
STM32
CubeMX

1. Description

1.1. Project

Project Name	Dehydrator
Board Name	custom
Generated with:	STM32CubeMX 6.0.0
Date	10/01/2020

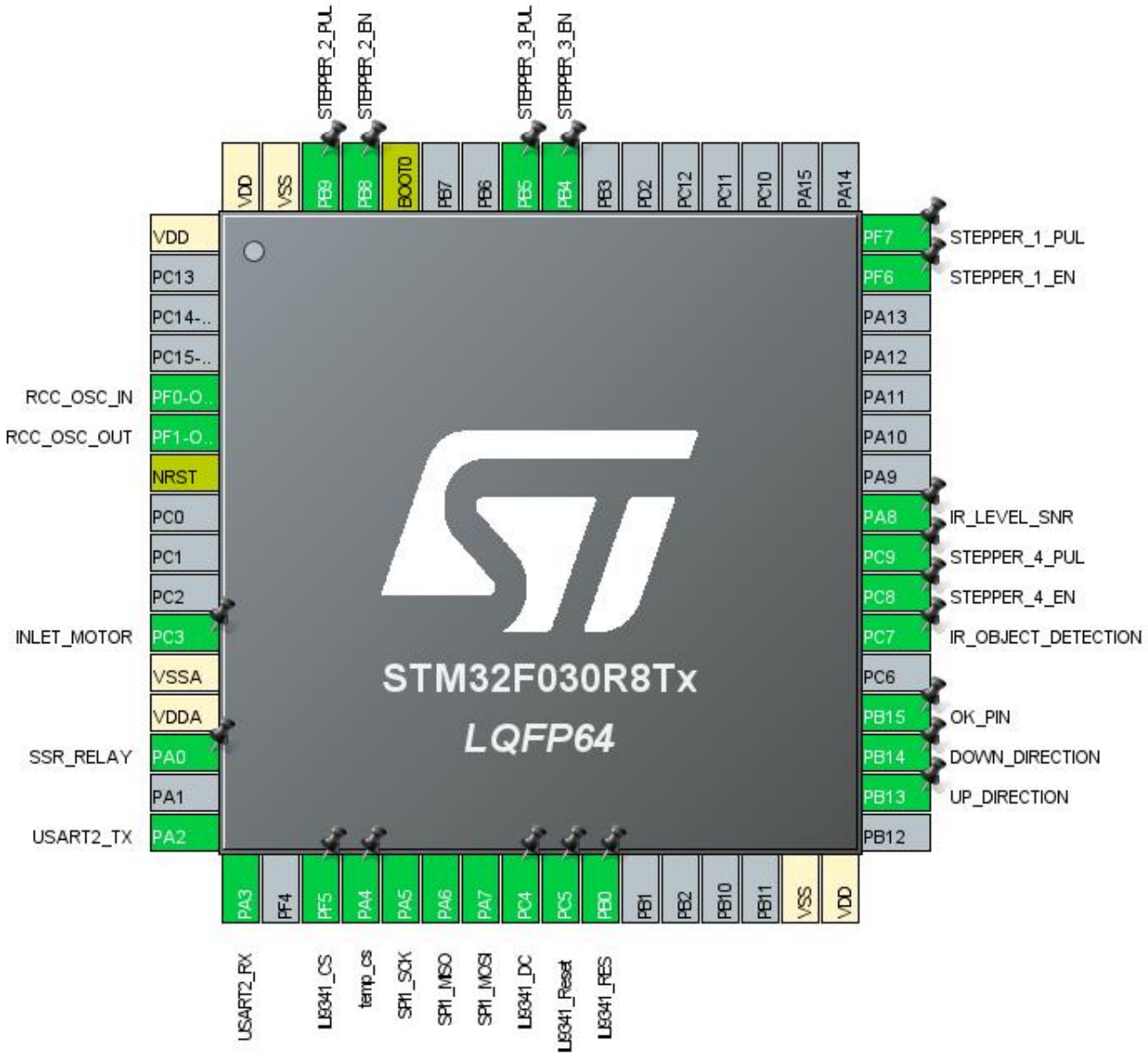
1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x0 Value Line
MCU name	STM32F030R8Tx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M0

2. Pinout Configuration

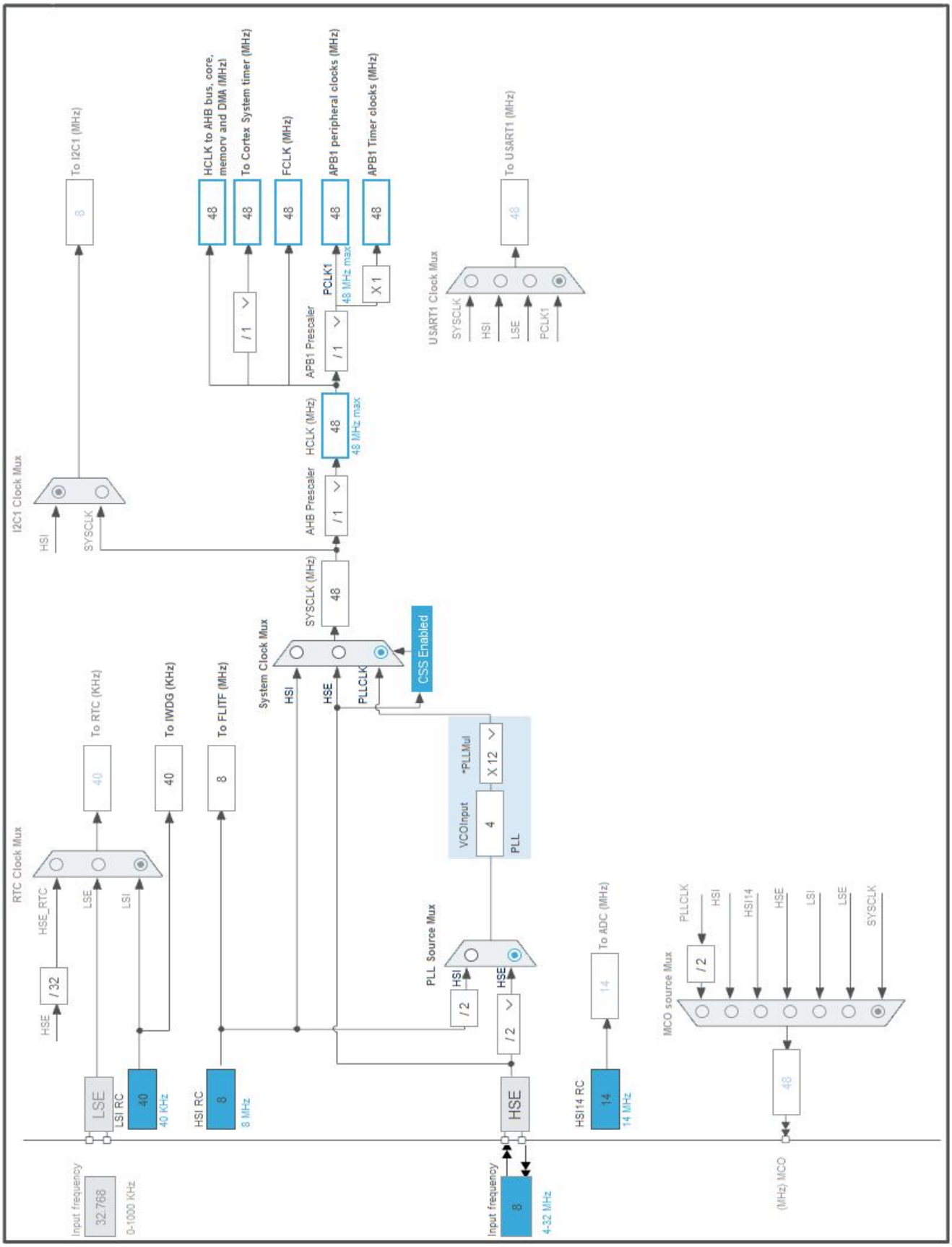


3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
11	PC3 *	I/O	GPIO_Output	INLET_MOTOR
12	VSSA	Power		
13	VDDA	Power		
14	PA0 *	I/O	GPIO_Output	SSR_RELAY
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
19	PF5 *	I/O	GPIO_Output	ILI9341_CS
20	PA4 *	I/O	GPIO_Output	temp_cs
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
24	PC4 *	I/O	GPIO_Output	ILI9341_DC
25	PC5 *	I/O	GPIO_Output	ILI9341_Reset
26	PB0 *	I/O	GPIO_Output	ILI9341_RES
31	VSS	Power		
32	VDD	Power		
34	PB13 *	I/O	GPIO_Input	UP_DIRECTION
35	PB14 *	I/O	GPIO_Input	DOWN_DIRECTION
36	PB15 *	I/O	GPIO_Input	OK_PIN
38	PC7 *	I/O	GPIO_Input	IR_OBJECT_DETECTION
39	PC8 *	I/O	GPIO_Output	STEPPER_4_EN
40	PC9 *	I/O	GPIO_Output	STEPPER_4_PUL
41	PA8 *	I/O	GPIO_Input	IR_LEVEL_SNR
47	PF6 *	I/O	GPIO_Output	STEPPER_1_EN
48	PF7 *	I/O	GPIO_Output	STEPPER_1_PUL
56	PB4 *	I/O	GPIO_Output	STEPPER_3_EN
57	PB5 *	I/O	GPIO_Output	STEPPER_3_PUL
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	STEPPER_2_EN
62	PB9 *	I/O	GPIO_Output	STEPPER_2_PUL
63	VSS	Power		
64	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	Dehydrator
Project Folder	C:\Users\CEPL\Desktop\dehydeated\Dehydrator
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.0
Application Structure	Advanced
Generate Under Root	Yes
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 only the necessary library files
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_SPI1_Init	SPI1
4	MX_TIM3_Init	TIM3
5	MX_USART2_UART_Init	USART2
6	MX_TIM1_Init	TIM1
7	MX_IWDG_Init	IWDG
8	MX_TIM15_Init	TIM15

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x0 Value Line
MCU	STM32F030R8Tx
Datasheet	DS9773_Rev2

6.2. Parameter Selection

Temperature	25
Vdd	3.6

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

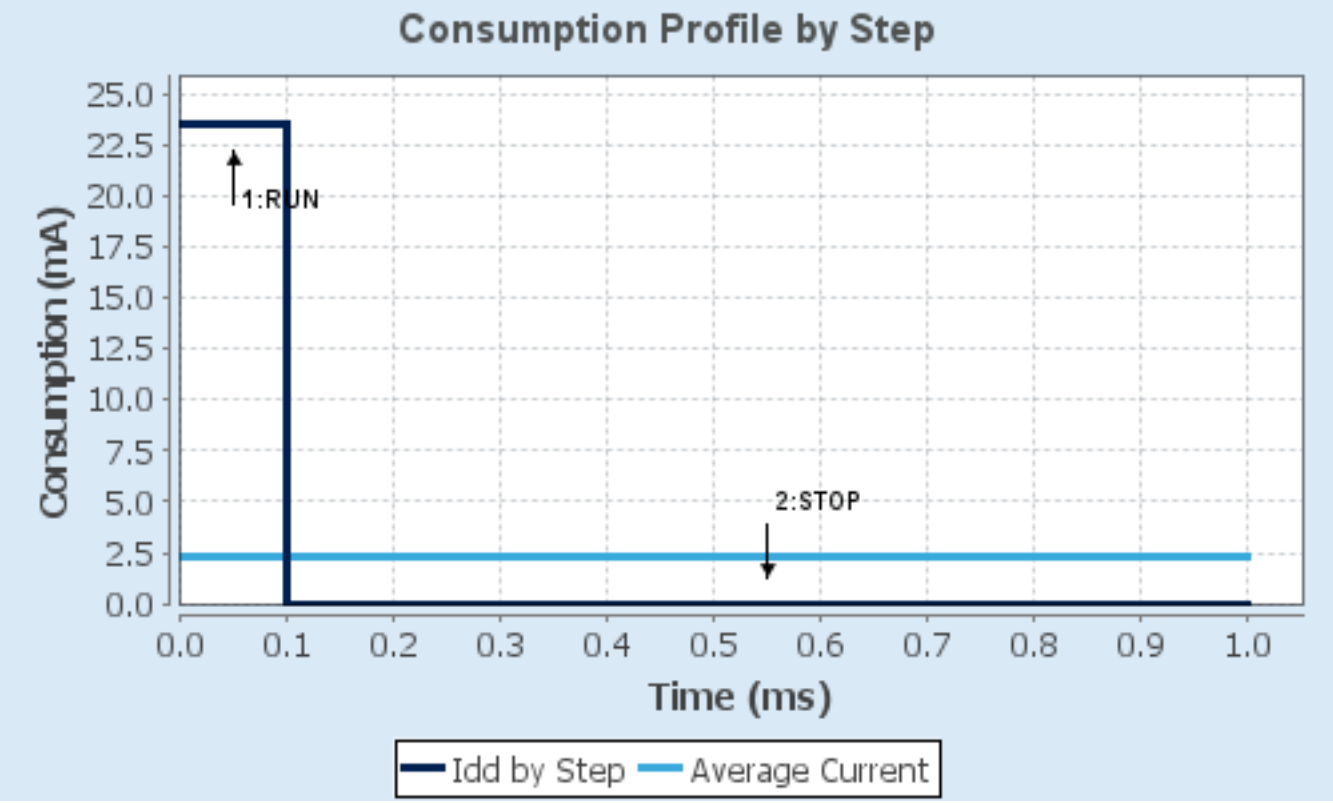
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.6	3.6
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	48 MHz	0 Hz
Clock Configuration	HSE PLL All IPs ON	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	23.46 mA	7.9 µA
Duration	0.1 ms	0.9 ms
DMIPS	0.0	0.0
Ta Max	101.28	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	2.35 mA
Battery Life	1 month, 29 days, 16 hours	Average DMIPS	0.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1:RUN
2:STOP
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. GPIO

7.2. IWDG

mode: Activated

7.2.1. Parameter Settings:

Watchdog Clocking:

IWDG counter clock prescaler	4
IWDG window value	4095
IWDG down-counter reload value	4095

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

7.4. SPI1

Mode: Full-Duplex 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)	**4 ***
Baud Rate	**12.0 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

Timebase Source: SysTick

7.6. TIM1

Clock Source : Internal Clock

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**65535 ***
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

7.7. TIM3

Clock Source : Internal Clock

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**479 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**999 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

7.8. TIM15

mode: Clock Source

7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**999 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**959 ***
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

7.9. USART2

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
Single Sample	Disable

Advanced Features:

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

*** 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	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-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	**High ***	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
GPIO	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	INLET_MOTOR
	PA0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SSR_RELAY
	PF5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_CS
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	temp_cs
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_DC
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_Reset
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_RES
	PB13	GPIO_Input	Input mode	**Pull-up ***	n/a	UP_DIRECTION
	PB14	GPIO_Input	Input mode	**Pull-up ***	n/a	DOWN_DIRECTION
	PB15	GPIO_Input	Input mode	**Pull-up ***	n/a	OK_PIN
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	IR_OBJECT_DETECTION
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_4_EN
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_4_PUL
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	IR_LEVEL_SNR
	PF6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_1_EN
	PF7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_1_PUL
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_3_EN
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_3_PUL
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_2_EN
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEPPER_2_PUL

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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
TIM1 break, update, trigger and commutation interrupts	true	0	0
TIM3 global interrupt	true	0	0
TIM15 global interrupt	true	0	0
USART2 global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 capture compare interrupt	unused		
SPI1 global interrupt	unused		

8.3.2. NVIC Code generation

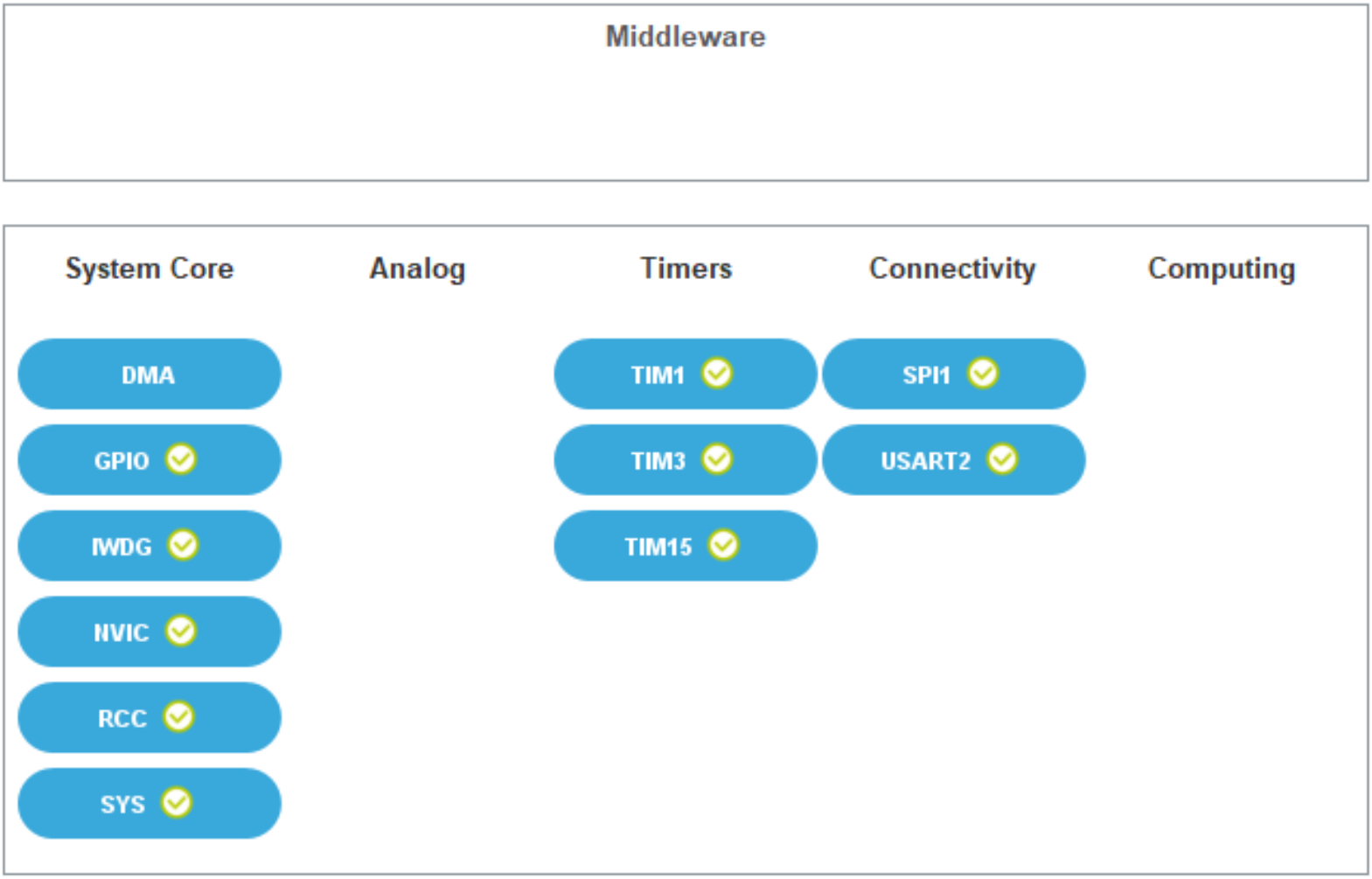
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	true	true	true
Hard fault interrupt	true	true	false
System service call via SWI instruction	true	true	false
Pendable request for system service	true	true	false
System tick timer	true	true	true
TIM1 break, update, trigger and commutation interrupts	true	true	true
TIM3 global interrupt	true	true	true
TIM15 global interrupt	true	true	true
USART2 global interrupt	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/DM00088500.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00091010.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00051352.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00091791.pdf
Application note	http://www.st.com/resource/en/application_note/CD00160362.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/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/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00052530.pdf
Application note	http://www.st.com/resource/en/application_note/DM00053084.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/DM00080497.pdf
Application note	http://www.st.com/resource/en/application_note/DM00085385.pdf
Application note	http://www.st.com/resource/en/application_note/DM00087593.pdf
Application note	http://www.st.com/resource/en/application_note/DM00089834.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00145318.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf

Application note	http://www.st.com/resource/en/application_note/DM00210690.pdf
Application note	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/DM00226326.pdf
Application note	http://www.st.com/resource/en/application_note/DM00236305.pdf
Application note	http://www.st.com/resource/en/application_note/DM00188145.pdf
Application note	http://www.st.com/resource/en/application_note/DM00327191.pdf
Application note	http://www.st.com/resource/en/application_note/DM00355687.pdf
Application note	http://www.st.com/resource/en/application_note/DM00354244.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/DM00445657.pdf
Application note	http://www.st.com/resource/en/application_note/DM00493651.pdf
Application note	http://www.st.com/resource/en/application_note/DM00483659.pdf
Application note	http://www.st.com/resource/en/application_note/DM00536349.pdf