
STM32
CubeMX

1. Description

1.1. Project

Project Name	Medogonka_L152_02_LCD
Board Name	custom
Generated with:	STM32CubeMX 6.0.1
Date	09/30/2020

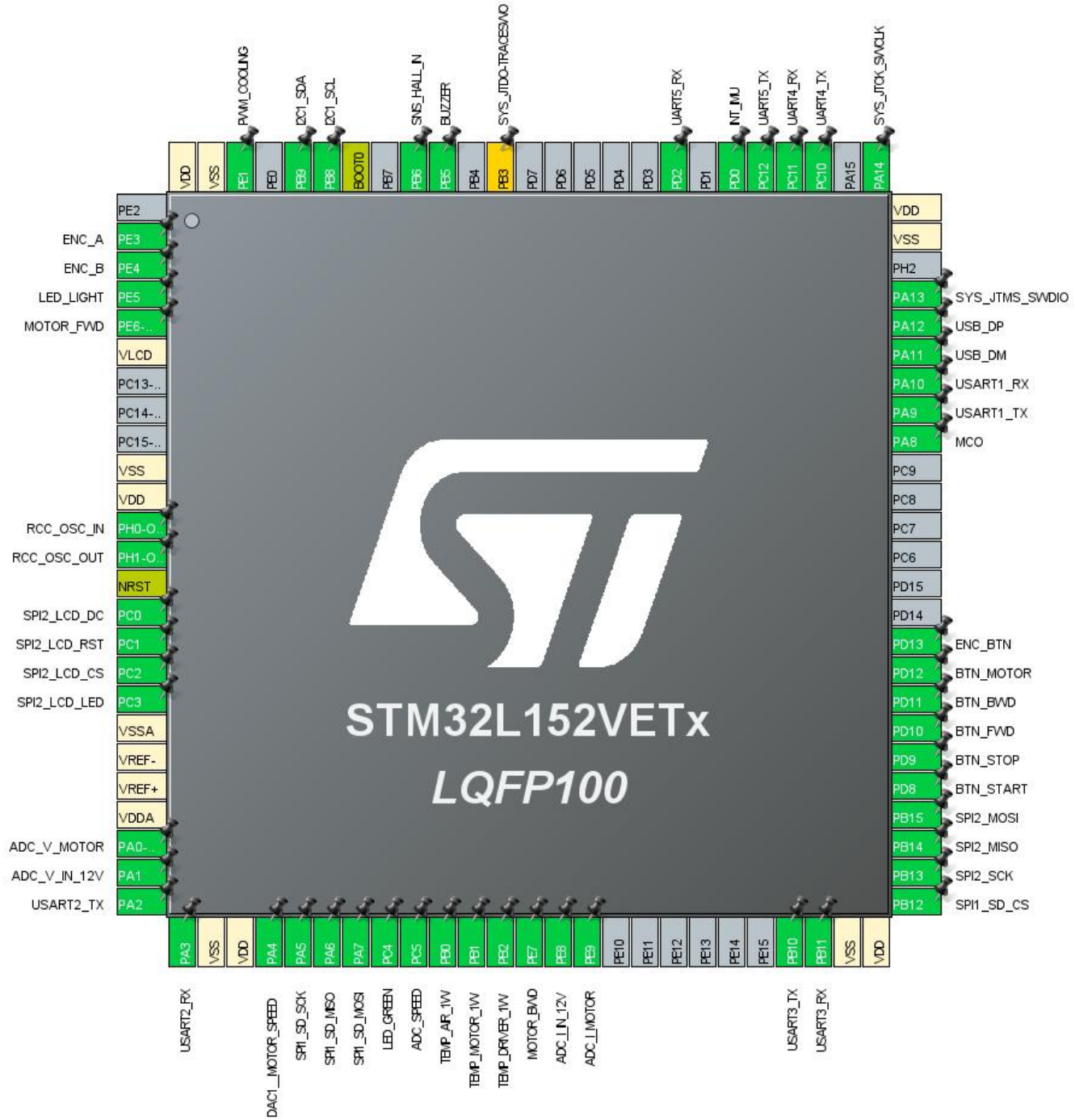
1.2. MCU

MCU Series	STM32L1
MCU Line	STM32L151/152
MCU name	STM32L152VETx
MCU Package	LQFP100
MCU Pin number	100

1.3. Core(s) information

Core(s)	Arm Cortex-M3

2. Pinout Configuration



3. Pins Configuration

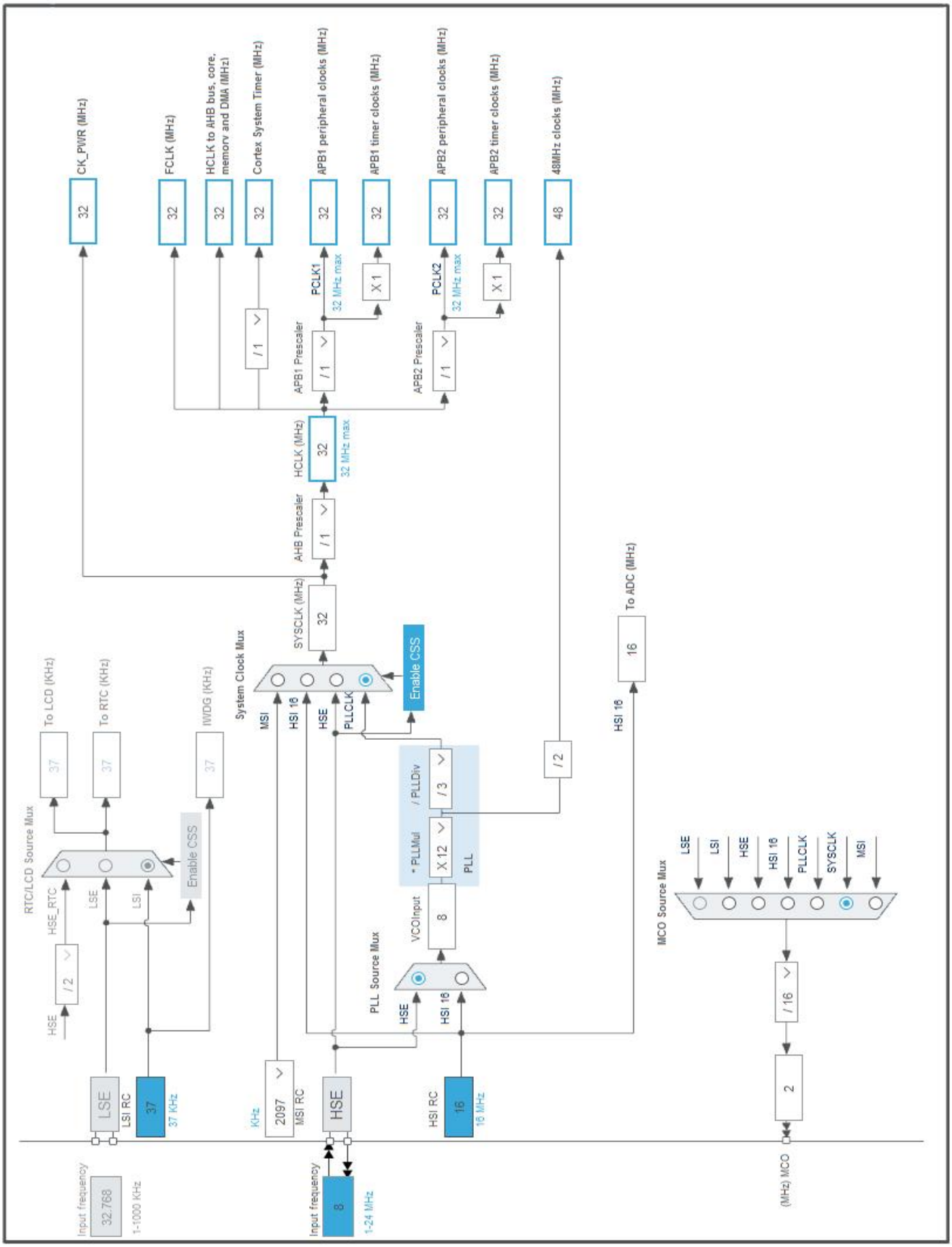
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
2	PE3	I/O	TIM3_CH1	ENC_A
3	PE4	I/O	TIM3_CH2	ENC_B
4	PE5 *	I/O	GPIO_Output	LED_LIGHT
5	PE6-WKUP3 *	I/O	GPIO_Output	MOTOR_FWD
6	VLCD	Power		
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN	I/O	RCC_OSC_IN	RCC_OSC_IN
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	RCC_OSC_OUT
14	NRST	Reset		
15	PC0 *	I/O	GPIO_Output	SPI2_LCD_DC
16	PC1 *	I/O	GPIO_Output	SPI2_LCD_RST
17	PC2 *	I/O	GPIO_Output	SPI2_LCD_CS
18	PC3 *	I/O	GPIO_Output	SPI2_LCD_LED
19	VSSA	Power		
20	VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0-WKUP1	I/O	ADC_IN0	ADC_V_MOTOR
24	PA1	I/O	ADC_IN1	ADC_V_IN_12V
25	PA2	I/O	USART2_TX	USART2_TX
26	PA3	I/O	USART2_RX	USART2_RX
27	VSS	Power		
28	VDD	Power		
29	PA4	I/O	DAC_OUT1	DAC1__MOTOR_SPEED
30	PA5	I/O	SPI1_SCK	SPI1_SD_SCK
31	PA6	I/O	SPI1_MISO	SPI1_SD_MISO
32	PA7	I/O	SPI1_MOSI	SPI1_SD_MOSI
33	PC4 *	I/O	GPIO_Output	LED_GREEN
34	PC5	I/O	ADC_IN15	ADC_SPEED
35	PB0 *	I/O	GPIO_Output	TEMP_AIR_1W
36	PB1 *	I/O	GPIO_Output	TEMP_MOTOR_1W
37	PB2 *	I/O	GPIO_Output	TEMP_DRIVER_1W
38	PE7 *	I/O	GPIO_Output	MOTOR_BWD
39	PE8	I/O	ADC_IN23	ADC_I_IN_12V
40	PE9	I/O	ADC_IN24	ADC_I_MOTOR

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
47	PB10	I/O	USART3_TX	USART3_TX
48	PB11	I/O	USART3_RX	USART3_RX
49	VSS	Power		
50	VDD	Power		
51	PB12 *	I/O	GPIO_Output	SPI1_SD_CS
52	PB13	I/O	SPI2_SCK	SPI2_SCK
53	PB14	I/O	SPI2_MISO	SPI2_MISO
54	PB15	I/O	SPI2_MOSI	SPI2_MOSI
55	PD8	I/O	GPIO_EXTI8	BTN_START
56	PD9	I/O	GPIO_EXTI9	BTN_STOP
57	PD10	I/O	GPIO_EXTI10	BTN_FWD
58	PD11	I/O	GPIO_EXTI11	BTN_BWD
59	PD12	I/O	GPIO_EXTI12	BTN_MOTOR
60	PD13	I/O	GPIO_EXTI13	ENC_BTN
67	PA8	I/O	RCC_MCO	MCO
68	PA9	I/O	USART1_TX	USART1_TX
69	PA10	I/O	USART1_RX	USART1_RX
70	PA11	I/O	USB_DM	USB_DM
71	PA12	I/O	USB_DP	USB_DP
72	PA13	I/O	SYS_JTMS-SWDIO	SYS_JTMS_SWDIO
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	SYS_JTCK_SWCLK
78	PC10	I/O	UART4_TX	UART4_TX
79	PC11	I/O	UART4_RX	UART4_RX
80	PC12	I/O	UART5_TX	UART5_TX
81	PD0	I/O	GPIO_EXTI0	INT_IMU
83	PD2	I/O	UART5_RX	UART5_RX
89	PB3 **	I/O	SYS_JTDO-TRACESWO	SYS_JTDO-TRACESWO
91	PB5 *	I/O	GPIO_Output	BUZZER
92	PB6	I/O	TIM4_CH1	SNS_HALL_IN
94	BOOT0	Boot		
95	PB8	I/O	I2C1_SCL	I2C1_SCL
96	PB9	I/O	I2C1_SDA	I2C1_SDA
98	PE1	I/O	TIM11_CH1	PWM_COOLING
99	VSS	Power		
100	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	Medogonka_L152_02_LCD
Project Folder	C:\Devel\!Projects\AVR_Eclipse_Mars.2\Workspaces\STM32CubeIDE\Medogonk
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_L1 V1.10.1
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	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
Enable Full Assert	No

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	IP Instance Name
1	MX_GPIO_Init	GPIO
2	MX_DMA_Init	DMA
3	SystemClock_Config	RCC
4	MX_SPI1_Init	SPI1
5	MX_SPI2_Init	SPI2
6	MX_I2C1_Init	I2C1
7	MX_USART1_UART_Init	USART1
8	MX_USB_DEVICE_Init	USB_DEVICE
9	MX_DAC_Init	DAC
10	MX_FATFS_Init	FATFS
11	MX_ADC_Init	ADC

Rank	Function Name	IP Instance Name
12	MX_TIM3_Init	TIM3
13	MX_TIM4_Init	TIM4
14	MX_TIM11_Init	TIM11
15	MX_UART4_Init	UART4
16	MX_UART5_Init	UART5
17	MX_USART2_UART_Init	USART2
18	MX_USART3_UART_Init	USART3

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32L1
Line	STM32L151/152
MCU	STM32L152VETx
Datasheet	DS10002_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.0

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

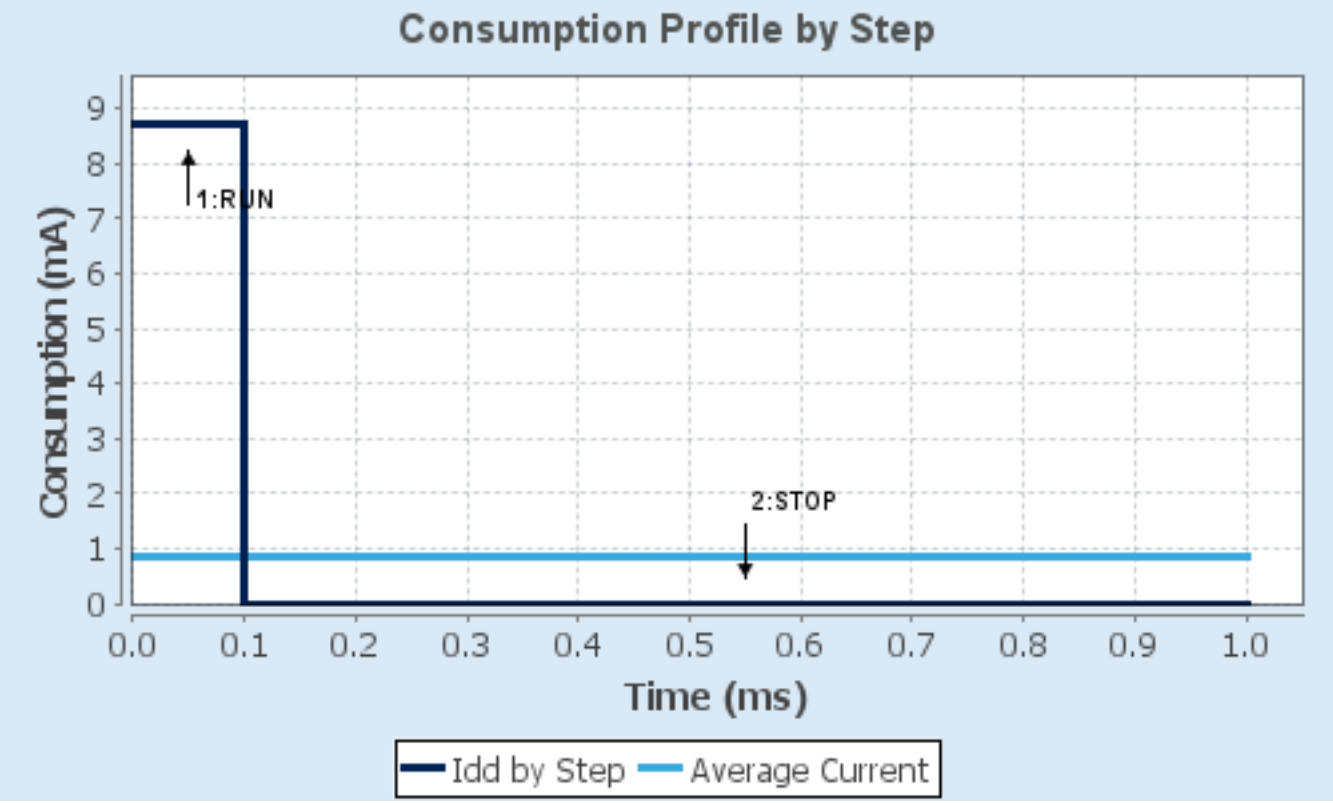
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	Range1-High	NoRange
Fetch Type	FLASH	n/a
CPU Frequency	32 MHz	0 Hz
Clock Configuration	HSI PLL	ALL CLOCKS OFF
Clock Source Frequency	16 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	8.7 mA	560 nA
Duration	0.1 ms	0.9 ms
DMIPS	33.0	0.0
Ta Max	103.88	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	870.5 µA
Battery Life	5 months, 9 days, 22 hours	Average DMIPS	33.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
9
8
7
6
5
4
3
2
1
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. ADC

mode: IN0

mode: IN1

mode: IN15

mode: IN23

mode: IN24

mode: Temperature Sensor Channel

mode: Vrefint Channel

7.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode divided by 1
Bank to use	Bank A
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of sequence conversion
Low Power Auto Wait	Disabled
Low Power Auto Off	Disabled

ADC_Regular_ConversionMode:

Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	**Channel Temperature Sensor ***
Sampling Time	4 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

7.2. DAC

mode: OUT1 Configuration

7.2.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	None

7.3. GPIO

7.4. I2C1

I2C: I2C

7.4.1. Parameter Settings:

Master Features:

I2C Speed Mode	**Fast Mode ***
I2C Clock Speed (Hz)	400000
Fast Mode Duty Cycle	Duty cycle Tlow/Thigh = 2

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

7.5. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

mode: Master Clock Output

7.5.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

7.6. SPI1

Mode: Full-Duplex Master

7.6.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**16.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.7. SPI2

Mode: Full-Duplex Master

7.7.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**16.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.8. SYS

Debug: Serial Wire

Timebase Source: TIM7

7.9. TIM3

Combined Channels: Encoder Mode

7.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**100 ***
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)

Encoder:

Encoder Mode	Encoder Mode TI1
____ Parameters for Channel 1 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0
____ Parameters for Channel 2 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0

7.10. TIM4

Clock Source : Internal Clock

Channel1: Output Compare CH1

7.10.1. 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)	**Division by 4 ***
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)

Output Compare Channel 1:

Mode	**Active Level on match ***
Pulse (16 bits value)	0
Output compare preload	Disable
CH Polarity	High

7.11. TIM11

Clock Source : Internal Clock

Channel1: PWM Generation CH1

7.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**100 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

PWM Generation Channel 1:

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

7.12. UART4

Mode: Asynchronous

7.12.1. 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

7.13. UART5

Mode: Asynchronous

7.13.1. 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

7.14. USART1

Mode: Asynchronous

7.14.1. 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

7.15. USART2

Mode: Asynchronous

7.15.1. 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

7.16. USART3

Mode: Asynchronous

7.16.1. 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

7.17. USB

mode: Device (FS)

7.17.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Physical interface	Internal Phy

Power Parameters:

Low Power	Disabled
Battery Charging	Disabled

7.18. FATFS

mode: User-defined

7.18.1. Set Defines:

Version:

FATFS version	R0.12c

Function Parameters:

FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Disabled
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	Disabled
USE_MKFS (Make filesystem function)	Enabled
USE_FASTSEEK (Fast seek function)	Enabled
USE_EXPAND (Use f_expand function)	Disabled
USE_CHMOD (Change attributes function)	Disabled
USE_LABEL (Volume label functions)	Disabled
USE_FORWARD (Forward function)	Disabled

Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	Latin 1
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255
LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8
FS_RPATH (Relative Path)	Disabled

Physical Drive Parameters:

VOLUMES (Logical drives)	1
MAX_SS (Maximum Sector Size)	512
MIN_SS (Minimum Sector Size)	512
MULTI_PARTITION (Volume partitions feature)	Disabled
USE_TRIM (Erase feature)	Disabled
FS_NOFSINFO (Force full FAT scan)	0

System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_EXFAT (Support of exFAT file system)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp
FS_REENTRANT (Re-Entrancy)	Enabled

FS_TIMEOUT (Timeout ticks)	1000
SYNC_t (O/S sync object)	osSemaphoreId_t
FS_LOCK (Number of files opened simultaneously)	2

7.19. FREERTOS

Interface: CMSIS_V2

7.19.1. Config parameters:

API:

FreeRTOS API	CMSIS v2

Versions:

FreeRTOS version	10.0.1
CMSIS-RTOS version	2.00

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	**10000 ***
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	Enabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

7.19.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Enabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Enabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Enabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

7.19.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT	Disabled

Project settings:

Use FW pack heap file	Enabled

7.20. USB_DEVICE

Class For FS IP: Mass Storage Class

7.20.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

MSC_MEDIA_PACKET (Media I/O buffer Size)	512

7.20.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22314
PRODUCT_STRING (Product Identifier)	STM32 Mass Storage
CONFIGURATION_STRING (Configuration Identifier)	MSC Config
INTERFACE_STRING (Interface Identifier)	MSC Interface

*** 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	PA0-WKUP1	ADC_IN0	Analog mode	No pull-up and no pull-down	n/a	ADC_V_MOTOR
	PA1	ADC_IN1	Analog mode	No pull-up and no pull-down	n/a	ADC_V_IN_12V
	PC5	ADC_IN15	Analog mode	No pull-up and no pull-down	n/a	ADC_SPEED
	PE8	ADC_IN23	Analog mode	No pull-up and no pull-down	n/a	ADC_I_IN_12V
	PE9	ADC_IN24	Analog mode	No pull-up and no pull-down	n/a	ADC_I_MOTOR
DAC	PA4	DAC_OUT1	Analog mode	No pull-up and no pull-down	n/a	DAC1__MOTOR_SPEED
I2C1	PB8	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	I2C1_SCL
	PB9	I2C1_SDA	Alternate Function Open Drain	Pull-up	**High ***	I2C1_SDA
RCC	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	RCC_OSC_IN
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	RCC_OSC_OUT
	PA8	RCC_MCO	Alternate Function Push Pull	No pull-up and no pull-down	Very Low	MCO
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI1_SD_SCK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI1_SD_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI1_SD_MOSI
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI2_SCK
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI2_MISO
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	SPI2_MOSI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SYS_JTMS_SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SYS_JTCK_SWCLK
TIM3	PE3	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Very Low	ENC_A
	PE4	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Very Low	ENC_B
TIM4	PB6	TIM4_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Very Low	SNS_HALL_IN
TIM11	PE1	TIM11_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Very Low	PWM_COOLING
UART4	PC10	UART4_TX	Alternate Function Push Pull	Pull-up	**High ***	UART4_TX
	PC11	UART4_RX	Alternate Function Push Pull	Pull-up	**High ***	UART4_RX
UART5	PC12	UART5_TX	Alternate Function Push Pull	Pull-up	**High ***	UART5_TX
	PD2	UART5_RX	Alternate Function Push Pull	Pull-up	**High ***	UART5_RX
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART1_TX
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART1_RX

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART2_TX
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART2_RX
USART3	PB10	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART3_TX
	PB11	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USART3_RX
USB	PA11	USB_DM	n/a	n/a	n/a	USB_DM
	PA12	USB_DP	n/a	n/a	n/a	USB_DP
Single Mapped Signals	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	SYS_JTDO-TRACESWO
GPIO	PE5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	LED_LIGHT
	PE6-WKUP3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	MOTOR_FWD
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	SPI2_LCD_DC
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	SPI2_LCD_RST
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	SPI2_LCD_CS
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	SPI2_LCD_LED
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	LED_GREEN
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	TEMP_AIR_1W
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	TEMP_MOTOR_1W
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	TEMP_DRIVER_1W
	PE7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	MOTOR_BWD
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	SPI1_SD_CS
	PD8	GPIO_EXTI8	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	BTN_START
	PD9	GPIO_EXTI9	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	BTN_STOP
	PD10	GPIO_EXTI10	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	BTN_FWD
	PD11	GPIO_EXTI11	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	BTN_BWD
	PD12	GPIO_EXTI12	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	BTN_MOTOR
	PD13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	ENC_BTN
	PD0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	INT_IMU
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	BUZZER

8.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI2_TX	DMA1_Channel5	Memory To Peripheral	**Medium ***

SPI2_TX: DMA1_Channel5 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

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
DMA1 channel5 global interrupt	true	0	0
ADC global interrupt	true	0	0
USB low priority interrupt	true	0	0
TIM3 global interrupt	true	0	0
USART1 global interrupt	true	0	0
USART2 global interrupt	true	0	0
USART3 global interrupt	true	0	0
TIM7 global interrupt	true	0	0
UART4 global interrupt	true	0	0
UART5 global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line0 interrupt	unused		
USB high priority interrupt	unused		
DAC interrupt	unused		
EXTI line[9:5] interrupts	unused		
TIM11 global interrupt	unused		
TIM4 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
EXTI line[15:10] interrupts	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

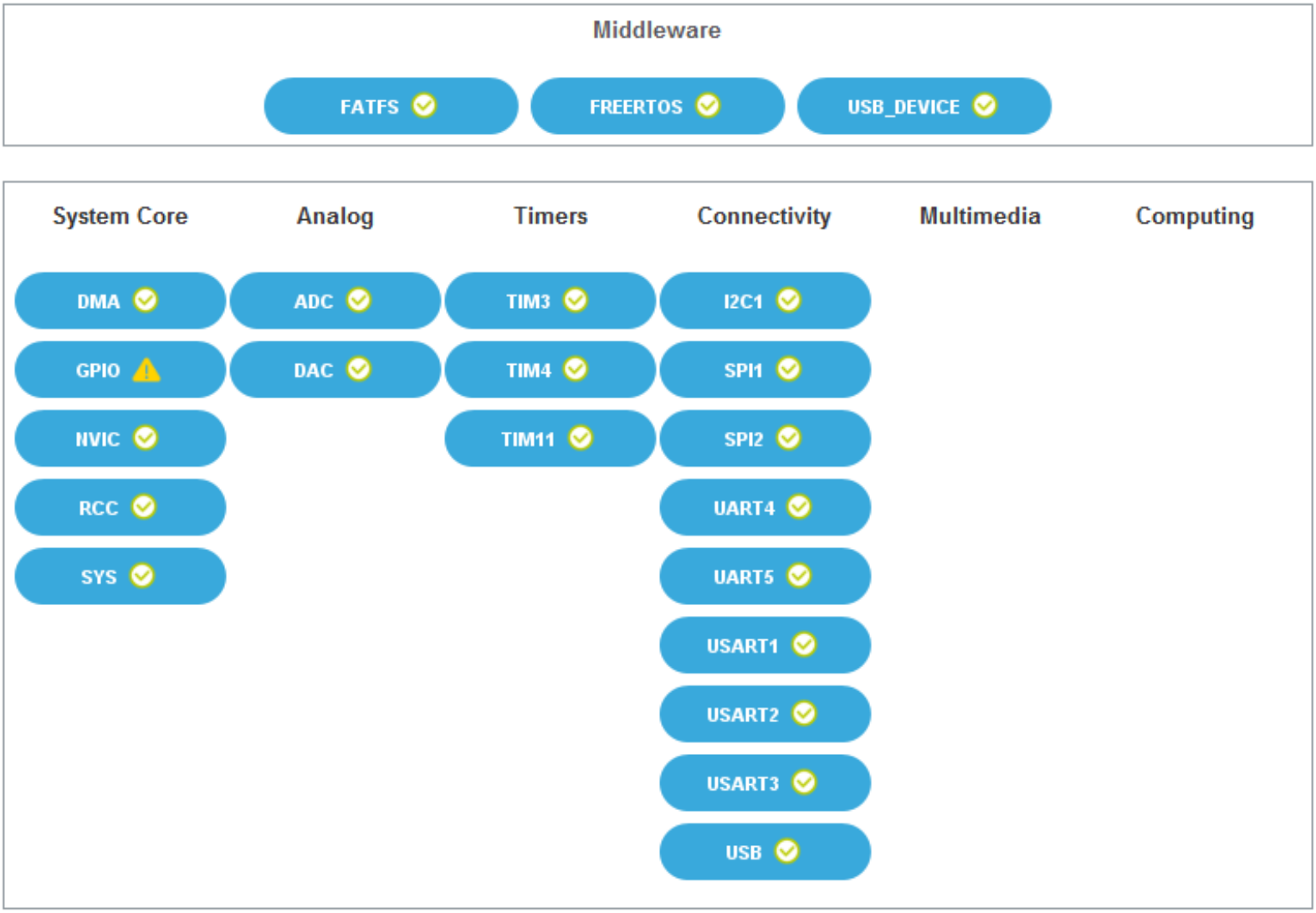
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Hard fault interrupt	true	true	false
Memory management fault	true	true	false
Pre-fetch fault, memory access fault	true	true	false
Undefined instruction or illegal state	true	true	false
System service call via SWI instruction	true	false	false
Debug monitor	true	true	false
Pendable request for system service	true	false	false
System tick timer	true	false	false
DMA1 channel5 global interrupt	true	true	true
ADC global interrupt	true	true	true
USB low priority interrupt	true	true	true
TIM3 global interrupt	true	true	true
USART1 global interrupt	true	true	true
USART2 global interrupt	true	true	true
USART3 global interrupt	true	true	true
TIM7 global interrupt	true	true	true
UART4 global interrupt	true	true	true
UART5 global interrupt	true	true	true

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current



10. Software Pack Report

10.1. Software Pack selected

Vendor	Name	Version	Component
STMicroelectronics	FreeRTOS	0.0.1	Class : CMSIS Group : RTOS2 SubGroup : FreeRTOS Version : 10.2.0 Class : RTOS Group : Core Version : 10.2.0
STMicroelectronics	USB_DEVICE	2.0.0	Class : USB Group : USB Device SubGroup : MSC FS Version : 2.0

11. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00098321.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/CD00240193.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/CD00228163.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00104204.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/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/CD00270081.pdf
Application note	http://www.st.com/resource/en/application_note/CD00273528.pdf
Application note	http://www.st.com/resource/en/application_note/CD00280599.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/DM00032987.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/DM00073742.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/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00158601.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf
Application note	http://www.st.com/resource/en/application_note/DM00188260.pdf

Application note	http://www.st.com/resource/en/application_note/DM00141025.pdf
Application note	http://www.st.com/resource/en/application_note/DM00220769.pdf
Application note	http://www.st.com/resource/en/application_note/DM00206898.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/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/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/DM00536349.pdf
Application note	http://www.st.com/resource/en/application_note/DM00660597.pdf