
STM32
CubeMX

1. Description

1.1. Project

Project Name	AudioOutputTest
Board Name	STM3240G-EVAL
Generated with:	STM32CubeMX 6.11.0
Date	04/03/2024

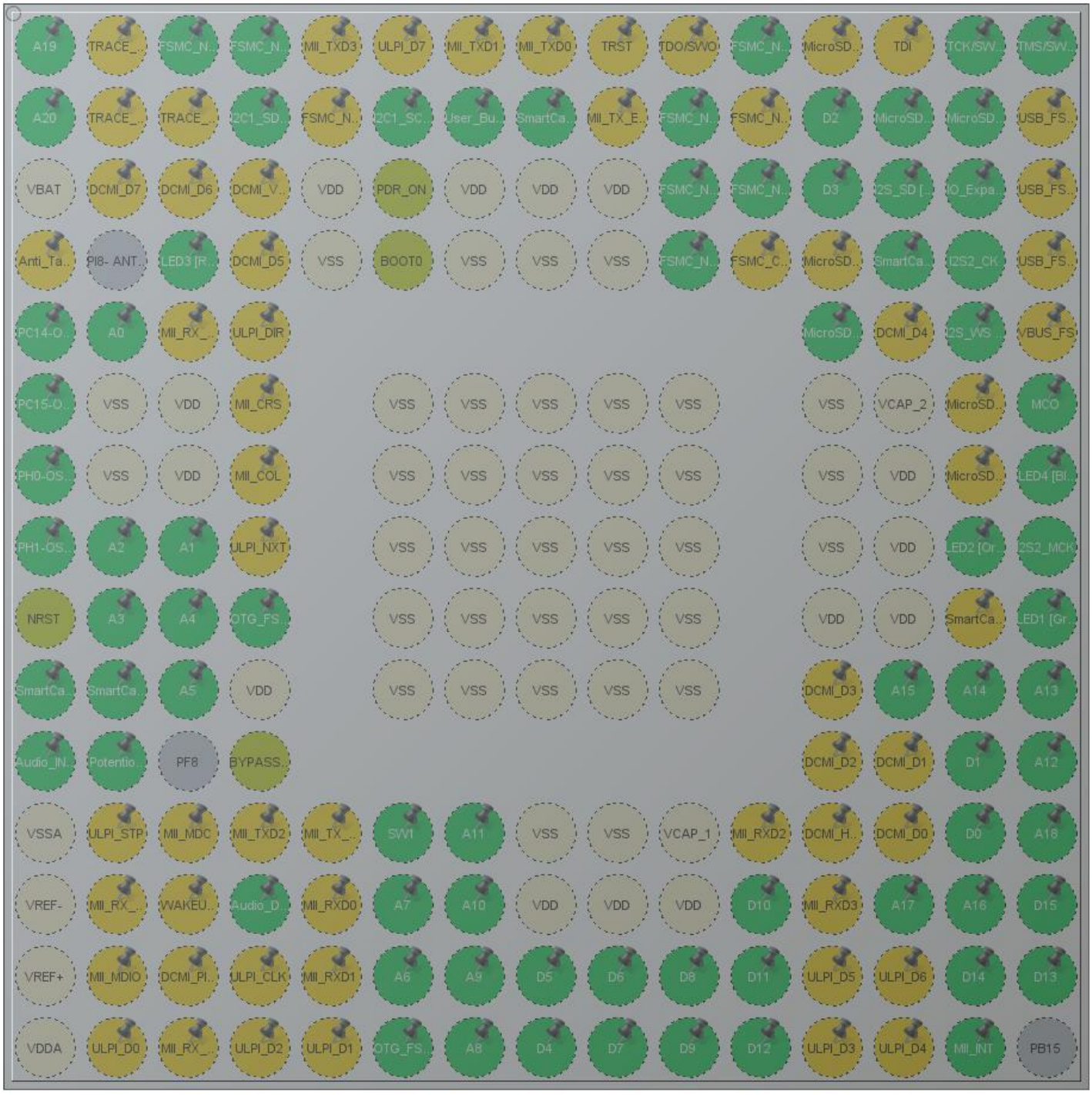
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407IGHx
MCU Package	UFBGA176
MCU Pin number	201

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration



UFBGA176 +25 (Top view)

3. Pins Configuration

Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
A1	PE3	I/O	FSMC_A19	A19
A2	PE2 *	I/O	SYS_TRACECLK	TRACE_CLK
A3	PE1	I/O	FSMC_NBL1	FSMC_NBL1 [SRAM_BHE]
A4	PE0	I/O	FSMC_NBL0	FSMC_NBL0 [SRAM_BLE]
A5	PB8 *	I/O	ETH_TXD3	MII_TXD3
A6	PB5 *	I/O	USB_OTG_HS_ULPI_D7	ULPI_D7
A7	PG14 *	I/O	ETH_TXD1	MII_TXD1
A8	PG13 *	I/O	ETH_TXD0	MII_TXD0
A9	PB4 *	I/O	SYS_JTRST	TRST
A10	PB3 *	I/O	SYS_JTDO-SWO	TDO/SWO
A11	PD7	I/O	FSMC_NE1	FSMC_NE1 [OneNAND_CE]
A12	PC12 *	I/O	SDIO_CK	MicroSDCard_CLK
A13	PA15 *	I/O	SYS_JTDI	TDI
A14	PA14	I/O	SYS_JTCK-SWCLK	TCK/SWCLK
A15	PA13	I/O	SYS_JTMS-SWDIO	TMS/SWDIO
B1	PE4	I/O	FSMC_A20	A20
B2	PE5 *	I/O	SYS_TRACED2	TRACE_D2
B3	PE6 *	I/O	SYS_TRACED3	TRACE_D3
B4	PB9	I/O	I2C1_SDA	I2C1_SDA [CAM_SDA]
B5	PB7 *	I/O	FSMC_NL	FSMC_NL [OneNAND_AVD]
B6	PB6	I/O	I2C1_SCL	I2C1_SCL [CAM_SCL]
B7	PG15	I/O	GPIO_EXTI15	User_Button [Button B4]
B8	PG12 **	I/O	GPIO_Output	SmartCard_CMDVCC
B9	PG11 *	I/O	ETH_TX_EN	MII_TX_EN
B10	PG10	I/O	FSMC_NE3	FSMC_NE3 [TFT-LCD_CS]
B11	PD6 *	I/O	FSMC_NWAIT	FSMC_NWAIT [OneNAND_RDY]
B12	PD0	I/O	FSMC_D2	D2
B13	PC11	I/O	USART3_RX	MicroSDCard_D3
B14	PC10	I/O	USART3_TX	MicroSDCard_D2
B15	PA12 *	I/O	USB_OTG_FS_DP	USB_FS_DP
C1	VBAT	Power		
C2	PI7 *	I/O	DCMI_D7	DCMI_D7
C3	PI6 *	I/O	DCMI_D6	DCMI_D6

Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
C4	PI5 *	I/O	DCMI_VSYNC	DCMI_VSYNC
C5	VDD	Power		
C6	PDR_ON	Reset		
C7	VDD	Power		
C8	VDD	Power		
C9	VDD	Power		
C10	PG9	I/O	FSMC_NE2	FSMC_NE2 [SDRAM_CE]
C11	PD5	I/O	FSMC_NWE	FSMC_NWE
C12	PD1	I/O	FSMC_D3	D3
C13	PI3	I/O	I2S2_SD	I2S_SD [CS43L22_SDIN]
C14	PI2	I/O	GPIO_EXTI2	IO_Expander_INT
C15	PA11 *	I/O	USB_OTG_FS_DM	USB_FS_DM
D1	PC13-ANTI_TAMP *	I/O	RTC_AF1	Anti_Tamper [Button B3]
D3	PI9 **	I/O	GPIO_Output	LED3 [Red]
D4	PI4 *	I/O	DCMI_D5	DCMI_D5
D5	VSS	Power		
D6	BOOT0	Boot		
D7	VSS	Power		
D8	VSS	Power		
D9	VSS	Power		
D10	PD4	I/O	FSMC_NOE	FSMC_NOE
D11	PD3 *	I/O	FSMC_CLK	FSMC_CLK [OneNAND_CLK]
D12	PD2 *	I/O	SDIO_CMD	MicroSDCard_CMD
D13	PH15 **	I/O	GPIO_Output	SmartCard_3/5V
D14	PI1	I/O	I2S2_CK	
D15	PA10 *	I/O	USB_OTG_FS_ID	USB_FS_ID
E1	PC14-OSC32_IN	I/O	RCC_OSC32_IN	PC14-OSC32_IN
E2	PF0	I/O	FSMC_A0	A0
E3	PI10 *	I/O	ETH_RX_ER	MII_RX_ER
E4	PI11 *	I/O	USB_OTG_HS_ULPI_DIR	ULPI_DIR
E12	PH13 **	I/O	GPIO_Input	MicroSDCard_Detect
E13	PH14 *	I/O	DCMI_D4	DCMI_D4
E14	PI0	I/O	I2S2_WS	I2S_WS [CS43L22_LRCK]
E15	PA9 *	I/O	USB_OTG_FS_VBUS	VBUS_FS
F1	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	PC15-OSC32_OUT
F2	VSS	Power		
F3	VDD	Power		
F4	PH2 *	I/O	ETH_CRS	MII_CRS

Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
F6	VSS	Power		
F7	VSS	Power		
F8	VSS	Power		
F9	VSS	Power		
F10	VSS	Power		
F12	VSS	Power		
F13	VCAP_2	Power		
F14	PC9 *	I/O	SDIO_D1	MicroSDCard_D1
F15	PA8	I/O	RCC_MCO_1	MCO
G1	PH0-OSC_IN	I/O	RCC_OSC_IN	PH0-OSC_IN
G2	VSS	Power		
G3	VDD	Power		
G4	PH3 *	I/O	ETH_COL	MII_COL
G6	VSS	Power		
G7	VSS	Power		
G8	VSS	Power		
G9	VSS	Power		
G10	VSS	Power		
G12	VSS	Power		
G13	VDD	Power		
G14	PC8 *	I/O	SDIO_D0	MicroSDCard_D0
G15	PC7 **	I/O	GPIO_Output	LED4 [Blue]
H1	PH1-OSC_OUT	I/O	RCC_OSC_OUT	PH1-OSC_OUT
H2	PF2	I/O	FSMC_A2	A2
H3	PF1	I/O	FSMC_A1	A1
H4	PH4 *	I/O	USB_OTG_HS_ULPI_NXT	ULPI_NXT
H6	VSS	Power		
H7	VSS	Power		
H8	VSS	Power		
H9	VSS	Power		
H10	VSS	Power		
H12	VSS	Power		
H13	VDD	Power		
H14	PG8 **	I/O	GPIO_Output	LED2 [Orange]
H15	PC6	I/O	I2S2_MCK	
J1	NRST	Reset		
J2	PF3	I/O	FSMC_A3	A3
J3	PF4	I/O	FSMC_A4	A4
J4	PH5 **	I/O	GPIO_Output	OTG_FS_PowerSwitchOn

Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
J6	VSS	Power		
J7	VSS	Power		
J8	VSS	Power		
J9	VSS	Power		
J10	VSS	Power		
J12	VDD	Power		
J13	VDD	Power		
J14	PG7 *	I/O	USART6_CK	SmartCard_CLK
J15	PG6 **	I/O	GPIO_Output	LED1 [Green]
K1	PF7 **	I/O	GPIO_Output	SmartCard_RST
K2	PF6 **	I/O	GPIO_Input	SmartCard_OFF
K3	PF5	I/O	FSMC_A5	A5
K4	VDD	Power		
K6	VSS	Power		
K7	VSS	Power		
K8	VSS	Power		
K9	VSS	Power		
K10	VSS	Power		
K12	PH12 *	I/O	DCMI_D3	DCMI_D3
K13	PG5	I/O	FSMC_A15	A15
K14	PG4	I/O	FSMC_A14	A14
K15	PG3	I/O	FSMC_A13	A13
L1	PF10	I/O	ADC3_IN8	Audio_IN [TS472_OUT+]
L2	PF9	I/O	ADC3_IN7	Potentiometer [RV1]
L4	BYPASS_REG	Reset		
L12	PH11 *	I/O	DCMI_D2	DCMI_D2
L13	PH10 *	I/O	DCMI_D1	DCMI_D1
L14	PD15	I/O	FSMC_D1	D1
L15	PG2	I/O	FSMC_A12	A12
M1	VSSA	Power		
M2	PC0 *	I/O	USB_OTG_HS_ULPI_STP	ULPI_STP
M3	PC1 *	I/O	ETH_MDC	MII_MDC
M4	PC2 *	I/O	ETH_TXD2	MII_TXD2
M5	PC3 *	I/O	ETH_TX_CLK	MII_TX_CLK
M6	PB2 **	I/O	GPIO_Input	SW1
M7	PG1	I/O	FSMC_A11	A11
M8	VSS	Power		
M9	VSS	Power		
M10	VCAP_1	Power		

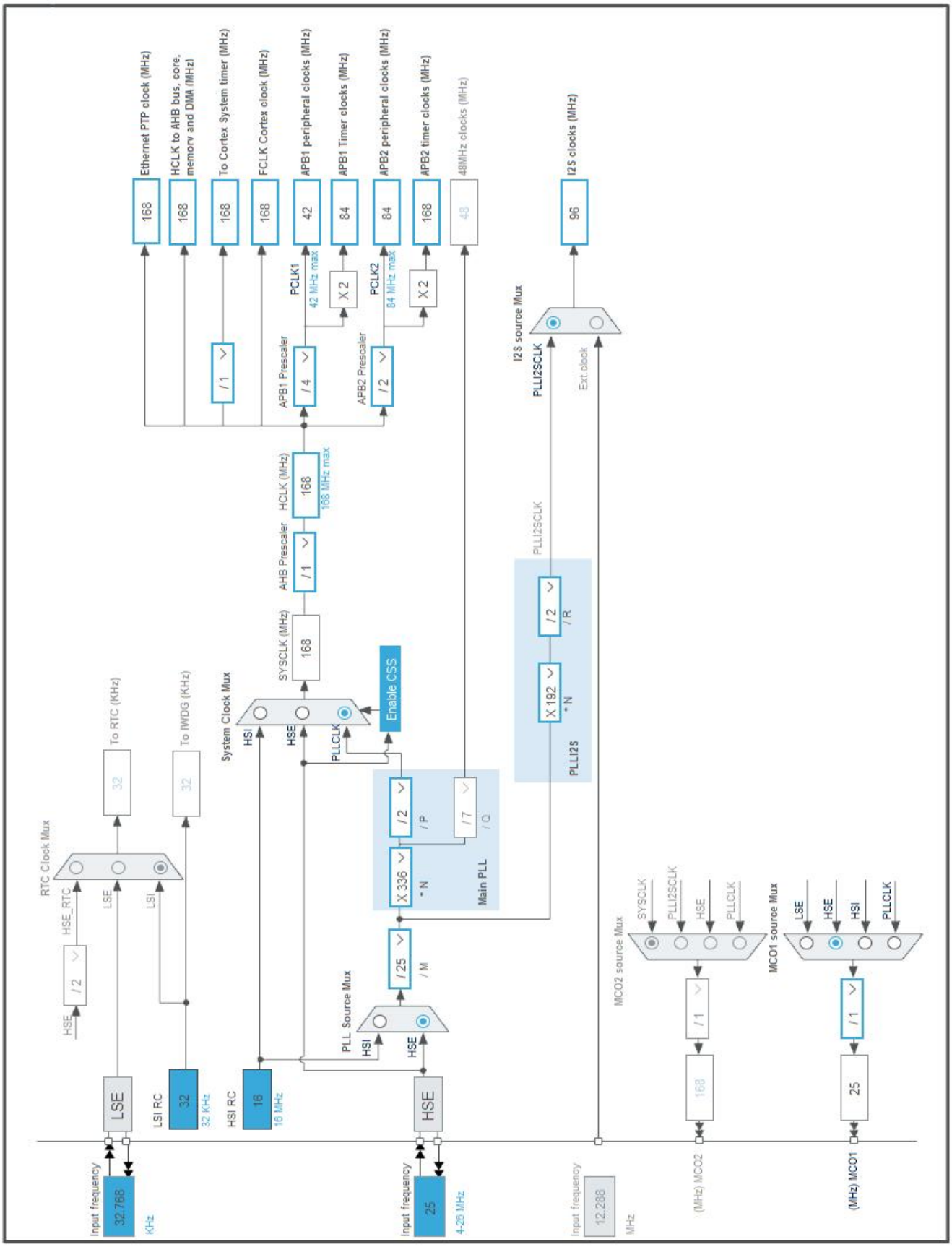
Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
M11	PH6 *	I/O	ETH_RXD2	MII_RXD2
M12	PH8 *	I/O	DCMI_HSYNC	DCMI_HSYNC
M13	PH9 *	I/O	DCMI_D0	DCMI_D0
M14	PD14	I/O	FSMC_D0	D0
M15	PD13	I/O	FSMC_A18	A18
N1	VREF-	Power		
N2	PA1 *	I/O	ETH_RX_CLK	MII_RX_CLK/RMII_REF_CLK
N3	PA0-WKUP *	I/O	SYS_WKUP	WAKEUP [Button B2]
N4	PA4	I/O	DAC_OUT1	Audio_DAC_OUT [CS43L22_AIN1]
N5	PC4 *	I/O	ETH_RXD0	MII_RXD0
N6	PF13	I/O	FSMC_A7	A7
N7	PG0	I/O	FSMC_A10	A10
N8	VDD	Power		
N9	VDD	Power		
N10	VDD	Power		
N11	PE13	I/O	FSMC_D10	D10
N12	PH7 *	I/O	ETH_RXD3	MII_RXD3
N13	PD12	I/O	FSMC_A17	A17
N14	PD11	I/O	FSMC_A16	A16
N15	PD10	I/O	FSMC_D15	D15
P1	VREF+	Power		
P2	PA2 *	I/O	ETH_MDIO	MII_MDIO
P3	PA6 *	I/O	DCMI_PIXCLK	DCMI_PIXCK
P4	PA5 *	I/O	USB_OTG_HS_ULPI_CK	ULPI_CLK
P5	PC5 *	I/O	ETH_RXD1	MII_RXD1
P6	PF12	I/O	FSMC_A6	A6
P7	PF15	I/O	FSMC_A9	A9
P8	PE8	I/O	FSMC_D5	D5
P9	PE9	I/O	FSMC_D6	D6
P10	PE11	I/O	FSMC_D8	D8
P11	PE14	I/O	FSMC_D11	D11
P12	PB12 *	I/O	USB_OTG_HS_ULPI_D5	ULPI_D5
P13	PB13 *	I/O	USB_OTG_HS_ULPI_D6	ULPI_D6
P14	PD9	I/O	FSMC_D14	D14
P15	PD8	I/O	FSMC_D13	D13
R1	VDDA	Power		
R2	PA3 *	I/O	USB_OTG_HS_ULPI_D0	ULPI_D0
R3	PA7 *	I/O	ETH_RX_DV	MII_RX_DV/RMII_CRSDV

Pin Number UFBGA176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
R4	PB1 *	I/O	USB_OTG_HS_ULPI_D2	ULPI_D2
R5	PB0 *	I/O	USB_OTG_HS_ULPI_D1	ULPI_D1
R6	PF11	I/O	GPIO_EXTI11	OTG_FS_OverCurrent
R7	PF14	I/O	FSMC_A8	A8
R8	PE7	I/O	FSMC_D4	D4
R9	PE10	I/O	FSMC_D7	D7
R10	PE12	I/O	FSMC_D9	D9
R11	PE15	I/O	FSMC_D12	D12
R12	PB10 *	I/O	USB_OTG_HS_ULPI_D3	ULPI_D3
R13	PB11 *	I/O	USB_OTG_HS_ULPI_D4	ULPI_D4
R14	PB14	I/O	GPIO_EXTI14	MII_INT

** 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	AudioOutputTest
Project Folder	C:\Users\student\Desktop\VoxART\AudioOutputTest
Toolchain / IDE	MDK-ARM V5.32
Firmware Package Name and Version	STM32Cube FW_F4 V1.28.0
Application Structure	Advanced
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	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_DMA_Init	DMA
4	MX_ADC3_Init	ADC3
5	MX_DAC_Init	DAC
6	MX_FSMC_Init	FSMC
7	MX_I2C1_Init	I2C1
8	MX_I2S2_Init	I2S2
9	MX_USART3_UART_Init	USART3
10	MX_TIM2_Init	TIM2

1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407IGHx
Datasheet	DS8626_Rev8

1.2. Parameter Selection

Temperature	25
Vdd	3.3

1.3. 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

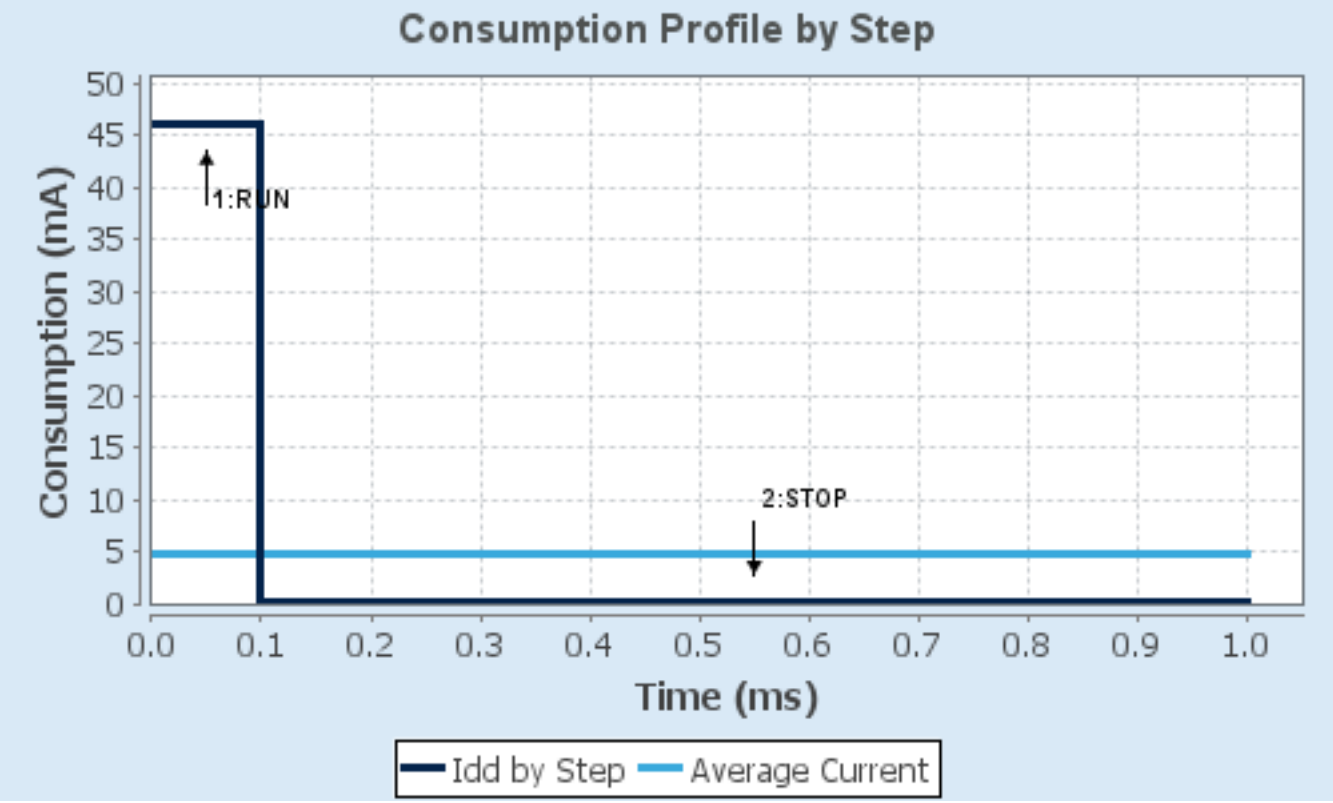
1.4. Sequence

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 µA
Duration	0.1 ms	0.9 ms
DMIPS	210.0	0.0
Ta Max	99.08	104.96
Category	In DS Table	In DS Table

1.5. Results

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

1.6. Chart


Consumption Profile by Step
Consumption (mA)
50
45
40
35
30
25
20
15
10
5
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

2. Peripherals and Middlewares Configuration

2.1. ADC3

mode: IN7

mode: IN8

2.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	EOC flag at the end of single channel conversion

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 7
Sampling Time	3 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

2.2. DAC

mode: OUT1 Configuration

2.2.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	None

2.3. FSMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

Chip Select: NE1

Memory type: NOR Flash

Address: 21 bits

Data: 16 bits

NOR Flash/PSRAM/SRAM/ROM/LCD 2

Chip Select: NE2

Memory type: SRAM

Address: 21 bits

Data: 16 bits

Byte enable: set

NOR Flash/PSRAM/SRAM/ROM/LCD 3

Chip Select: NE3

Memory type: SRAM

Address: 21 bits

Data: 16 bits

2.3.1. NOR/PSRAM 1:

NOR/PSRAM control:

Memory type	NOR Flash
Bank	Bank 1 NOR/PSRAM 1
Write operation	Disabled
Extended mode	Disabled

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

2.3.2. NOR/PSRAM 2:

NOR/PSRAM control:

Memory type	SRAM
Bank	Bank 1 NOR/PSRAM 2
Write operation	Disabled
Extended mode	Disabled

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	15

Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

2.3.3. NOR/PSRAM 3:

NOR/PSRAM control:

Memory type	SRAM
Bank	Bank 1 NOR/PSRAM 3
Write operation	Disabled
Extended mode	Disabled

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

2.4. I2C1

I2C: I2C

2.4.1. Parameter Settings:

Master Features:

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

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

2.5. I2S2

Mode: Half-Duplex Master

mode: Master Clock Output

2.5.1. Parameter Settings:

Generic Parameters:

Transmission Mode	Mode Master Transmit
Communication Standard	I2S Philips

Data and Frame Format	16 Bits Data on 16 Bits Frame
Selected Audio Frequency	**48 KHz ***
Real Audio Frequency	**46.875 KHz ***
Error between Selected and Real	**-2.34 % ***

Clock Parameters:

Clock Source	I2S PLL Clock
Clock Polarity	Low

2.6. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

mode: Master Clock Output 1

2.6.1. 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 Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

2.7. SYS

Debug: Serial Wire

Timebase Source: SysTick

2.8. TIM2

Clock Source : Internal Clock

2.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**84-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**20-1 ***
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	**Update Event ***

2.9. USART3

Mode: Asynchronous

2.9.1. 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

*** User modified value**

3. System Configuration

3.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC3	PF10	ADC3_IN8	Analog mode	No pull-up and no pull-down	n/a	Audio_IN [TS472_OUT+]
	PF9	ADC3_IN7	Analog mode	No pull-up and no pull-down	n/a	Potentiometer [RV1]
DAC	PA4	DAC_OUT1	Analog mode	No pull-up and no pull-down	n/a	Audio_DAC_OUT [CS43L22_AIN1]
FSMC	PE3	FSMC_A19	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A19
	PE1	FSMC_NBL1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NBL1 [SRAM_BHE]
	PE0	FSMC_NBL0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NBL0 [SRAM_BLE]
	PD7	FSMC_NE1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NE1 [OneNAND_CE]
	PE4	FSMC_A20	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A20
	PG10	FSMC_NE3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NE3 [TFT-LCD_CS]
	PD0	FSMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D2
	PG9	FSMC_NE2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NE2 [SDRAM_CE]
	PD5	FSMC_NWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NWE
	PD1	FSMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D3
	PD4	FSMC_NOE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NOE
	PF0	FSMC_A0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A0
	PF2	FSMC_A2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A2
	PF1	FSMC_A1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A1
	PF3	FSMC_A3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A3
	PF4	FSMC_A4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A4
	PF5	FSMC_A5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A5
	PG5	FSMC_A15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A15
	PG4	FSMC_A14	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A14
	PG3	FSMC_A13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A13
	PD15	FSMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D1
	PG2	FSMC_A12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A12
	PG1	FSMC_A11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A11
	PD14	FSMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D0
	PD13	FSMC_A18	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A18
	PF13	FSMC_A7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A7
	PG0	FSMC_A10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A10
	PE13	FSMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D10
	PD12	FSMC_A17	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A17
	PD11	FSMC_A16	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A16

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD10	FSMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D15
	PF12	FSMC_A6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A6
	PF15	FSMC_A9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A9
	PE8	FSMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D5
	PE9	FSMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D6
	PE11	FSMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D8
	PE14	FSMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D11
	PD9	FSMC_D14	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D14
	PD8	FSMC_D13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D13
	PF14	FSMC_A8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A8
	PE7	FSMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D4
	PE10	FSMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D7
	PE12	FSMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D9
	PE15	FSMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D12
I2C1	PB9	I2C1_SDA	Alternate Function Open Drain	**Pull-up ***	Low	I2C1_SDA [CAM_SDA]
	PB6	I2C1_SCL	Alternate Function Open Drain	**Pull-up ***	Low	I2C1_SCL [CAM_SCL]
I2S2	PI3	I2S2_SD	Alternate Function Push Pull	No pull-up and no pull-down	Low	I2S_SD [CS43L22_SDIN]
	PI1	I2S2_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PI0	I2S2_WS	Alternate Function Push Pull	No pull-up and no pull-down	Low	I2S_WS [CS43L22_LRCK]
	PC6	I2S2_MCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	PC14-OSC32_IN
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	PC15-OSC32_OUT
	PA8	RCC_MCO_1	Alternate Function Push Pull	No pull-up and no pull-down	Low	MCO
	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	PH0-OSC_IN
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	PH1-OSC_OUT
SYS	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK/SWCLK
	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS/SWDIO
USART3	PC11	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	MicroSDCard_D3
	PC10	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	MicroSDCard_D2
Single Mapped Signals	PE2	SYS_TRACECLK	n/a	n/a	n/a	TRACE_CLK
	PB8	ETH_TXD3	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TXD3
	PB5	USB_OTG_HS_ULPI_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D7

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PG14	ETH_TXD1	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TXD1
	PG13	ETH_TXD0	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TXD0
	PB4	SYS_JTRST	n/a	n/a	n/a	TRST
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	TDO/SWO
	PC12	SDIO_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	MicroSDCard_CLK
	PA15	SYS_JTDI	n/a	n/a	n/a	TDI
	PE5	SYS_TRACED2	n/a	n/a	n/a	TRACE_D2
	PE6	SYS_TRACED3	n/a	n/a	n/a	TRACE_D3
	PB7	FSMC_NL	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NL [OneNAND_AVD]
	PG11	ETH_TX_EN	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TX_EN
	PD6	FSMC_NWAIT	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_NWAIT [OneNAND_RDY]
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_DP
	PI7	DCMI_D7	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D7
	PI6	DCMI_D6	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D6
	PI5	DCMI_VSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_VSYNC
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_DM
	PC13-ANTI_TAMP	RTC_AF1	n/a	n/a	n/a	Anti_Tamper [Button B3]
	PI4	DCMI_D5	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D5
	PD3	FSMC_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	FSMC_CLK [OneNAND_CLK]
	PD2	SDIO_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	MicroSDCard_CMD
	PA10	USB_OTG_FS_ID	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_ID
	PI10	ETH_RX_ER	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RX_ER
	PI11	USB_OTG_HS_ULPI_DIR	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_DIR
	PH14	DCMI_D4	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D4
	PA9	USB_OTG_FS_VBUS	Input mode	No pull-up and no pull-down	n/a	VBUS_FS
	PH2	ETH_CRS	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_CRS
	PC9	SDIO_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	MicroSDCard_D1
	PH3	ETH_COL	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_COL
	PC8	SDIO_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	MicroSDCard_D0
	PH4	USB_OTG_HS_ULPI_NXT	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_NXT
	PG7	USART6_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	SmartCard_CLK
	PH12	DCMI_D3	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D3

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PH11	DCMI_D2	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D2
	PH10	DCMI_D1	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D1
	PC0	USB_OTG_HS_ULPI_STP	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_STP
	PC1	ETH_MDC	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_MDC
	PC2	ETH_TXD2	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TXD2
	PC3	ETH_TX_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_TX_CLK
	PH6	ETH_RXD2	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RXD2
	PH8	DCMI_HSYNC	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_HSYNC
	PH9	DCMI_D0	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_D0
	PA1	ETH_RX_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RX_CLK/RMII_REF_CLK
	PA0-WKUP	SYS_WKUP	n/a	n/a	n/a	WAKEUP [Button B2]
	PC4	ETH_RXD0	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RXD0
	PH7	ETH_RXD3	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RXD3
	PA2	ETH_MDIO	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_MDIO
	PA6	DCMI_PIXCLK	Alternate Function Push Pull	No pull-up and no pull-down	Low	DCMI_PIXCK
	PA5	USB_OTG_HS_ULPI_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_CLK
	PC5	ETH_RXD1	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RXD1
	PB12	USB_OTG_HS_ULPI_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D5
	PB13	USB_OTG_HS_ULPI_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D6
	PA3	USB_OTG_HS_ULPI_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D0
	PA7	ETH_RX_DV	Alternate Function Push Pull	No pull-up and no pull-down	Low	MII_RX_DV/RMII_CRSDV
	PB1	USB_OTG_HS_ULPI_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D2
	PB0	USB_OTG_HS_ULPI_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D1
	PB10	USB_OTG_HS_ULPI_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D3
	PB11	USB_OTG_HS_ULPI_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	ULPI_D4
GPIO	PG15	GPIO_EXTI15	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	User_Button [Button B4]
	PG12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SmartCard_CMDVCC
	PI2	GPIO_EXTI2	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	IO_Expander_INT

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PI9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED3 [Red]
	PH15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SmartCard_3/5V
	PH13	GPIO_Input	Input mode	**Pull-up ***	n/a	MicroSDCard_Detect
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED4 [Blue]
	PG8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED2 [Orange]
	PH5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OTG_FS_PowerSwitchOn
	PG6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED1 [Green]
	PF7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SmartCard_RST
	PF6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	SmartCard_OFF
	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	SW1
	PF11	GPIO_EXTI11	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	OTG_FS_OverCurrent
	PB14	GPIO_EXTI14	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	MII_INT

3.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI2_TX	DMA1_Stream4	Memory To Peripheral	Low

SPI2_TX: DMA1_Stream4 DMA request Settings:

Mode:	**Circular ***
Use fifo:	**Enable ***
FIFO Threshold:	Full
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	**Half Word ***
Memory Data Width:	**Half Word ***
Peripheral Burst Size:	Single
Memory Burst Size:	Single

3.3. NVIC configuration

3.3.1. 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 stream4 global interrupt	true	0	0
TIM2 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1, ADC2 and ADC3 global interrupts	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI2 global interrupt	unused		
USART3 global interrupt	unused		
TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts	unused		
FPU global interrupt	unused		

3.3.2. NVIC Code generation

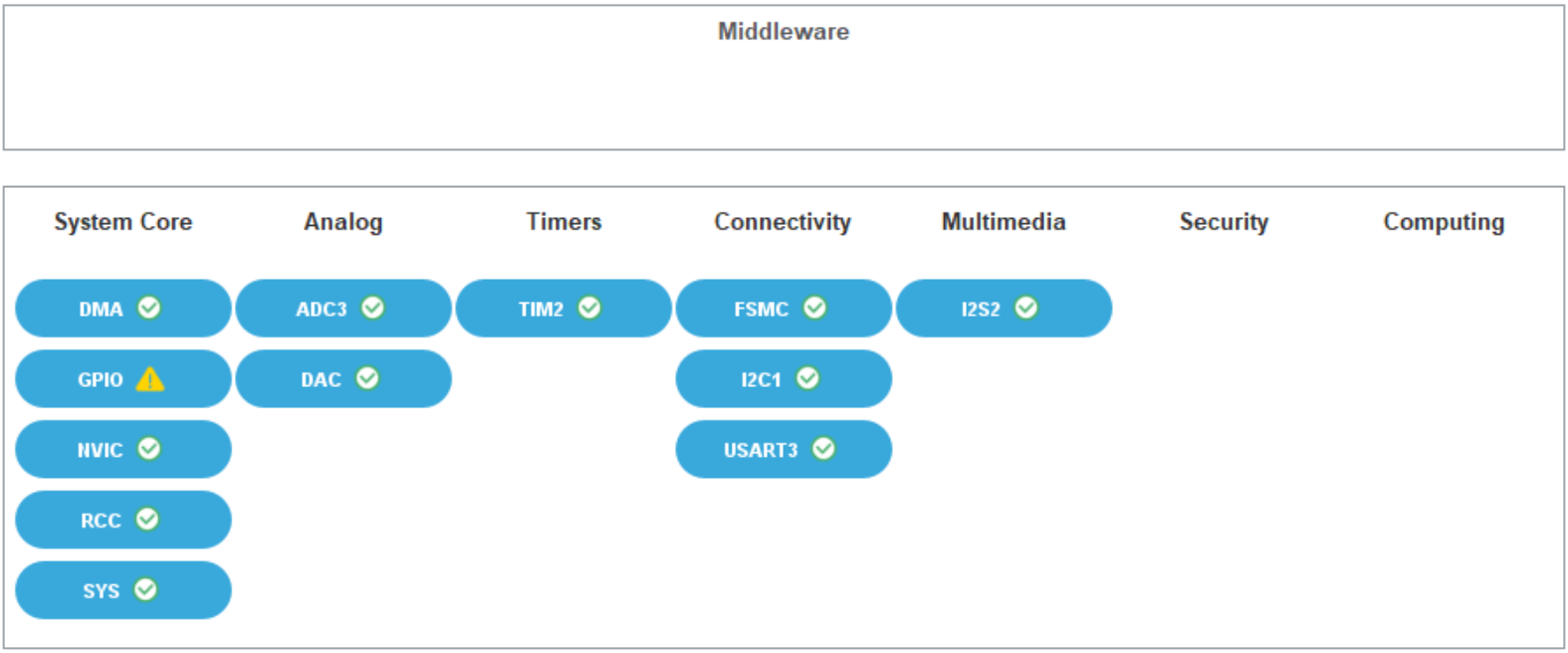
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal 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
DMA1 stream4 global interrupt	false	true	true
TIM2 global interrupt	false	true	true

*** User modified value**

4. System Views

4.1. Category view

4.1.1. Current



5. Docs & Resources

Type	Link