
STM32
CubeMX

1. Description

1.1. Project

Project Name	f446test
Board Name	custom
Generated with:	STM32CubeMX 6.0.1
Date	10/01/2020

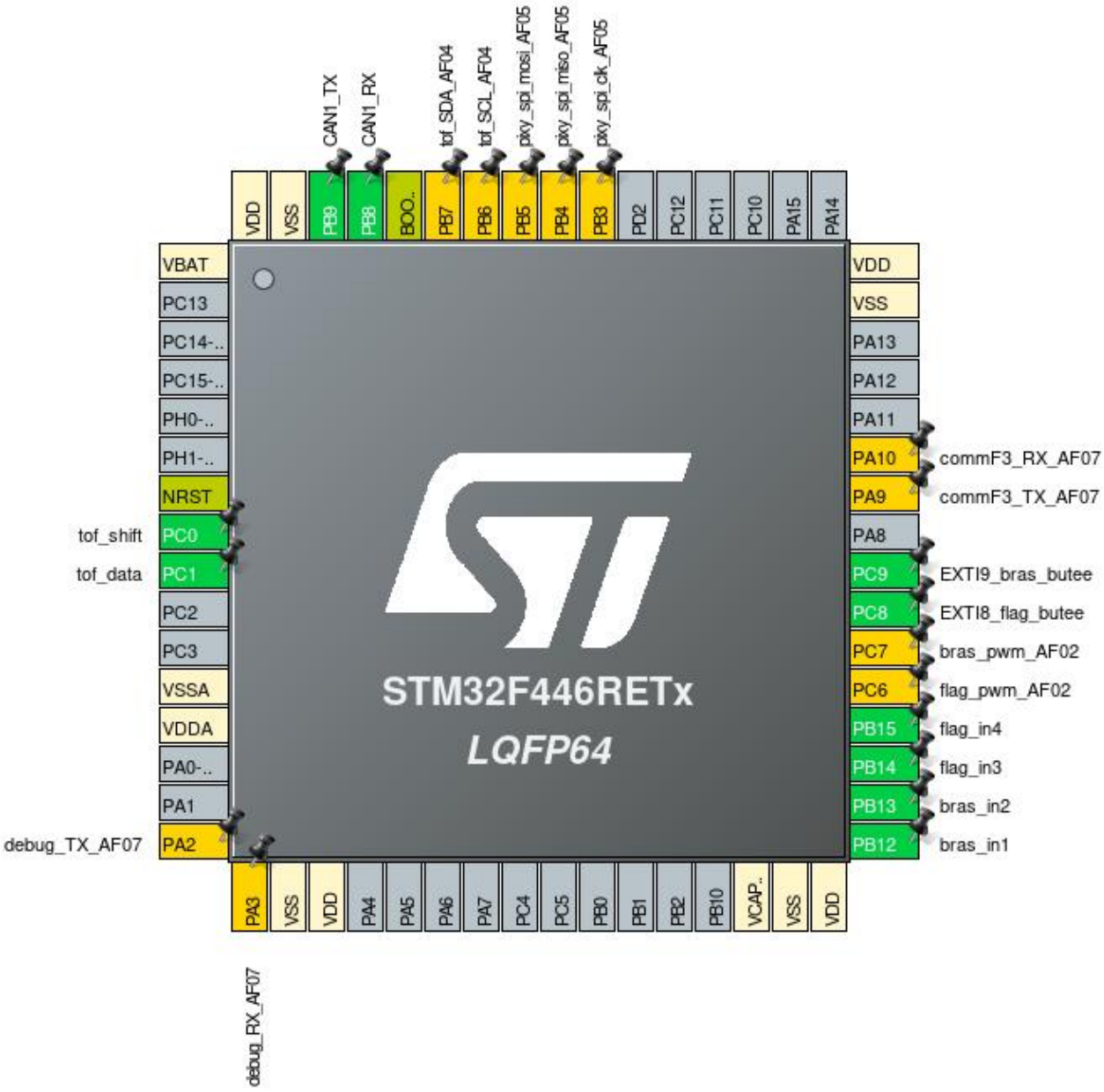
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F446
MCU name	STM32F446RETx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration

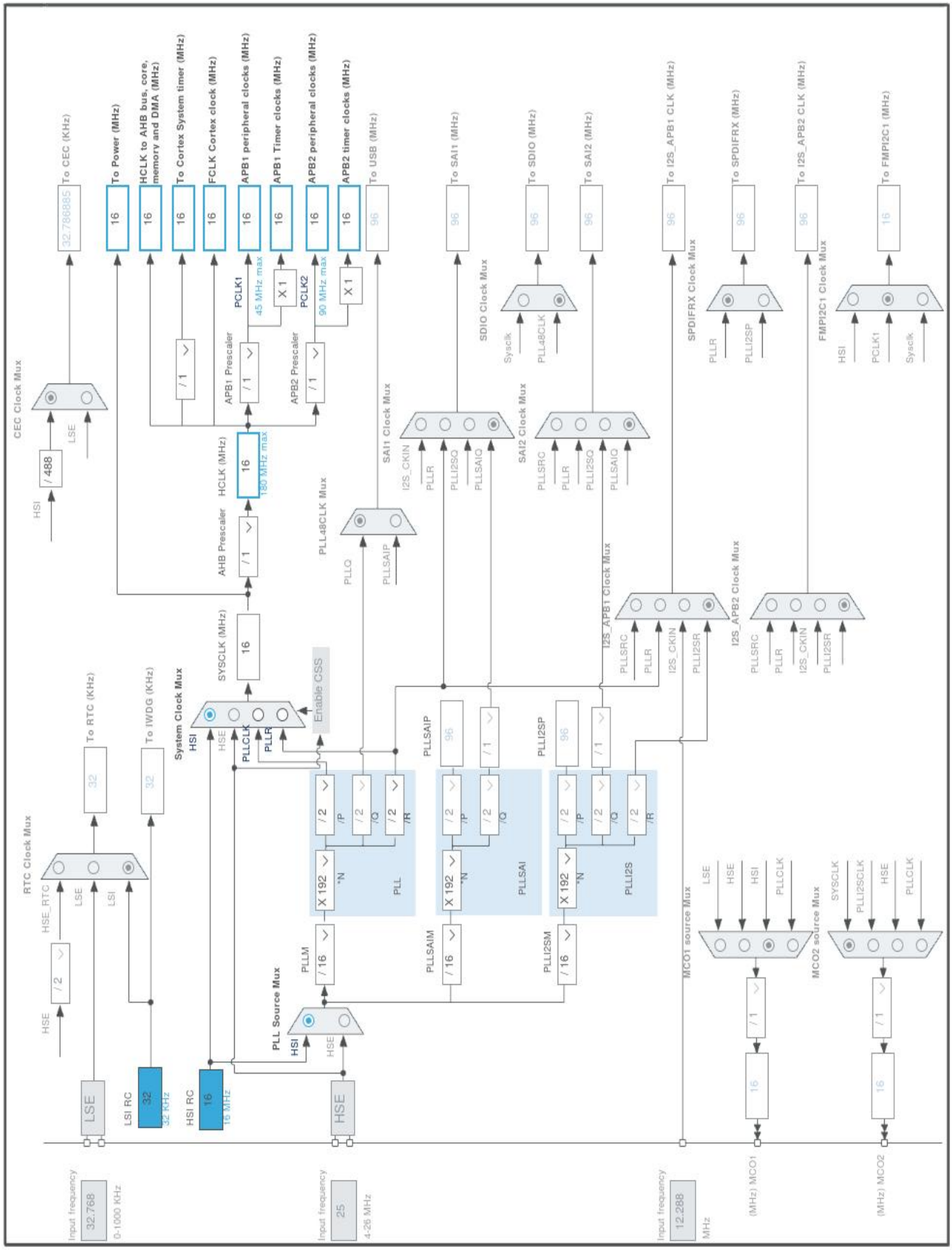


3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	tof_shift
9	PC1 *	I/O	GPIO_Output	tof_data
12	VSSA	Power		
13	VDDA	Power		
16	PA2 **	I/O	USART2_TX	debug_TX_AF07
17	PA3 **	I/O	USART2_RX	debug_RX_AF07
18	VSS	Power		
19	VDD	Power		
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	bras_in1
34	PB13 *	I/O	GPIO_Output	bras_in2
35	PB14 *	I/O	GPIO_Output	flag_in3
36	PB15 *	I/O	GPIO_Output	flag_in4
37	PC6 **	I/O	TIM3_CH1	flag_pwm_AF02
38	PC7 **	I/O	TIM3_CH2	bras_pwm_AF02
39	PC8	I/O	GPIO_EXTI8	EXTI8_flag_butee
40	PC9	I/O	GPIO_EXTI9	EXTI9_bras_butee
42	PA9 **	I/O	USART1_TX	commF3_TX_AF07
43	PA10 **	I/O	USART1_RX	commF3_RX_AF07
47	VSS	Power		
48	VDD	Power		
55	PB3 **	I/O	SPI1_SCK	pixy_spi_clk_AF05
56	PB4 **	I/O	SPI1_MISO	pixy_spi_miso_AF05
57	PB5 **	I/O	SPI1_MOSI	pixy_spi_mosi_AF05
58	PB6 **	I/O	I2C1_SCL	tof_SCL_AF04
59	PB7 **	I/O	I2C1_SDA	tof_SDA_AF04
60	BOOT0	Boot		
61	PB8	I/O	CAN1_RX	
62	PB9	I/O	CAN1_TX	
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	f446test
Project Folder	/home/akko/robotronik/cdfr2020CarteCerveauProg/pinMapf446
Toolchain / IDE	EWARM V8.32
Firmware Package Name and Version	STM32Cube FW_F4 V1.25.0
Application Structure	Basic
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

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	No
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
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	IP Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_CAN1_Init	CAN1

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F446
MCU	STM32F446RETx
Datasheet	DS10693_Rev6

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

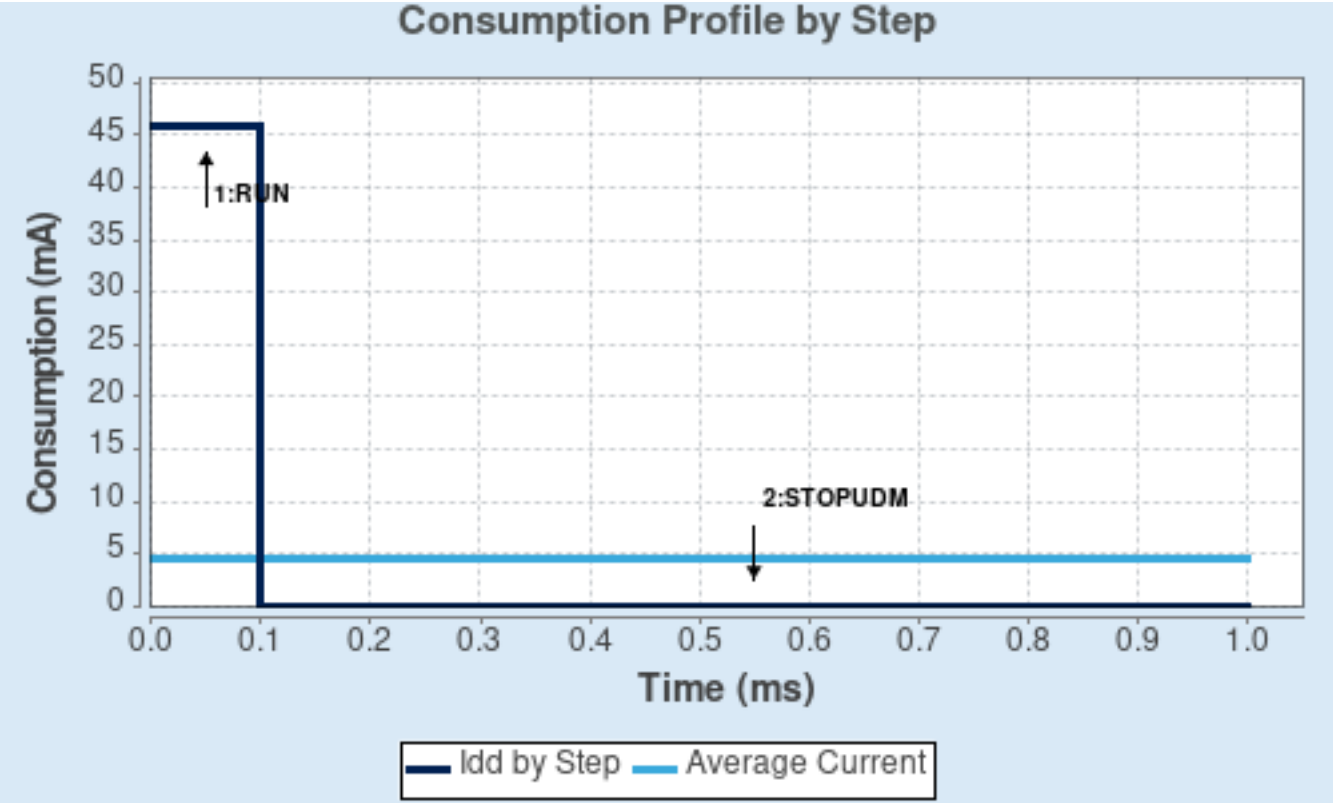
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP_UDM (Under Drive)
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	RAM/FLASH/REGON/ART/PREFETCH	n/a
CPU Frequency	180 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	55 µA
Duration	0.1 ms	0.9 ms
DMIPS	225.0	0.0
Ta Max	98.02	104.99
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	4.65 mA
Battery Life	1 month	Average DMIPS	225.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
50
45
40
35
30
25
20
15
10
5
0
1:RUN
2:STOPUDM
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

7. IPs and Middleware Configuration

7.1. CAN1

mode: Mode

7.1.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	16
Time Quantum	**1000.0 ***
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
Automatic Retransmission	Disable
Receive Fifo Locked Mode	Disable
Transmit Fifo Priority	Disable

Advanced Parameters:

Operating Mode	Normal

7.2. GPIO

7.3. RCC

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	**Power Regulator Voltage Scale 2 ***
Power Over Drive	Disabled

7.4. SYS

Timebase Source: SysTick

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
CAN1	PB8	CAN1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB9	CAN1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
Single Mapped Signals	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	debug_TX_AF07
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	debug_RX_AF07
	PC6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	flag_pwm_AF02
	PC7	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	bras_pwm_AF02
	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	commF3_TX_AF07
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	commF3_RX_AF07
	PB3	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	pixy_spi_clk_AF05
	PB4	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	pixy_spi_miso_AF05
	PB5	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	pixy_spi_mosi_AF05
	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**Very High** *	tof_SCL_AF04
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	**Very High** *	tof_SDA_AF04
GPIO	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	tof_shift
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	tof_data
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	bras_in1
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	bras_in2
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	flag_in3
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	flag_in4
	PC8	GPIO_EXTI8	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	EXTI8_flag_butee
	PC9	GPIO_EXTI9	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	EXTI9_bras_butee

8.2. DMA configuration

nothing configured in DMA service

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
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
CAN1 TX interrupt	unused		
CAN1 RX0 interrupt	unused		
CAN1 RX1 interrupt	unused		
CAN1 SCE interrupt	unused		
EXTI line[9:5] interrupts	unused		
FPU global interrupt	unused		

8.3.2. NVIC Code generation

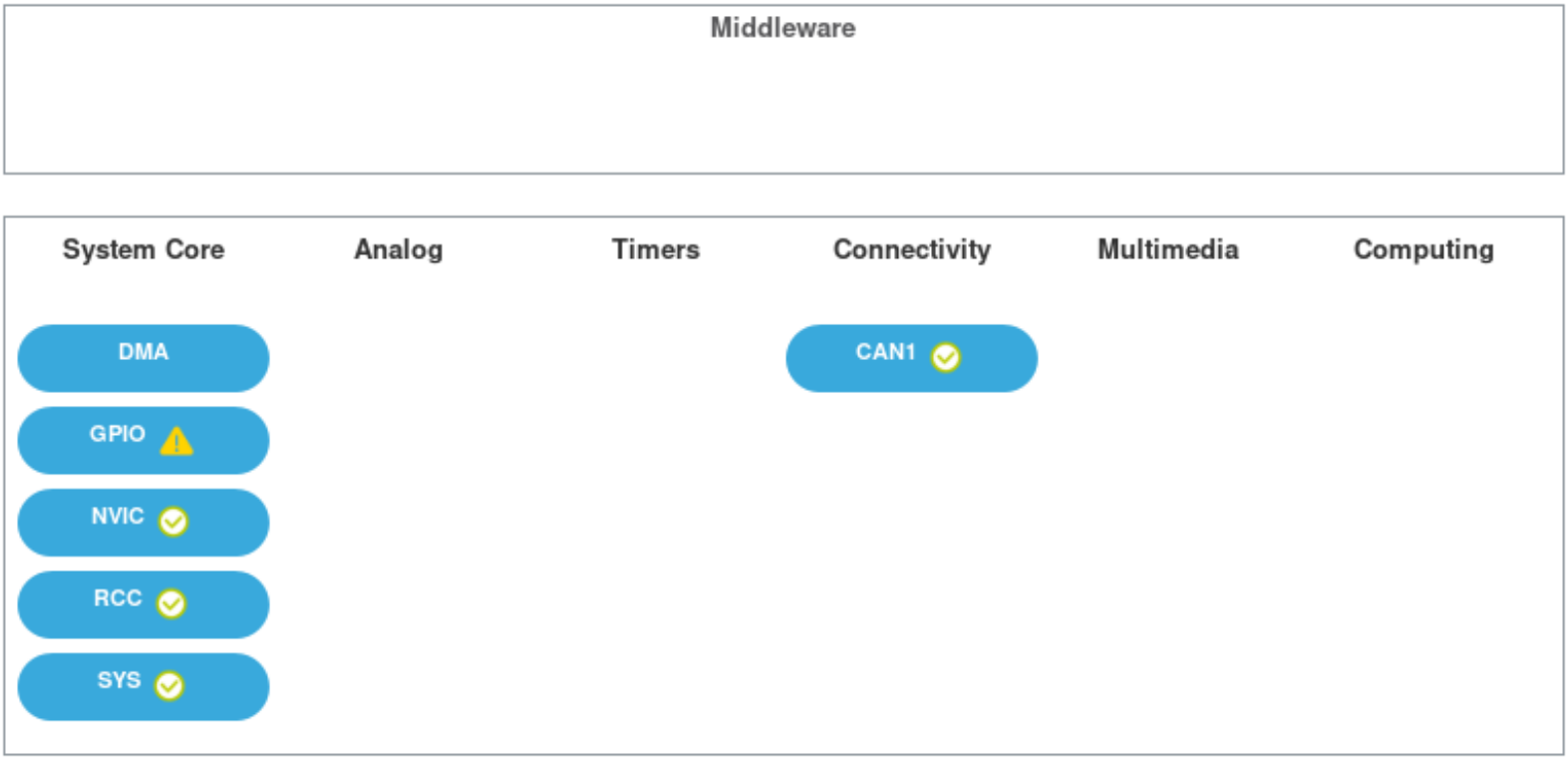
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	true	true	false
Hard fault interrupt	true	true	false
Memory management fault	true	true	false
Pre-fetch fault, memory access fault	true	true	false
Undefined instruction or illegal state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

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current



10. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00141306.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00135183.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00155929.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/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/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
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Application note	http://www.st.com/resource/en/application_note/DM00154959.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf

Application note	http://www.st.com/resource/en/application_note/DM00161778.pdf
Application note	http://www.st.com/resource/en/application_note/DM00213525.pdf
Application note	http://www.st.com/resource/en/application_note/DM00220769.pdf
Application note	http://www.st.com/resource/en/application_note/DM00227538.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	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/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
Application note	http://www.st.com/resource/en/application_note/DM00373474.pdf
Application note	http://www.st.com/resource/en/application_note/DM00315319.pdf
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