arm Cortex-M4	

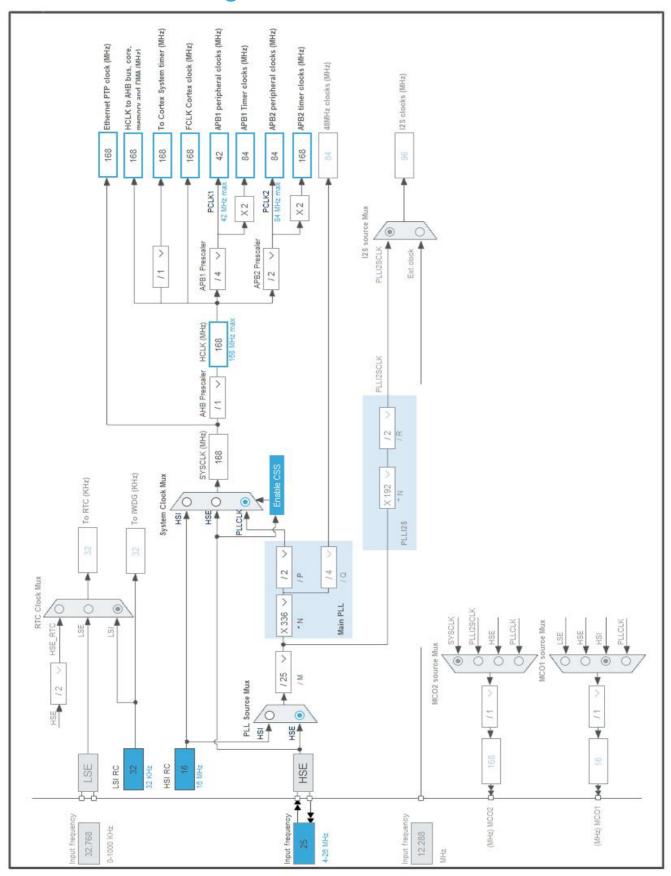
2. Pinout Configuration



3. Pins Configuration

Pin Number	Pin Name	Pin Type	Alternate	Label
LQFP100	(function after		Function(s)	
	reset)			
6	VBAT	Power		
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		
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
27	VSS	Power		
28	VDD	Power		
30	PA5	I/O	SPI1_SCK	
31	PA6	I/O	SPI1_MISO	
32	PA7	I/O	SPI1_MOSI	
47	PB10	I/O	USART3_TX	
48	PB11	I/O	USART3_RX	
49	VCAP_1	Power		
50	VDD	Power		
68	PA9	I/O	USART1_TX	
69	PA10	I/O	USART1_RX	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
86	PD5	I/O	USART2_TX	
87	PD6	I/O	USART2_RX	
92	PB6	I/O	I2C1_SCL	
93	PB7	I/O	I2C1_SDA	
94	BOOT0	Boot		
99	VSS	Power		
100	VDD	Power		

4. Clock Tree Configuration



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5. Software Project

5.1. Project Settings

Name	Value	
Project Name	F407VET6_25MHz	
Project Folder	D:\shared documents\code projects\learngit\FeiTeSCS-ROBOT-ARM	
Toolchain / IDE	MDK-ARM V5.27	
Firmware Package Name and Version	STM32Cube FW_F4 V1.25.2	
Application Structure	Advanced	
Generate Under Root	No	
Do not generate the main()	No	
Minimum Heap Size	0xF00	
Minimum Stack Size	0xF00	

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy all used libraries into the project folder
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
1 /	
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_I2C1_Init	I2C1
4	MX_SPI1_Init	SPI1
5	MX_USART1_UART_Init	USART1
6	MX_USART2_UART_Init	USART2
7	MX_USART3_UART_Init	USART3

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
мси	STM32F407VETx
Datasheet	DS8626_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

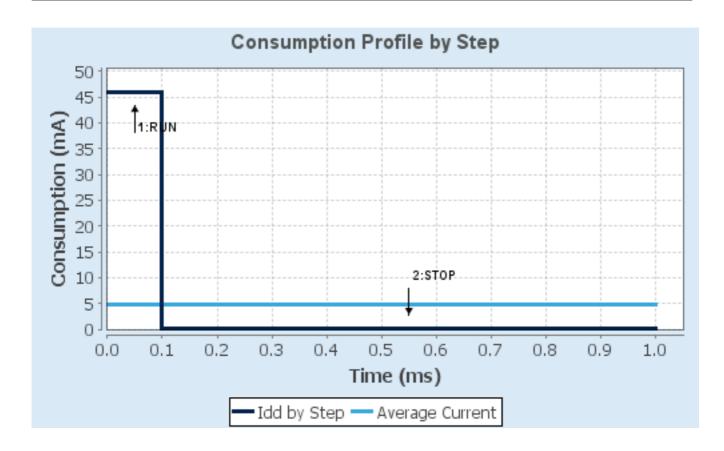
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	168 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator LP Flash-PwrDwn
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	46 mA	280 μA
Duration	0.1 ms	0.9 ms
DMIPS	210.0	0.0
Ta Max	98.47	104.96
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	4.85 mA
Battery Life	29 days, 4 hours	Average DMIPS	210.0 DMIPS

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. I2C1 I2C: I2C

7.1.1. 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

7.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.2.1. 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 Regulator Voltage Scale Power Regulator Voltage Scale 1

7.3. SPI1

Mode: Full-Duplex Master 7.3.1. 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

7.4. SYS

Debug: Serial Wire

Timebase Source: SysTick

7.5. USART1

Mode: Asynchronous

7.5.1. Parameter Settings:

Basic Parameters:

Baud Rate 1000000 *

Word Length 8 Bits (including Parity)

Parity None Stop Bits 1

Advanced Parameters:

Data Direction Receive and Transmit

Over Sampling 16 Samples

7.6. USART2

Mode: Asynchronous

7.6.1. 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

7.7. USART3

Mode: Asynchronous

7.7.1. 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	
I2C1	PB6 I2C1_SCL		Alternate Function Open Drain	Pull-up	Very High		
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very High		
RCC	PH0- OSC_IN	RCC_OSC_IN	n/a	n/a	n/a		
	PH1- OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a		
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *		
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *		
	PA7	SPI1_MOSI	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		
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	PD5	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High		
	PD6	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High		
USART3	PB10	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High		
	PB11	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High		

8.2. DMA configuration

nothing configured in DMA service

F407VET6_25MHz Project
Configuration Report

8.3. NVIC configuration

8.3.1. NVIC

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	
USART1 global interrupt	true	0	0	
USART2 global interrupt	true	0	0	
USART3 global interrupt	true	0	0	
PVD interrupt through EXTI line 16	unused			
Flash global interrupt	unused			
RCC global interrupt	unused			
I2C1 event interrupt	unused			
I2C1 error interrupt	unused			
SPI1 global interrupt	unused			
FPU global interrupt	unused			

8.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler	
Non maskable interrupt	false	true	false	
Hard fault interrupt	false true		false	
Memory management fault	false	true	false	
Pre-fetch fault, memory access fault	false	true	false	
Undefined instruction or illegal state	false	true	false	
System service call via SWI instruction	false	true	false	
Debug monitor	false	true	false	
Pendable request for system service	false	true	false	
System tick timer	false	true	true	
USART1 global interrupt	false	true	true	
USART2 global interrupt	false	true	true	
USART3 global interrupt	false	true	true	

* User modified value				

9. System Views

9.1. Category view

9.1.1. Current

			Middleware			
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA			I2C1 ⊘			
GРЮ ⊘			SPI1 ♥			
NVIC ⊘			USART1 ♥			
RCC ♥			USART2 ⊘			
sys 🤣			USART3 ⊘			

10. Docs & Resources

Type Link

Datasheet http://www.st.com/resource/en/datasheet/DM00037051.pdf

Reference http://www.st.com/resource/en/reference_manual/DM00031020.pdf

manual

Programming http://www.st.com/resource/en/programming manual/DM00046982.pdf

manual

Errata sheet http://www.st.com/resource/en/errata_sheet/DM00037591.pdf

Application note http://www.st.com/resource/en/application_note/CD00167594.pdf

Application note http://www.st.com/resource/en/application_note/CD00211314.pdf

Application note http://www.st.com/resource/en/application_note/CD00249778.pdf

Application note http://www.st.com/resource/en/application_note/CD00259245.pdf

Application note http://www.st.com/resource/en/application_note/CD00264321.pdf

Application note http://www.st.com/resource/en/application_note/CD00264342.pdf

Application note http://www.st.com/resource/en/application_note/CD00264379.pdf

Application note http://www.st.com/resource/en/application_note/DM00024853.pdf

Application note http://www.st.com/resource/en/application_note/DM00025071.pdf

Application note http://www.st.com/resource/en/application_note/DM00040802.pdf

Application note http://www.st.com/resource/en/application_note/DM00040808.pdf

Application note http://www.st.com/resource/en/application_note/DM00042534.pdf

Application note http://www.st.com/resource/en/application_note/DM00046011.pdf

Application note http://www.st.com/resource/en/application_note/DM00050879.pdf

Application note http://www.st.com/resource/en/application_note/DM00072315.pdf

Application note http://www.st.com/resource/en/application_note/DM00073742.pdf

Application note http://www.st.com/resource/en/application_note/DM00073853.pdf

Application note http://www.st.com/resource/en/application_note/DM00080497.pdf

Application note http://www.st.com/resource/en/application_note/DM00081379.pdf

Application note http://www.st.com/resource/en/application_note/DM00115714.pdf

Application note http://www.st.com/resource/en/application_note/DM00123028.pdf

Application note http://www.st.com/resource/en/application_note/DM00129215.pdf http://www.st.com/resource/en/application_note/DM00154959.pdf Application note Application note http://www.st.com/resource/en/application_note/DM00160482.pdf Application note http://www.st.com/resource/en/application_note/DM00213525.pdf http://www.st.com/resource/en/application_note/DM00220769.pdf Application note http://www.st.com/resource/en/application_note/DM00257177.pdf Application note http://www.st.com/resource/en/application note/DM00272912.pdf Application note Application note http://www.st.com/resource/en/application note/DM00226326.pdf Application note http://www.st.com/resource/en/application note/DM00236305.pdf Application note http://www.st.com/resource/en/application note/DM00263732.pdf Application note http://www.st.com/resource/en/application_note/DM00281138.pdf Application note http://www.st.com/resource/en/application_note/DM00296349.pdf Application note http://www.st.com/resource/en/application_note/DM00327191.pdf Application note http://www.st.com/resource/en/application_note/DM00354244.pdf http://www.st.com/resource/en/application_note/DM00373474.pdf Application note http://www.st.com/resource/en/application_note/DM00315319.pdf Application note Application note http://www.st.com/resource/en/application_note/DM00380469.pdf Application note http://www.st.com/resource/en/application note/DM00395696.pdf Application note http://www.st.com/resource/en/application_note/DM00431633.pdf Application note http://www.st.com/resource/en/application note/DM00493651.pdf Application note http://www.st.com/resource/en/application note/DM00536349.pdf Application note http://www.st.com/resource/en/application note/DM00725181.pdf