



1. Description

1.1. Project

Project Name	NewIHM8
Board Name	ACB_OCR_HMI_IAR
Generated with:	STM32CubeMX 6.1.1
Date	12/07/2023

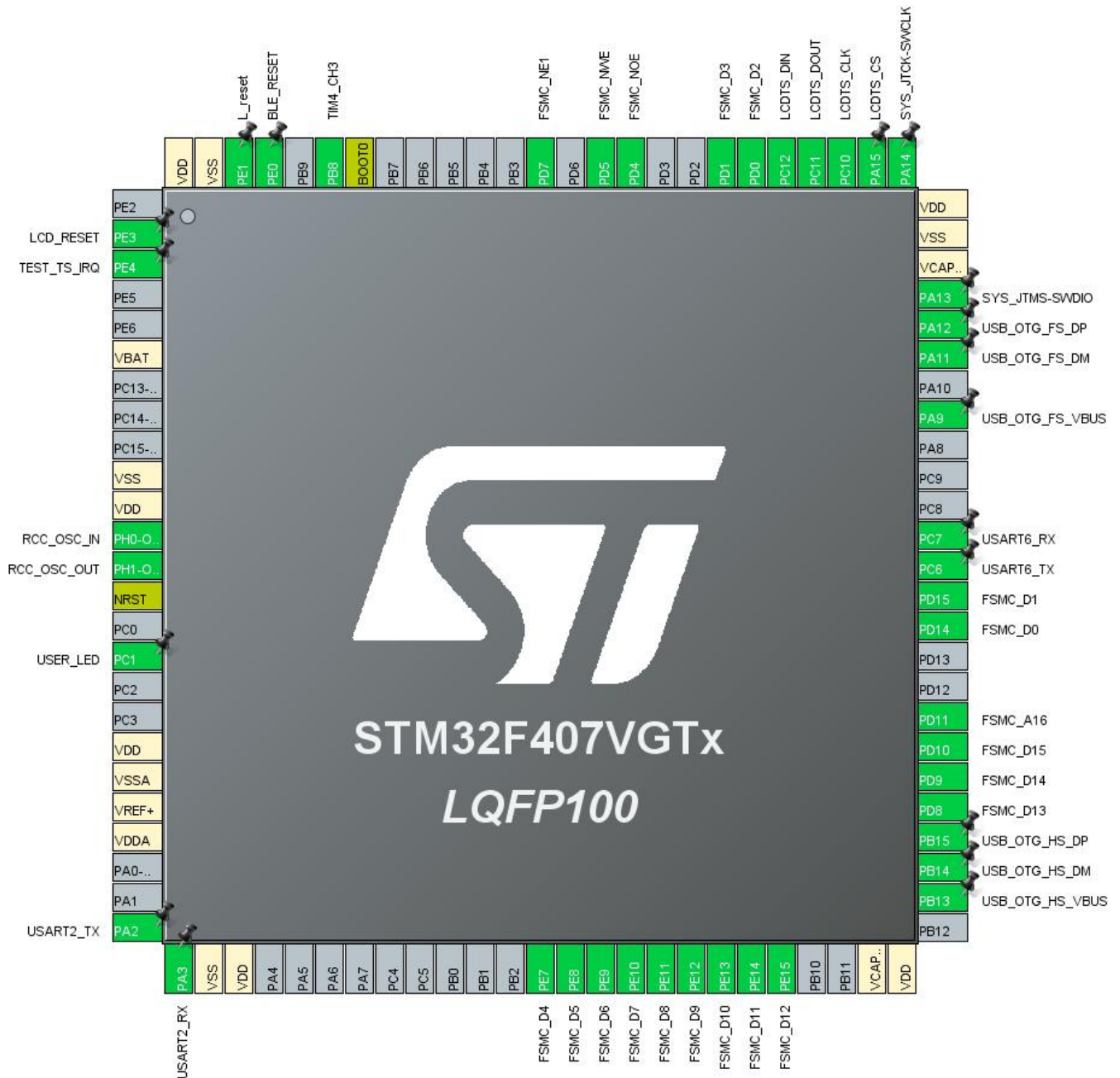
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VGTx
MCU Package	LQFP100
MCU Pin number	100

1.3. Core(s) information

Core(s)	Arm Cortex-M4
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2. Pinout Configuration



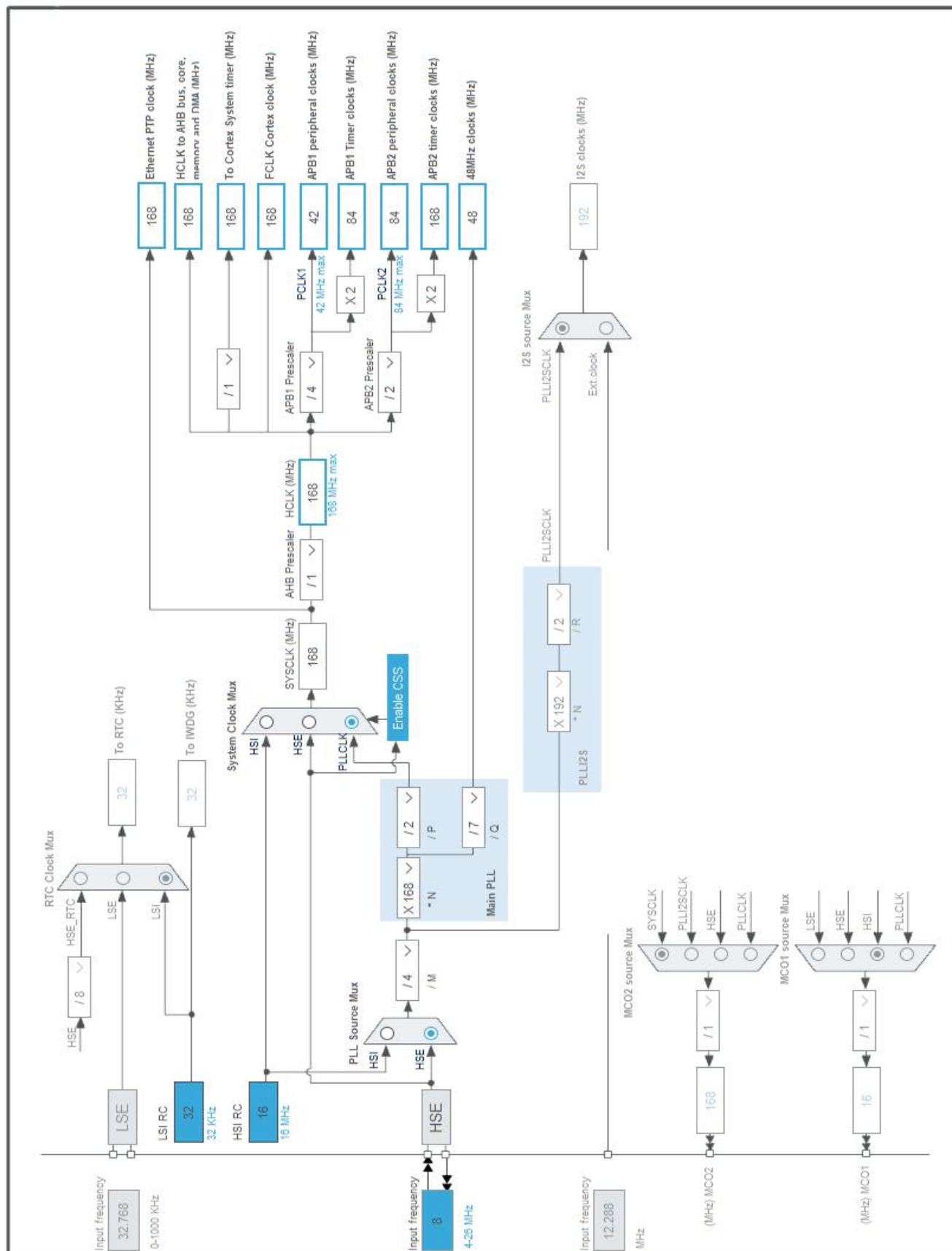
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
2	PE3 *	I/O	GPIO_Output	LCD_RESET
3	PE4 *	I/O	GPIO_Input	TEST_TS_IRQ
6	VBAT	Power		
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN	I/O	RCC_OSC_IN	
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
16	PC1 *	I/O	GPIO_Output	USER_LED
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
25	PA2	I/O	USART2_TX	
26	PA3	I/O	USART2_RX	
27	VSS	Power		
28	VDD	Power		
38	PE7	I/O	FSMC_D4	
39	PE8	I/O	FSMC_D5	
40	PE9	I/O	FSMC_D6	
41	PE10	I/O	FSMC_D7	
42	PE11	I/O	FSMC_D8	
43	PE12	I/O	FSMC_D9	
44	PE13	I/O	FSMC_D10	
45	PE14	I/O	FSMC_D11	
46	PE15	I/O	FSMC_D12	
49	VCAP_1	Power		
50	VDD	Power		
52	PB13	I/O	USB_OTG_HS_VBUS	
53	PB14	I/O	USB_OTG_HS_DM	
54	PB15	I/O	USB_OTG_HS_DP	
55	PD8	I/O	FSMC_D13	
56	PD9	I/O	FSMC_D14	
57	PD10	I/O	FSMC_D15	
58	PD11	I/O	FSMC_A16	
61	PD14	I/O	FSMC_D0	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
62	PD15	I/O	FSMC_D1	
63	PC6	I/O	USART6_TX	
64	PC7	I/O	USART6_RX	
68	PA9	I/O	USB_OTG_FS_VBUS	
70	PA11	I/O	USB_OTG_FS_DM	
71	PA12	I/O	USB_OTG_FS_DP	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
77	PA15 *	I/O	GPIO_Output	LCDTS_CS
78	PC10	I/O	SPI3_SCK	LCDTS_CLK
79	PC11	I/O	SPI3_MISO	LCDTS_DOUT
80	PC12	I/O	SPI3_MOSI	LCDTS_DIN
81	PD0	I/O	FSMC_D2	
82	PD1	I/O	FSMC_D3	
85	PD4	I/O	FSMC_NOE	
86	PD5	I/O	FSMC_NWE	
88	PD7	I/O	FSMC_NE1	
94	BOOT0	Boot		
95	PB8	I/O	TIM4_CH3	
97	PE0 *	I/O	GPIO_Output	BLE_RESET
98	PE1 *	I/O	GPIO_Input	L_reset
99	VSS	Power		
100	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	NewIHM8
Project Folder	D:\STM32F4\NewIHM8
Toolchain / IDE	EWARM V7
Firmware Package Name and Version	STM32Cube FW_F4 V1.25.2
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	Peripheral Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_CRC_Init	CRC
4	MX_FSMC_Init	FSMC
5	MX_SPI3_Init	SPI3
6	MX_TIM4_Init	TIM4
7	MX_USART2_UART_Init	USART2
8	MX_USART6_UART_Init	USART6
9	MX_USB_DEVICE_Init	USB_DEVICE
10	MX_USB_HOST_Init	USB_HOST

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407VGTx
Datasheet	DS8626_Rev8

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

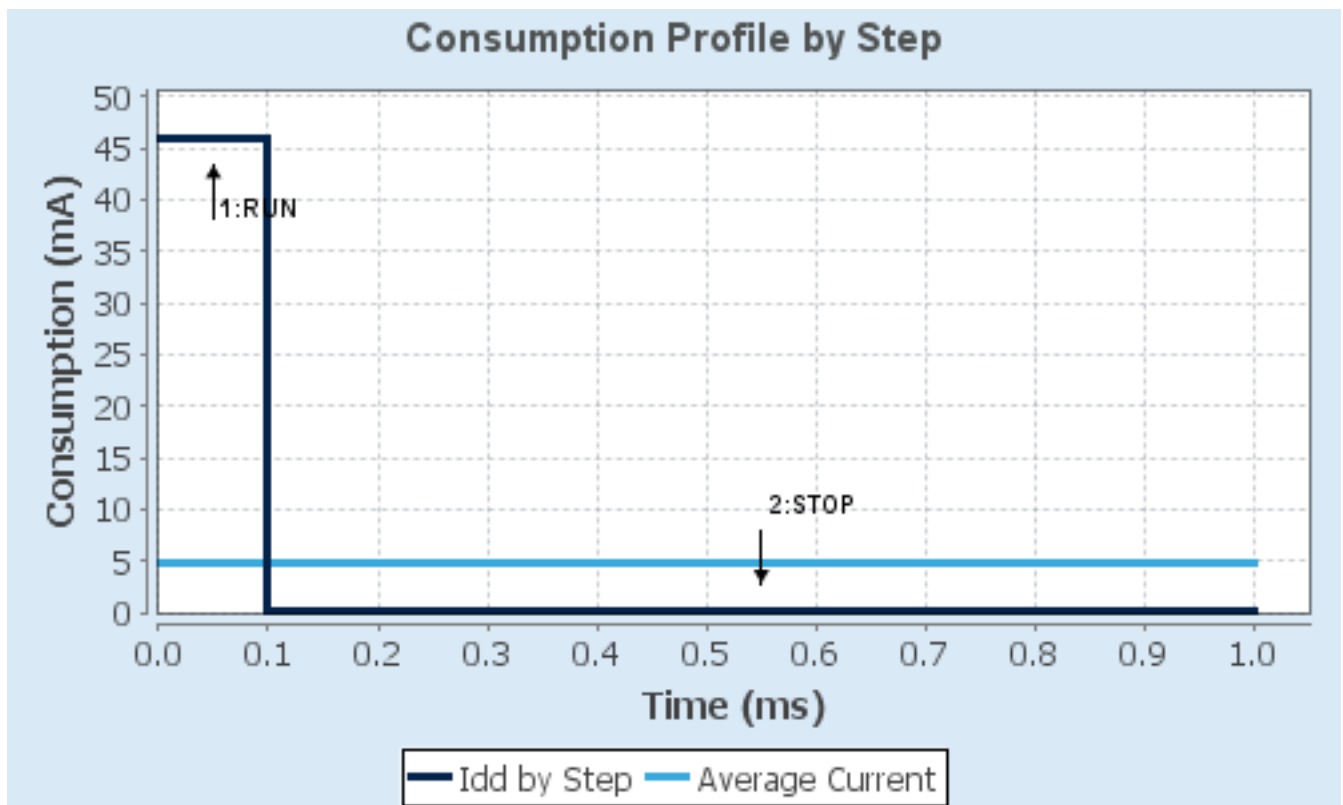
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	168 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	280 μ A
Duration	0.1 ms	0.9 ms
DMIPS	210.0	0.0
Ta Max	98.47	104.96
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	4.85 mA
Battery Life	29 days, 4 hours	Average DMIPS	210.0 DMIPS

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. CRC

mode: Activated

7.2. FSMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

Chip Select: set

Memory type: LCD Interface

LCD Register Select: A16

Data: 16 bits

7.2.1. NOR/PSRAM 1:

NOR/PSRAM control:

Memory type	LCD Interface
Bank	Bank 1 NOR/PSRAM 1
Write operation	Enabled
Extended mode	Disabled

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	4 *
Data setup time in HCLK clock cycles	40 *
Bus turn around time in HCLK clock cycles	0 *

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	5 WS (6 CPU cycle)

RCC Parameters:

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

Power Parameters:

Power Regulator Voltage Scale

Power Regulator Voltage Scale 1

7.4. SPI3

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)

32 *

Baud Rate

1.3125 MBits/s *

Clock Polarity (CPOL)

Low

Clock Phase (CPHA)

1 Edge

Advanced Parameters:

CRC Calculation

Disabled

NSS Signal Type

Software

7.5. SYS

Debug: Serial Wire

Timebase Source: TIM2

7.6. TIM4

Channel3: PWM Generation CH3

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

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)

PWM Generation Channel 3:

Mode

PWM mode 1

Pulse (16 bits value)

0

Output compare preload

Enable

Fast Mode

Disable

CH Polarity

High

7.7. USART2

Mode: Asynchronous

7.7.1. 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

7.8. USART6

Mode: Asynchronous

7.8.1. 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

7.9. USB_OTG_FS

Mode: Device_Only

mode: Activate_VBUS

7.9.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Low power	Disabled
Link Power Management	Disabled
VBUS sensing	Enabled
Signal start of frame	Disabled

7.10. USB_OTG_HS

Internal FS Phy: Host_Only

mode: Activate_VBUS

7.10.1. Parameter Settings:

Speed	Host Full Speed 12MBit/s
Enable internal IP DMA	Enabled *
Physical interface	Internal Phy
Signal start of frame	Disabled

7.11. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

7.11.1. 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:

USB CDC Rx Buffer Size	2048
USB CDC Tx Buffer Size	2048

7.11.2. 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)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

7.12. USB_HOST

Class For HS IP: Host Supporting ALL Classes

7.12.1. Parameter Settings:

Host Configuration:

USBH_MAX_NUM_ENDPOINTS (Maximum number of endpoints)	5
USBH_MAX_NUM_INTERFACES (Maximum number of interfaces)	10
USBH_MAX_NUM_SUPPORTED_CLASS (Maximum number of supported class)	5
USBH_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBH_KEEP_CFG_DESCRIPTOR (Keep the configuration into RAM)	Enabled
USBH_MAX_SIZE_CONFIGURATION (Maximum size in bytes for the Configuration Descriptor)	256
USBH_MAX_DATA_BUFFER (Maximum size of temporary data)	512
USBH_DEBUG_LEVEL (USBH Debug Level)	0: No debug message

CMSIS_RTOS:

USBH_USE_OS (Enable the support of an RTOS)	Disabled
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* User modified value

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
FSMC	PE7	FSMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE8	FSMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE9	FSMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE10	FSMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE11	FSMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE12	FSMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE13	FSMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE14	FSMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE15	FSMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD8	FSMC_D13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD9	FSMC_D14	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD10	FSMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD11	FSMC_A16	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD14	FSMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD15	FSMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD0	FSMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD1	FSMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD4	FSMC_NOE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD5	FSMC_NWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD7	FSMC_NE1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
RCC	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	LCDTS_CLK
	PC11	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	LCDTS_DOUT
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	LCDTS_DIN
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM4	PB8	TIM4_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	
USART6	PC6	USART6_TX	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	
	PC7	USART6_RX	Alternate Function Push Pull	No pull-up and no pull-down	Medium *	
USB_OTG_FS	PA9	USB_OTG_FS_VBUS	Input mode	No pull-up and no pull-down	n/a	
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	High *	
USB_OTG_HS	PB13	USB_OTG_HS_VBUS	Input mode	No pull-up and no pull-down	n/a	
	PB14	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PB15	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	High *	
GPIO	PE3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_RESET
	PE4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TEST_TS_IRQ
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USER_LED
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	LCDTS_CS
	PE0	GPIO_Output	Output Open Drain *	No pull-up and no pull-down	Low	BLE_RESET
	PE1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	L_reset

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
RCC global interrupt	true	0	0
TIM2 global interrupt	true	0	0
SPI3 global interrupt	true	0	0
USB On The Go FS global interrupt	true	0	0
USB On The Go HS global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
TIM4 global interrupt	unused		
USART2 global interrupt	unused		
USART6 global interrupt	unused		
USB On The Go HS End Point 1 Out global interrupt	unused		
USB On The Go HS End Point 1 In global interrupt	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	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
RCC global interrupt	false	true	false
TIM2 global interrupt	false	true	true
SPI3 global interrupt	false	true	true
USB On The Go FS global interrupt	false	true	true
USB On The Go HS global interrupt	false	true	true

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

Middleware

USB_DEVICE ✓

USB_HOST ⚠

System Core

DMA

GPIO ✓

NVIC ✓

RCC ✓

SYS ✓

Analog

Timers

TIM4 ✓

Connectivity

FSMC ✓

SPI3 ✓

USART2 ✓

USART6 ✓

USB_FS ✓

USB_HS ✓

Multimedia

Security

Computing

CRC ✓

10. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00037051.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00031020.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00037591.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/DM00025071.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/DM00050879.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
Application note	http://www.st.com/resource/en/application_note/DM00115714.pdf
Application note	http://www.st.com/resource/en/application_note/DM00123028.pdf

Application note http://www.st.com/resource/en/application_note/DM00129215.pdf

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/DM00213525.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/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/DM00263732.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

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