1. Description

1.1. Project

Project Name	JS20
Board Name	custom
Generated with:	STM32CubeMX 6.0.1
Date	08/17/2020

1.2. MCU

MCU Series	STM32F3
MCU Line	STM32F303
MCU name	STM32F303RETx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration
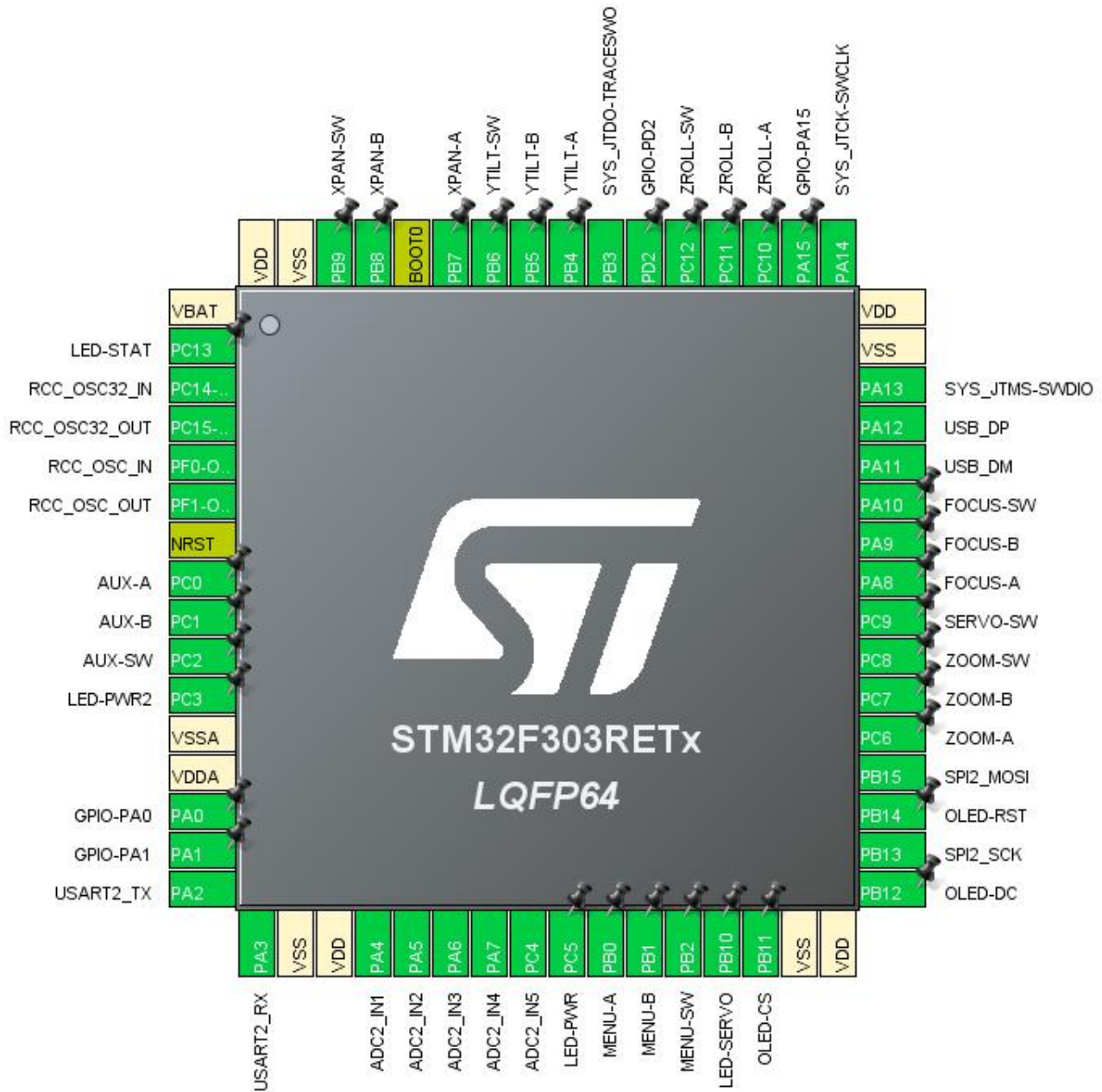
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13 *	I/O	GPIO_Output	LED-STAT
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Input	AUX-A
9	PC1 *	I/O	GPIO_Input	AUX-B
10	PC2 *	I/O	GPIO_Input	AUX-SW
11	PC3 *	I/O	GPIO_Output	LED-PWR2
12	VSSA	Power		
13	VDDA	Power		
14	PA0 *	I/O	GPIO_Input	GPIO-PA0
15	PA1 *	I/O	GPIO_Input	GPIO-PA1
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	ADC2_IN1	
21	PA5	I/O	ADC2_IN2	
22	PA6	I/O	ADC2_IN3	
23	PA7	I/O	ADC2_IN4	
24	PC4	I/O	ADC2_IN5	
25	PC5 *	I/O	GPIO_Output	LED-PWR
26	PB0 *	I/O	GPIO_Input	MENU-A
27	PB1 *	I/O	GPIO_Input	MENU-B
28	PB2 *	I/O	GPIO_Input	MENU-SW
29	PB10 *	I/O	GPIO_Output	LED-SERVO
30	PB11 *	I/O	GPIO_Output	OLED-CS
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	OLED-DC
34	PB13	I/O	SPI2_SCK	
35	PB14 *	I/O	GPIO_Output	OLED-RST
36	PB15	I/O	SPI2_MOSI	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6 *	I/O	GPIO_Input	ZOOM-A
38	PC7 *	I/O	GPIO_Input	ZOOM-B
39	PC8 *	I/O	GPIO_Input	ZOOM-SW
40	PC9 *	I/O	GPIO_Input	SERVO-SW
41	PA8 *	I/O	GPIO_Input	FOCUS-A
42	PA9 *	I/O	GPIO_Input	FOCUS-B
43	PA10 *	I/O	GPIO_Input	FOCUS-SW
44	PA11	I/O	USB_DM	
45	PA12	I/O	USB_DP	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15 *	I/O	GPIO_Input	GPIO-PA15
51	PC10 *	I/O	GPIO_Input	ZROLL-A
52	PC11 *	I/O	GPIO_Input	ZROLL-B
53	PC12 *	I/O	GPIO_Input	ZROLL-SW
54	PD2 *	I/O	GPIO_Input	GPIO-PD2
55	PB3	I/O	SYS_JTDO-TRACESWO	
56	PB4 *	I/O	GPIO_Input	YTILT-A
57	PB5 *	I/O	GPIO_Input	YTILT-B
58	PB6 *	I/O	GPIO_Input	YTILT-SW
59	PB7 *	I/O	GPIO_Input	XPAN-A
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Input	XPAN-B
62	PB9 *	I/O	GPIO_Input	XPAN-SW
63	VSS	Power		
64	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration
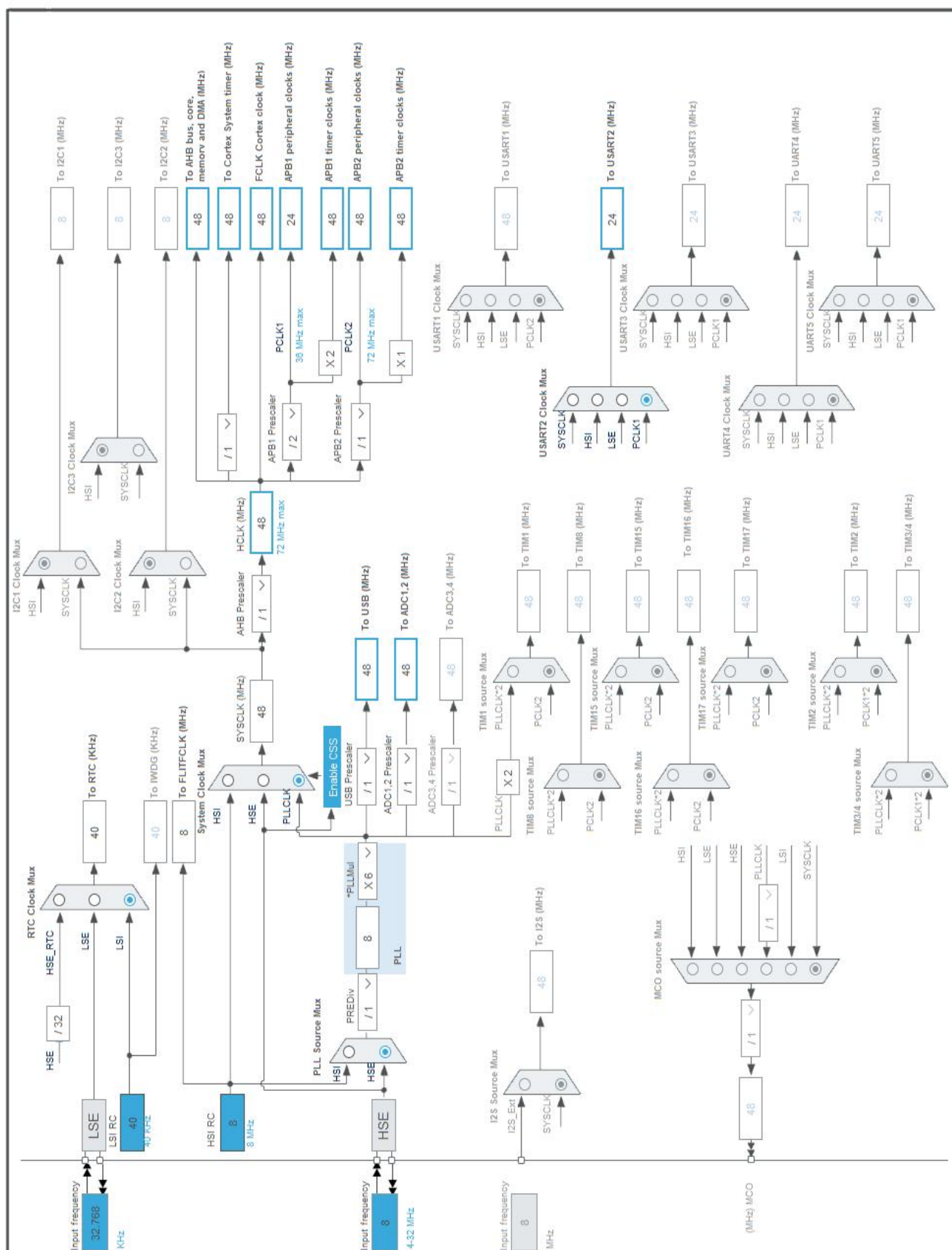
5. Software Project

5.1. Project Settings

Name	Value
Project Name	JS20
Project Folder	C:\Users\PJ-ENG\Desktop
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F3 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_ADC2_Init	ADC2
4	MX_SPI2_Init	SPI2
5	MX_USART2_UART_Init	USART2
6	MX_RTC_Init	RTC
7	MX_USB_DEVICE_Init	USB_DEVICE

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F3
Line	STM32F303
MCU	STM32F303RETx
Datasheet	DS10362_Rev5

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	72 MHz	0 Hz
Clock Configuration	HSEBYP PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	33.24 mA	9.8 µA
Duration	0.1 ms	0.9 ms
DMIPS	63.0	0.0
Ta Max	99.5	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	3.33 mA
Battery Life	1 month, 12 days, 1 hour	Average DMIPS	63.0 DMIPS

6.6. Chart

Consumption Profile by Step
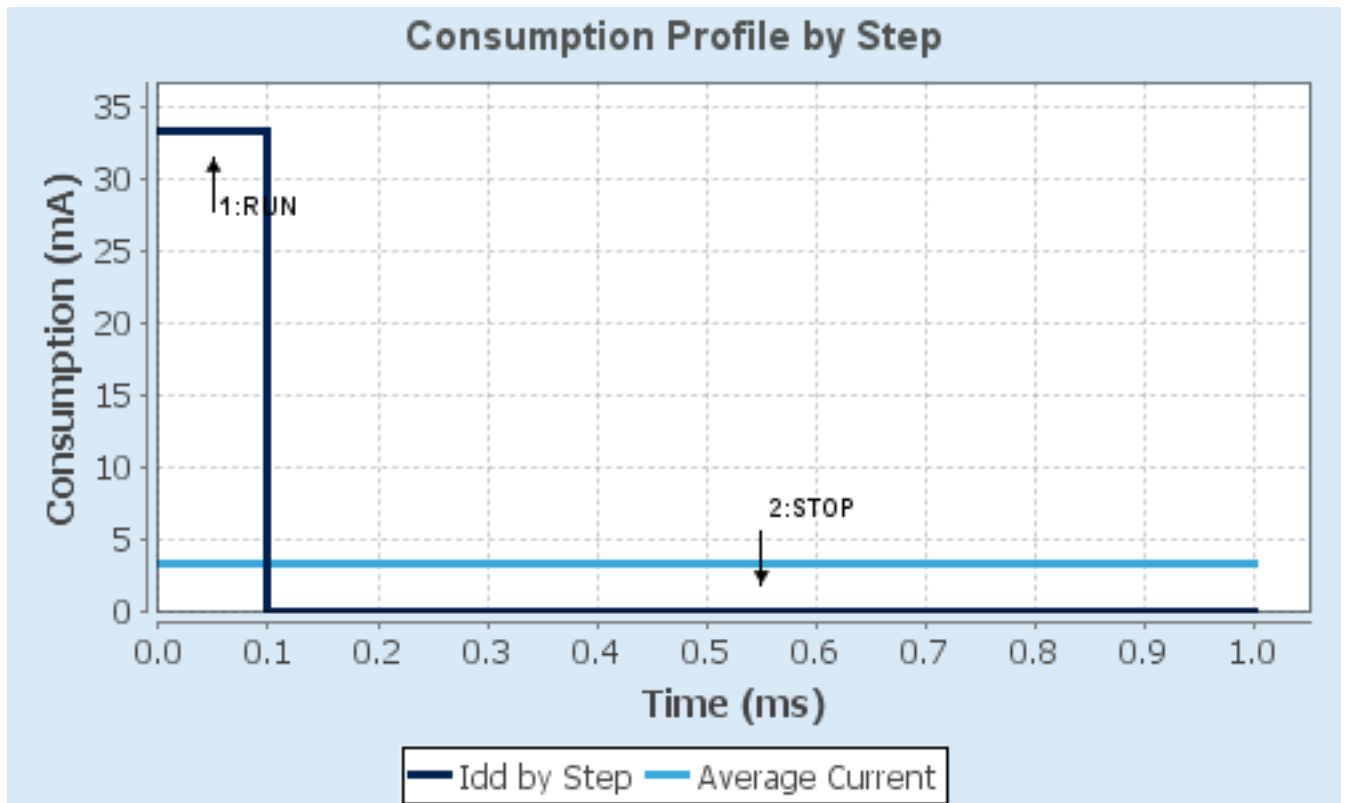
7. IPs and Middleware Configuration

7.1. ADC2

IN1: IN1 Single-ended

IN2: IN2 Single-ended

IN3: IN3 Single-ended

IN4: IN4 Single-ended

IN5: IN5 Single-ended

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

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

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 1
Sampling Time	1.5 Cycles
Offset Number	No offset
Offset	0

ADC_Injected_ConversionMode:

Enable Injected Conversions	Enable
Number Of Conversions	0

Analog Watchdog 1:

Enable Analog WatchDog1 Mode	false

Analog Watchdog 2:

Enable Analog WatchDog2 Mode	false

Analog Watchdog 3:

Enable Analog WatchDog3 Mode	false

7.2. GPIO

7.3. RCC
High Speed Clock (HSE): Crystal/Ceramic Resonator
Low Speed Clock (LSE) : 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:

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

7.4. RTC
mode: Activate Clock Source
mode: Activate Calendar
7.4.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	Monday

Month	January
Date	1
Year	0

7.5. SPI2
Mode: Transmit Only Master
7.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
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

7.6. SYS
Debug: Trace Asynchronous Sw
Timebase Source: SysTick

7.7. USART2
Mode: Asynchronous
7.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	38400
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. USB
mode: Device (FS)
7.8.1. Parameter Settings:

Basic Parameters:

| Speed | Full Speed 12MBit/s |
| Physical interface | Internal Phy |

Power Parameters:

| Low Power | Disabled |
| Link Power Management | Disabled |

7.9. USB_DEVICE
Class For FS IP: Human Interface Device Class (HID)
7.9.1. Parameter Settings:

Class Parameters:

| HID_FS_BINTERVAL | **0xA *** |

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

7.9.2. 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)	22315
PRODUCT_STRING (Product Identifier)	STM32 Human interface
CONFIGURATION_STRING (Configuration Identifier)	HID Config
INTERFACE_STRING (Interface Identifier)	HID 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
ADC2	PA4	ADC2_IN1	Analog mode	No pull up pull down	n/a	
	PA5	ADC2_IN2	Analog mode	No pull up pull down	n/a	
	PA6	ADC2_IN3	Analog mode	No pull up pull down	n/a	
	PA7	ADC2_IN4	Analog mode	No pull up pull down	n/a	
	PC4	ADC2_IN5	Analog mode	No pull up pull down	n/a	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	No pull up pull down	**High ***	
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull up pull down	**High ***	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull up pull down	**High ***	
	PA3	USART2_RX	Alternate Function Push Pull	No pull up pull down	**High ***	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PC13	GPIO_Output	Output Push Pull	No pull up pull down	Low	LED-STAT
	PC0	GPIO_Input	Input mode	No pull up pull down	n/a	AUX-A
	PC1	GPIO_Input	Input mode	No pull up pull down	n/a	AUX-B
	PC2	GPIO_Input	Input mode	No pull up pull down	n/a	AUX-SW
	PC3	GPIO_Output	Output Push Pull	No pull up pull down	Low	LED-PWR2
	PA0	GPIO_Input	Input mode	No pull up pull down	n/a	GPIO-PA0
	PA1	GPIO_Input	Input mode	No pull up pull down	n/a	GPIO-PA1
	PC5	GPIO_Output	Output Push Pull	No pull up pull down	Low	LED-PWR
	PB0	GPIO_Input	Input mode	No pull up pull down	n/a	MENU-A
	PB1	GPIO_Input	Input mode	No pull up pull down	n/a	MENU-B
	PB2	GPIO_Input	Input mode	No pull up pull down	n/a	MENU-SW
	PB10	GPIO_Output	Output Push Pull	No pull up pull down	Low	LED-SERVO

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB11	GPIO_Output	Output Push Pull	No pull up pull down	Low	OLED-CS
	PB12	GPIO_Output	Output Push Pull	No pull up pull down	Low	OLED-DC
	PB14	GPIO_Output	Output Push Pull	No pull up pull down	Low	OLED-RST
	PC6	GPIO_Input	Input mode	No pull up pull down	n/a	ZOOM-A
	PC7	GPIO_Input	Input mode	No pull up pull down	n/a	ZOOM-B
	PC8	GPIO_Input	Input mode	No pull up pull down	n/a	ZOOM-SW
	PC9	GPIO_Input	Input mode	No pull up pull down	n/a	SERVO-SW
	PA8	GPIO_Input	Input mode	No pull up pull down	n/a	FOCUS-A
	PA9	GPIO_Input	Input mode	No pull up pull down	n/a	FOCUS-B
	PA10	GPIO_Input	Input mode	No pull up pull down	n/a	FOCUS-SW
	PA15	GPIO_Input	Input mode	No pull up pull down	n/a	GPIO-PA15
	PC10	GPIO_Input	Input mode	No pull up pull down	n/a	ZROLL-A
	PC11	GPIO_Input	Input mode	No pull up pull down	n/a	ZROLL-B
	PC12	GPIO_Input	Input mode	No pull up pull down	n/a	ZROLL-SW
	PD2	GPIO_Input	Input mode	No pull up pull down	n/a	GPIO-PD2
	PB4	GPIO_Input	Input mode	No pull up pull down	n/a	YTILT-A
	PB5	GPIO_Input	Input mode	No pull up pull down	n/a	YTILT-B
	PB6	GPIO_Input	Input mode	No pull up pull down	n/a	YTILT-SW
	PB7	GPIO_Input	Input mode	No pull up pull down	n/a	XPAN-A
	PB8	GPIO_Input	Input mode	No pull up pull down	n/a	XPAN-B
	PB9	GPIO_Input	Input mode	No pull up pull down	n/a	XPAN-SW

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
USB low priority or CAN_RX0 interrupts	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 interrupts	unused		
USB high priority or CAN_TX interrupts	unused		
SPI2 global interrupt	unused		
USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26	unused		
USB high priority interrupt remap	unused		
USB low priority interrupt remap	unused		
Floating point unit 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
USB low priority or CAN_RX0 interrupts	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	USB_DEVICE	2.0.0	Class : USB Group : USB Device SubGroup : HID FS Version : 2.0

11. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00118585.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00043574.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00118589.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/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00047998.pdf
Application note	http://www.st.com/resource/en/application_note/DM00053084.pdf
Application note	http://www.st.com/resource/en/application_note/DM00070391.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/DM00074240.pdf
Application note	http://www.st.com/resource/en/application_note/DM00080497.pdf
Application note	http://www.st.com/resource/en/application_note/DM00083249.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/DM00121474.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129600.pdf
Application note	http://www.st.com/resource/en/application_note/DM00157785.pdf

Application note   http://www.st.com/resource/en/application_note/DM00160482.pdf

Application note   http://www.st.com/resource/en/application_note/DM00210617.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/DM00260340.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/DM00269146.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/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/DM00536349.pdf

Application note   http://www.st.com/resource/en/application_note/DM00607955.pdf

Application note   http://www.st.com/resource/en/application_note/DM00442720.pdf