
STM32
CubeMX

1. Description

1.1. Project

Project Name	STSpin3201Hall-Test1
Board Name	custom
Generated with:	STM32CubeMX 6.5.0
Date	06/06/2022

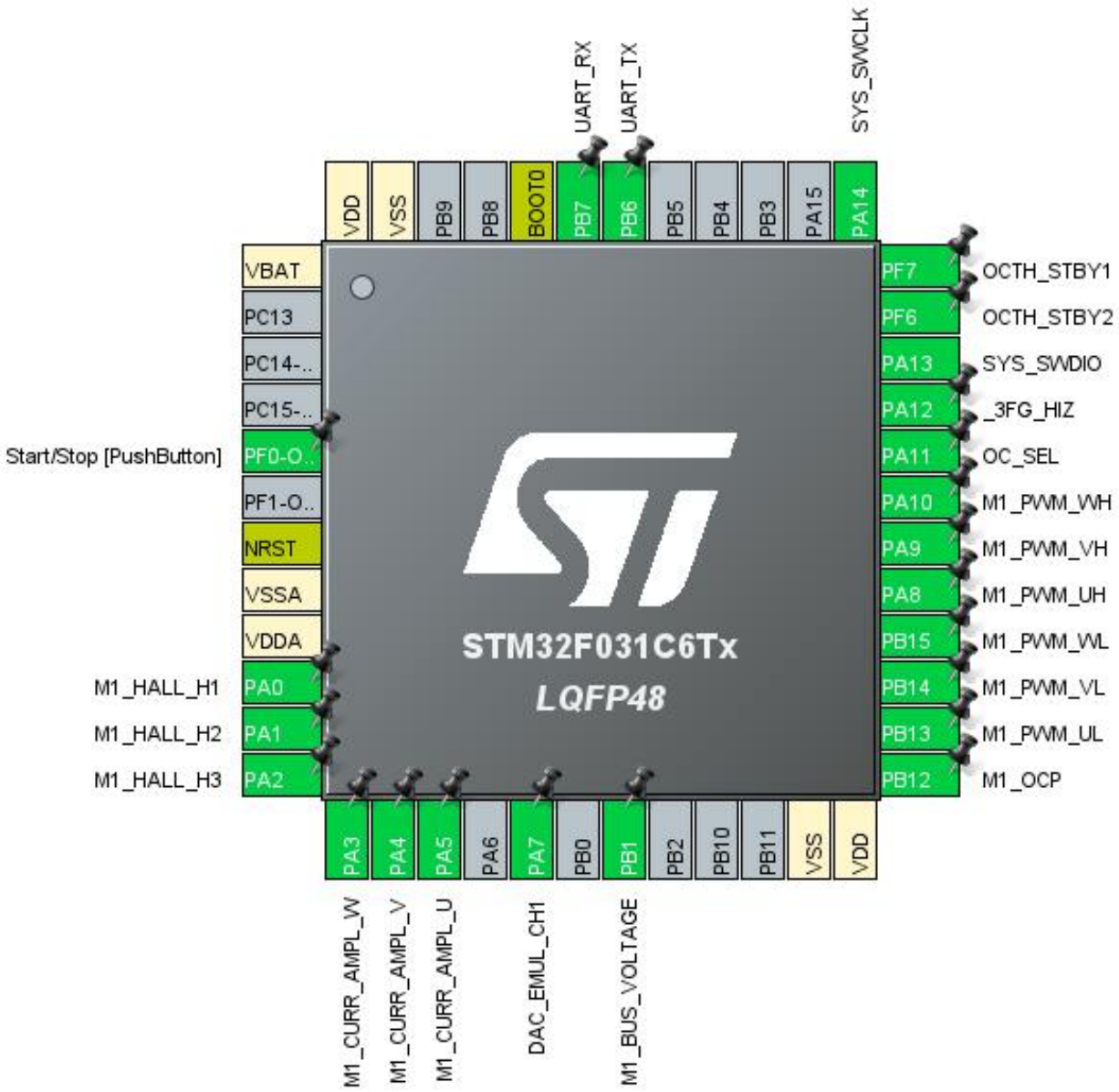
1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x1
MCU name	STM32F031C6Tx
MCU Package	LQFP48
MCU Pin number	48

1.3. Core(s) information

Core(s)	Arm Cortex-M0

2. Pinout Configuration

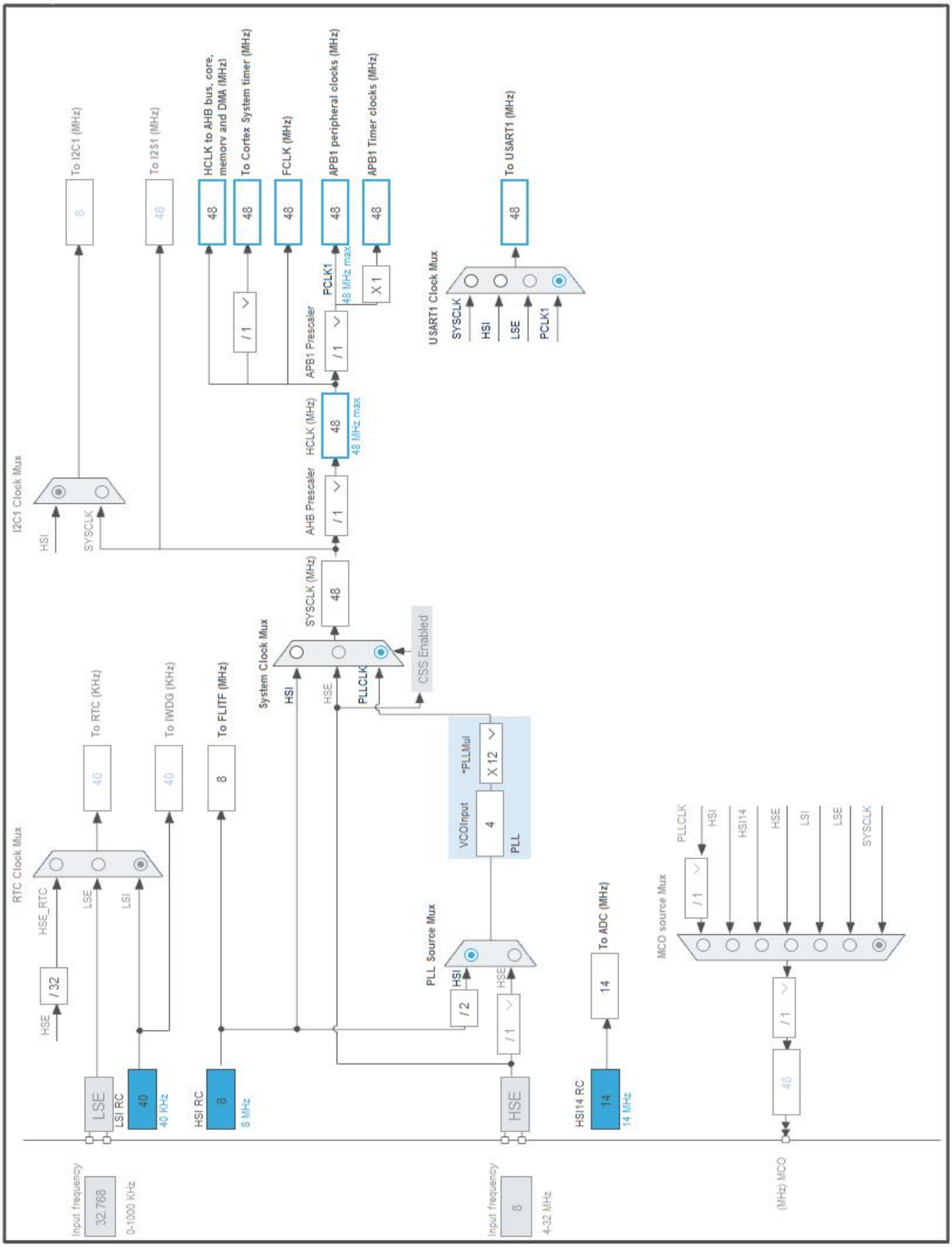


3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
5	PF0-OSC_IN	I/O	GPIO_EXTI0	Start/Stop [PushButton]
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0	I/O	TIM2_CH1	M1_HALL_H1
11	PA1	I/O	TIM2_CH2	M1_HALL_H2
12	PA2	I/O	TIM2_CH3	M1_HALL_H3
13	PA3	I/O	ADC_IN3	M1_CURR_AMPL_W
14	PA4	I/O	ADC_IN4	M1_CURR_AMPL_V
15	PA5	I/O	ADC_IN5	M1_CURR_AMPL_U
17	PA7	I/O	TIM14_CH1	DAC_EMUL_CH1
19	PB1	I/O	ADC_IN9	M1_BUS_VOLTAGE
23	VSS	Power		
24	VDD	Power		
25	PB12	I/O	TIM1_BKIN	M1_OCP
26	PB13	I/O	TIM1_CH1N	M1_PWM_UL
27	PB14	I/O	TIM1_CH2N	M1_PWM_VL
28	PB15	I/O	TIM1_CH3N	M1_PWM_WL
29	PA8	I/O	TIM1_CH1	M1_PWM_UH
30	PA9	I/O	TIM1_CH2	M1_PWM_VH
31	PA10	I/O	TIM1_CH3	M1_PWM_WH
32	PA11 *	I/O	GPIO_Output	OC_SEL
33	PA12 *	I/O	GPIO_Output	_3FG_HIZ
34	PA13	I/O	SYS_SWDIO	
35	PF6 *	I/O	GPIO_Output	OCTH_STBY2
36	PF7 *	I/O	GPIO_Output	OCTH_STBY1
37	PA14	I/O	SYS_SWCLK	
42	PB6	I/O	USART1_TX	UART_TX
43	PB7	I/O	USART1_RX	UART_RX
44	BOOT0	Boot		
47	VSS	Power		
48	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	STSpin3201Hall-Test1
Project Folder	E:\Consulting\VEOL\ArthroscopicShaver\Hardware\BLDC-
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.3
Application Structure	Basic
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x80
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	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_DMA_Init	DMA
4	MX_ADC_Init	ADC
5	MX_TIM1_Init	TIM1
6	MX_TIM2_Init	TIM2
7	MX_TIM14_Init	TIM14
8	MX_USART1_UART_Init	USART1
9	MX_MotorControl_Init	MotorControl

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x1
MCU	STM32F031C6Tx
Datasheet	DS10111_Rev6

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

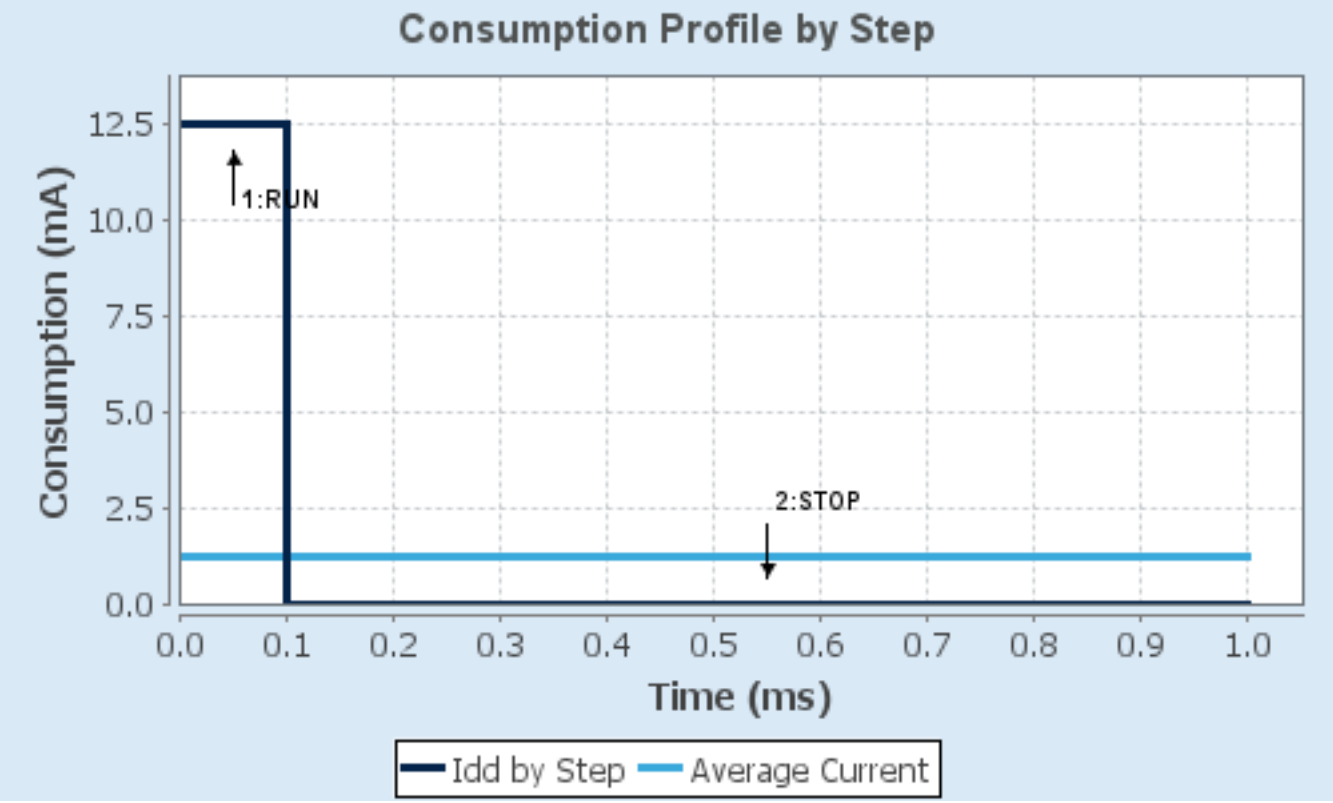
6.4. Sequence

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	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	12.45 mA	6.6 µA
Duration	0.1 ms	0.9 ms
DMIPS	0.0	0.0
Ta Max	102.53	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	1.25 mA
Battery Life	3 months, 21 days, 15 hours	Average DMIPS	0.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
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. Peripherals and Middlewares Configuration

7.1. ADC

mode: IN3

mode: IN4

mode: IN5

mode: IN9

7.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode
Resolution	ADC 12-bit resolution
Data Alignment	**Left alignment ***
Scan Conversion Mode	Forward
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Power Auto Power Off	Disabled

ADC_Regular_ConversionMode:

Sampling Time	**7.5 Cycles ***
External Trigger Conversion Source	**Timer 1 Trigger Out event ***
External Trigger Conversion Edge	Trigger detection on the rising edge

WatchDog:

Enable Analog WatchDog Mode	false

7.2. RCC

7.2.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

HSI Calibration Value	16
HSI14 Calibration Value	16

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

7.3. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

7.4. TIM1

Channel1: PWM Generation CH1 CH1N

Channel2: PWM Generation CH2 CH2N

Channel3: PWM Generation CH3 CH3N

Channel4: PWM Generation No Output

mode: Activate-Break-Input

7.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**((TIM_CLOCK_DIVIDER) - 1) ***
Counter Mode	**Center Aligned mode1 ***
Counter Period (AutoReload Register - 16 bits value)	**((PWM_PERIOD_CYCLES) / 2) ***
Internal Clock Division (CKD)	**Division by 2 ***
Repetition Counter (RCR - 8 bits value)	**(REP_COUNTER) ***
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	**Output Compare (OC4REF) ***

Break And Dead Time management - BRK Configuration:

BRK State	Enable
BRK Polarity	High

Break And Dead Time management - Output Configuration:

Automatic Output State	Disable
Off State Selection for Run Mode (OSSR)	**Enable ***
Off State Selection for Idle Mode (OSSI)	**Enable ***
Lock Configuration	**Lock Level 1 ***
Dead Time	**((DEAD_TIME_COUNTS) / 2) ***

PWM Generation Channel 1 and 1N:

Mode	PWM mode 1

Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CHN Polarity	High
CH Idle State	Reset
CHN Idle State	Reset

PWM Generation Channel 2 and 2N:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CHN Polarity	High
CH Idle State	Reset
CHN Idle State	Reset

PWM Generation Channel 3 and 3N:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CHN Polarity	High
CH Idle State	Reset
CHN Idle State	Reset

PWM Generation Channel 4:

Mode	**PWM mode 2 ***
Pulse (16 bits value)	**(((PWM_PERIOD_CYCLES) / 2) - (HTMIN)) ***
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

7.5. TIM2

Clock Source : Internal Clock

Combined Channels: XOR ON / Hall Sensor Mode

7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**M1_HALL_TIM_PERIOD ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Output Compare (OC2REF)

Hall Sensor:

Prescaler Division Ratio	No division
Polarity	Rising Edge
Input Filter	**M1_HALL_IC_FILTER ***
Commutation Delay	0

7.6. TIM14

mode: Activated

Channel1: PWM Generation CH1

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**0x800 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	**0x400 ***
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

7.7. USART1

Mode: Asynchronous

7.7.1. Parameter Settings:

Basic Parameters:

Baud Rate

	9600 *
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:

Auto Baudrate	Disable
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

7.8. MotorControl
mode: Enabled

7.8.1. Parameter Settings:

ST MC monitor usage	**true ***

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PA3	ADC_IN3	Analog mode	No pull-up and no pull-down	n/a	M1_CURR_AMPL_W
	PA4	ADC_IN4	Analog mode	No pull-up and no pull-down	n/a	M1_CURR_AMPL_V
	PA5	ADC_IN5	Analog mode	No pull-up and no pull-down	n/a	M1_CURR_AMPL_U
	PB1	ADC_IN9	Analog mode	No pull-up and no pull-down	n/a	M1_BUS_VOLTAGE
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
TIM1	PB12	TIM1_BKIN	Alternate Function Push Pull	**Pull-down ***	Low	M1_OCP
	PB13	TIM1_CH1N	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_UL
	PB14	TIM1_CH2N	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_VL
	PB15	TIM1_CH3N	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_WL
	PA8	TIM1_CH1	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_UH
	PA9	TIM1_CH2	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_VH
	PA10	TIM1_CH3	Alternate Function Push Pull	**Pull-down ***	**High ***	M1_PWM_WH
TIM2	PA0	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	M1_HALL_H1
	PA1	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	M1_HALL_H2
	PA2	TIM2_CH3	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	M1_HALL_H3
TIM14	PA7	TIM14_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	DAC_EMUL_CH1
USART1	PB6	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	UART_TX
	PB7	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	UART_RX
GPIO	PF0-OSC_IN	GPIO_EXTI0	**External Interrupt Mode with Falling edge trigger detection**	**Pull-up ***	n/a	Start/Stop [PushButton]
	PA11	GPIO_Output	Output Push Pull	**Pull-down ***	Low	OC_SEL
	PA12	GPIO_Output	Output Push Pull	**Pull-down ***	Low	_3FG_HIZ
	PF6	GPIO_Output	Output Push Pull	**Pull-down ***	Low	OCTH_STBY2
	PF7	GPIO_Output	Output Push Pull	**Pull-down ***	Low	OCTH_STBY1

8.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	**High ***

ADC: DMA1_Channel1 DMA request Settings:

Mode:	**Circular ***
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Half Word
Memory Data Width:	Half Word

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	2	0
EXTI line 0 and 1 interrupts	true	3	0
DMA1 channel 1 interrupt	true	1	0
TIM1 break, update, trigger and commutation interrupts	true	0	0
TIM2 global interrupt	true	3	0
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	true	3	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM14 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	false	false
Hard fault interrupt	false	false	false
System service call via SWI instruction	false	false	false
Pendable request for system service	false	false	false
System tick timer	false	false	true
EXTI line 0 and 1 interrupts	true	false	true
DMA1 channel 1 interrupt	true	false	true
TIM1 break, update, trigger and commutation interrupts	true	false	true
TIM2 global interrupt	true	false	true
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	true	false	true

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current

10. Docs & Resources

Type	Link
Presentations	https://www.st.com/resource/en/product_presentation/gt_stm32f0-l0.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_stm8_functional-safety-packages.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-usb-c-pd-solutions-presentation.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Training Material	https://www.st.com/resource/en/sales_guide/sg_sc2155.pdf
Brochures	https://www.st.com/resource/en/brochure/breveco0518.pdf
Brochures	https://www.st.com/resource/en/brochure/brstm32f0.pdf
Flyers	https://www.st.com/resource/en/flyer/flnucleolrwan.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flstmcsuite.pdf
Flyers	https://www.st.com/resource/en/flyer/fldpstpfc11120.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1181-electrostatic-discharge-sensitivity-measurement-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2548-using-the-stm32f0f1f3gxlx-series-dma-controller-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2606-stm32-microcontroller-system-memory-boot-mode-stmicroelectronics.pdf

Application Notes	https://www.st.com/resource/en/application_note/an2639-soldering-recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2834-how-to-get-the-best-adc-accuracy-in-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2945-stm8s-and-stm32-mcus-a-consistent-832bit-product-line-for-painless-migration-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3070-managing-the-driver-enable-signal-for-rs485-and-iolink-communications-with-the-stm32s-usart-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3126-audio-and-waveform-generation-using-the-dac-in-stm32-products-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3155-usart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3156-usb-dfu-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3236-increase-the-number-of-touchkeys-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3364-migration-and-compatibility-guidelines-for-stm32-microcontroller-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3371-using-the-hardware-realtime-clock-rtc-in-stm32-f0-f2-f3-f4-and-l1-series-of-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3960-esd-considerations-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4067-calibrating-stm32f0x1-stm32f0x2-and-stm32f0x8-lines-internal-rc-oscillators-

	stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4080-getting-started-with-stm32f0x1x2x8-hardware-development-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4088-migrating-between-stm32f1-and-stm32f0-series-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4099-implementation-of-transmitters-and-receivers-for-infrared-remote-control-protocols-with-mcus-of-the-stm32f0-and-stm32f3-series-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4221-i2c-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4229-how-to-implement-a-vocoder-solution-using-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4277-using-stm32-device-pwm-shutdown-features-for-motor-control-and-digital-power-conversion-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4299-improve-conducted-noise-robustness-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4310-sampling-capacitor-selection-guide-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4312-design-with-surface-sensors-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4316-tuning-a-touch-sensing-application-on-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4566-extending-the-dac-performance-of-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4617-migrating-between-stm32f0-and-stm32l0-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4655-virtually-

	increasing-the-number-of-serial-communication-peripherals-in-stm32-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4705-migration-guidelines-from-pic18-to-stm32f0-series-with-software-expansion-for-stm32cube-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4735-stm32cube-firmware-examples-for-stm32f0-series-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4759-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4776-generalpurpose-timer-cookbook-for-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4803-highspeed-si-simulations-using-ibis-and-boardlevel-simulations-using-hyperlynx-si-on-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4908-stm32-usart-automatic-baud-rate-detection-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4989-stm32-microcontroller-debug-toolbox-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4991-how-to-wake-up-an-stm32xx-series-microcontroller-from-lowpower-mode-with-the-usart-or-the-lpuart-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5027-interfacing-pdm-digital-microphones-using-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5036-thermal-management-guidelines-for-stm32-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5105-getting-started-with-touch-sensing-control-on-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5145-migration-of-applications-from-stm32f0-series-to-stm32g0-series--

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