



1. Description

1.1. Project

Project Name	Looper-STM32CubeIDE
Board Name	STM32F429I-DISC1
Generated with:	STM32CubeMX 6.5.0
Date	05/08/2022

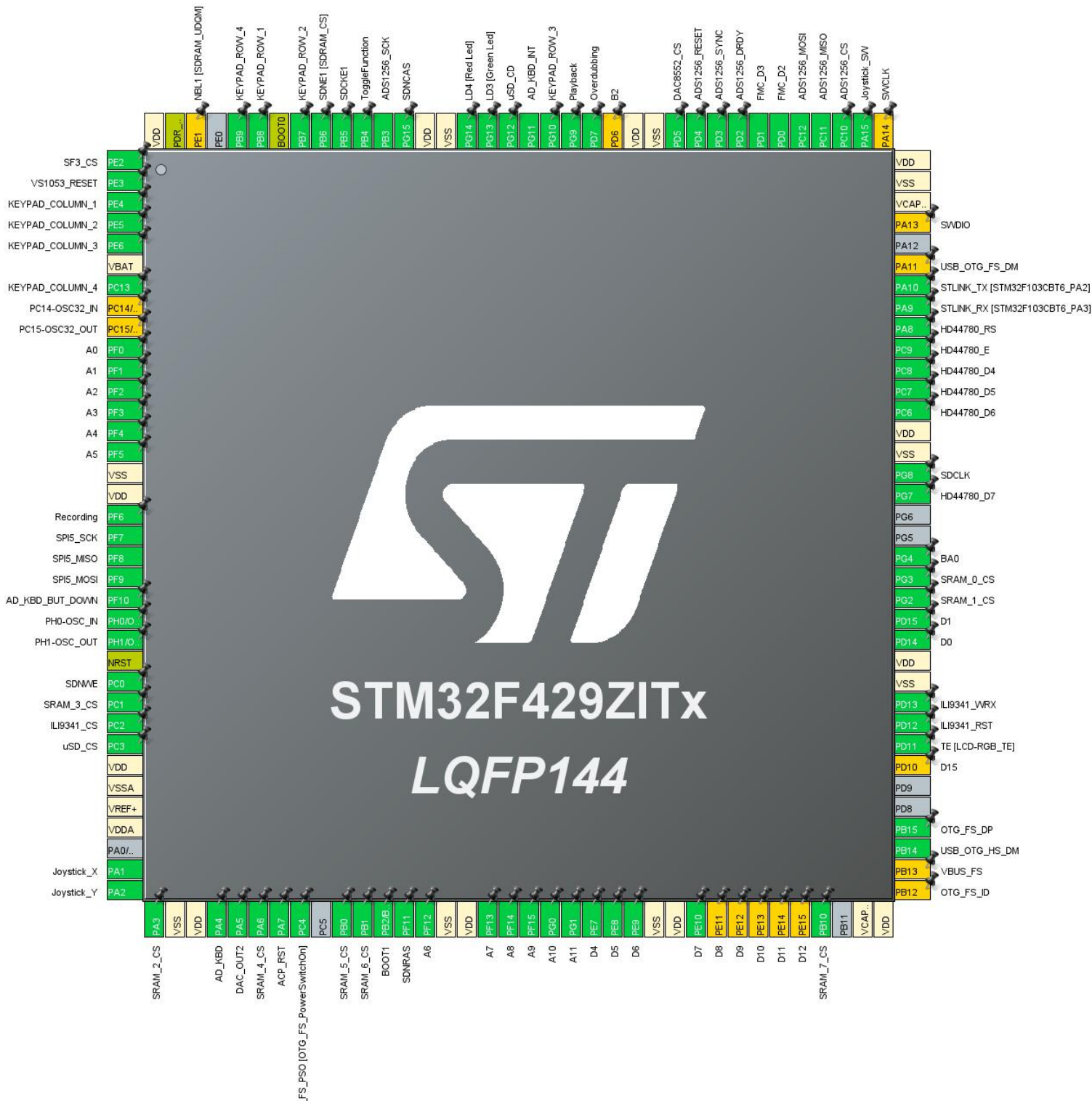
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F429/439
MCU name	STM32F429ZITx
MCU Package	LQFP144
MCU Pin number	144

1.3. Core(s) information

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



3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2 *	I/O	GPIO_Output	SF3_CS
2	PE3 *	I/O	GPIO_Output	VS1053_RESET
3	PE4 *	I/O	GPIO_Output	KEYPAD_COLUMN_1
4	PE5 *	I/O	GPIO_Output	KEYPAD_COLUMN_2
5	PE6 *	I/O	GPIO_Output	KEYPAD_COLUMN_3
6	VBAT	Power		
7	PC13 *	I/O	GPIO_Output	KEYPAD_COLUMN_4
8	PC14/OSC32_IN **	I/O	RCC_OSC32_IN	PC14-OSC32_IN
9	PC15/OSC32_OUT **	I/O	RCC_OSC32_OUT	PC15-OSC32_OUT
10	PF0	I/O	FMC_A0	A0
11	PF1	I/O	FMC_A1	A1
12	PF2	I/O	FMC_A2	A2
13	PF3	I/O	FMC_A3	A3
14	PF4	I/O	FMC_A4	A4
15	PF5	I/O	FMC_A5	A5
16	VSS	Power		
17	VDD	Power		
18	PF6	I/O	GPIO_EXTI6	Recording
19	PF7	I/O	SPI5_SCK	
20	PF8	I/O	SPI5_MISO	
21	PF9	I/O	SPI5_MOSI	
22	PF10	I/O	GPIO_EXTI10	AD_KBD_BUT_DOWN
23	PH0/OSC_IN	I/O	RCC_OSC_IN	PH0-OSC_IN
24	PH1/OSC_OUT	I/O	RCC_OSC_OUT	PH1-OSC_OUT
25	NRST	Reset		
26	PC0	I/O	FMC_SDNWE	SDNWE
27	PC1 *	I/O	GPIO_Output	SRAM_3_CS
28	PC2 *	I/O	GPIO_Output	ILI9341_CS
29	PC3 *	I/O	GPIO_Output	uSD_CS
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
35	PA1	I/O	ADC3_IN1	Joystick_X
36	PA2	I/O	ADC3_IN2	Joystick_Y
37	PA3 *	I/O	GPIO_Output	SRAM_2_CS

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
38	VSS	Power		
39	VDD	Power		
40	PA4	I/O	ADC1_IN4	AD_KBD
41	PA5	I/O	DAC_OUT2	
42	PA6 *	I/O	GPIO_Output	SRAM_4_CS
43	PA7 *	I/O	GPIO_Output	ACP_RST
44	PC4 *	I/O	GPIO_Output	OTG_FS_PSO [OTG_FS_PowerSwitchOn]
46	PB0 *	I/O	GPIO_Output	SRAM_5_CS
47	PB1 *	I/O	GPIO_Output	SRAM_6_CS
48	PB2/BOOT1 *	I/O	GPIO_Input	BOOT1
49	PF11	I/O	FMC_SDNRAS	SDNRAS
50	PF12	I/O	FMC_A6	A6
51	VSS	Power		
52	VDD	Power		
53	PF13	I/O	FMC_A7	A7
54	PF14	I/O	FMC_A8	A8
55	PF15	I/O	FMC_A9	A9
56	PG0	I/O	FMC_A10	A10
57	PG1	I/O	FMC_A11	A11
58	PE7	I/O	FMC_D4	D4
59	PE8	I/O	FMC_D5	D5
60	PE9	I/O	FMC_D6	D6
61	VSS	Power		
62	VDD	Power		
63	PE10	I/O	FMC_D7	D7
64	PE11 **	I/O	FMC_D8	D8
65	PE12 **	I/O	FMC_D9	D9
66	PE13 **	I/O	FMC_D10	D10
67	PE14 **	I/O	FMC_D11	D11
68	PE15 **	I/O	FMC_D12	D12
69	PB10 *	I/O	GPIO_Output	SRAM_7_CS
71	VCAP_1	Power		
72	VDD	Power		
73	PB12 **	I/O	USB_OTG_HS_ID	OTG_FS_ID
74	PB13 **	I/O	USB_OTG_HS_VBUS	VBUS_FS
75	PB14	I/O	USB_OTG_HS_DM	
76	PB15	I/O	USB_OTG_HS_DP	OTG_FS_DP
79	PD10 **	I/O	FMC_D15	D15

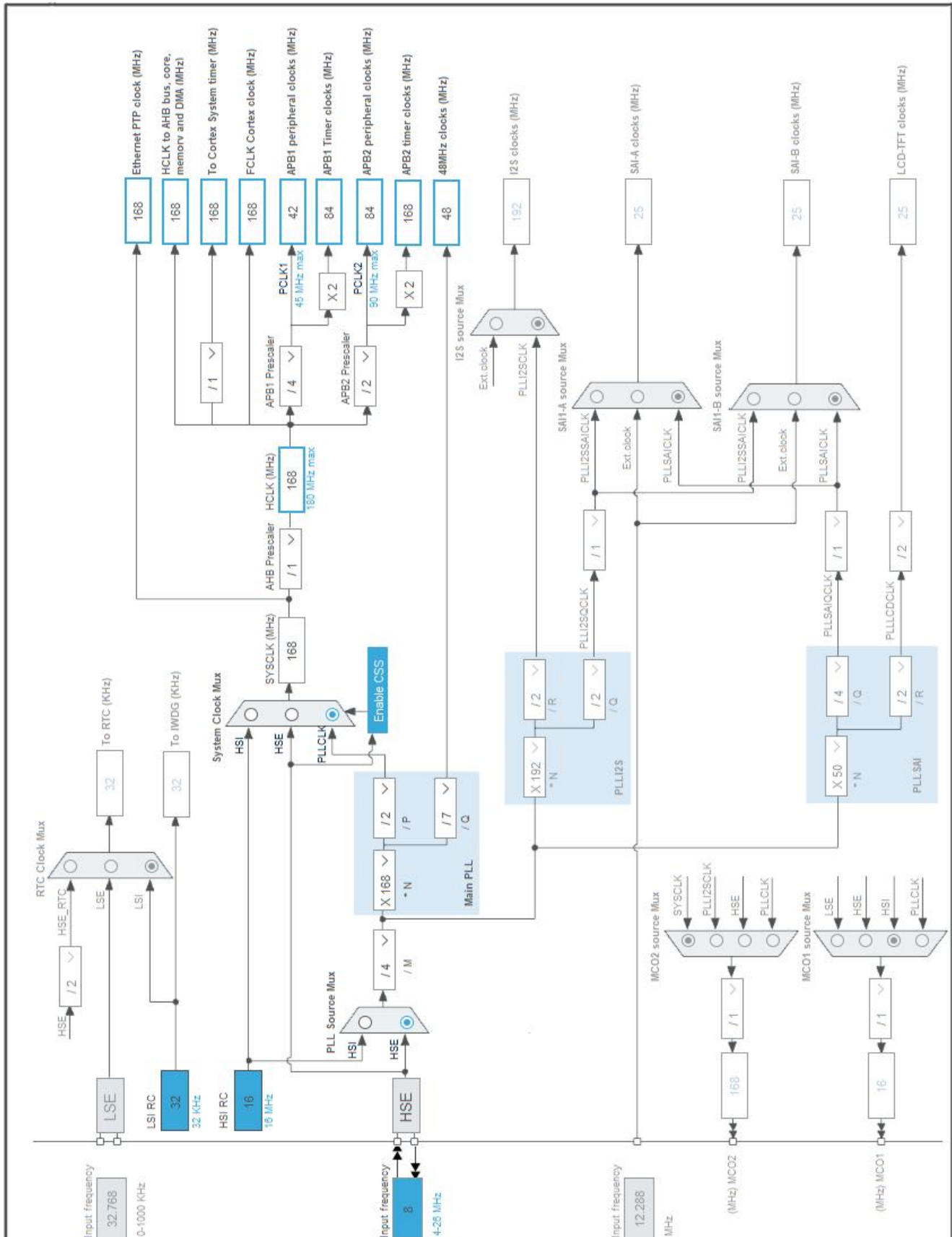
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
80	PD11 *	I/O	GPIO_Input	TE [LCD-RGB_TE]
81	PD12 *	I/O	GPIO_Output	ILI9341_RST
82	PD13 *	I/O	GPIO_Output	ILI9341_WRX
83	VSS	Power		
84	VDD	Power		
85	PD14	I/O	FMC_D0	D0
86	PD15	I/O	FMC_D1	D1
87	PG2 *	I/O	GPIO_Output	SRAM_1_CS
88	PG3 *	I/O	GPIO_Output	SRAM_0_CS
89	PG4	I/O	FMC_BA0	BA0
92	PG7 *	I/O	GPIO_Output	HD44780_D7
93	PG8	I/O	FMC_SDCLK	SDCLK
94	VSS	Power		
95	VDD	Power		
96	PC6 *	I/O	GPIO_Output	HD44780_D6
97	PC7 *	I/O	GPIO_Output	HD44780_D5
98	PC8 *	I/O	GPIO_Output	HD44780_D4
99	PC9 *	I/O	GPIO_Output	HD44780_E
100	PA8 *	I/O	GPIO_Output	HD44780_RS
101	PA9	I/O	USART1_TX	STLINK_RX [STM32F103CBT6_PA3]
102	PA10	I/O	USART1_RX	STLINK_TX [STM32F103CBT6_PA2]
103	PA11 **	I/O	USB_OTG_FS_DM	
105	PA13 **	I/O	SYS_JTMS-SWDIO	SWDIO
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14 **	I/O	SYS_JTCK-SWCLK	SWCLK
110	PA15	I/O	GPIO_EXTI15	Joystick_SW
111	PC10 *	I/O	GPIO_Output	ADS1256_CS
112	PC11	I/O	SPI3_MISO	ADS1256_MISO
113	PC12	I/O	SPI3_MOSI	ADS1256_MOSI
114	PD0	I/O	FMC_D2	
115	PD1	I/O	FMC_D3	
116	PD2	I/O	GPIO_EXTI2	ADS1256_DRDY
117	PD3 *	I/O	GPIO_Output	ADS1256_SYNC
118	PD4 *	I/O	GPIO_Output	ADS1256_RESET
119	PD5 *	I/O	GPIO_Output	DAC8552_CS
120	VSS	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
121	VDD	Power		
122	PD6 **	I/O	LTDC_B2	B2
123	PD7	I/O	GPIO_EXTI7	Overdubbing
124	PG9	I/O	GPIO_EXTI9	Playback
125	PG10 *	I/O	GPIO_Input	KEYPAD_ROW_3
126	PG11	I/O	ADC1_EXTI11	AD_KBD_INT
127	PG12 *	I/O	GPIO_Input	uSD_CD
128	PG13 *	I/O	GPIO_Output	LD3 [Green Led]
129	PG14 *	I/O	GPIO_Output	LD4 [Red Led]
130	VSS	Power		
131	VDD	Power		
132	PG15	I/O	FMC_SDNCAS	SDNCAS
133	PB3	I/O	SPI3_SCK	ADS1256_SCK
134	PB4	I/O	GPIO_EXTI4	ToggleFunction
135	PB5	I/O	FMC_SDCKE1	SDCKE1
136	PB6	I/O	FMC_SDNE1	SDNE1 [SDRAM_CS]
137	PB7 *	I/O	GPIO_Input	KEYPAD_ROW_2
138	BOOT0	Boot		
139	PB8 *	I/O	GPIO_Input	KEYPAD_ROW_1
140	PB9 *	I/O	GPIO_Input	KEYPAD_ROW_4
142	PE1 **	I/O	FMC_NBL1	NBL1 [SDRAM_UDQM]
143	PDR_ON	Reset		
144	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	Looper-STM32CubeIDE
Project Folder	C:\Users\Tomek\workspace\tom32f4\Looper-STM32CubeIDE
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F4 V1.27.0
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	Yes
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	No
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	MX_DMA_Init	DMA
3	MX_TIM2_Init	TIM2
4	MX_FMC_Init	FMC
5	SystemClock_Config	RCC
6	MX_TIM4_Init	TIM4
7	MX_SPI3_Init	SPI3
8	MX_USART1_UART_Init	USART1
9	MX_SPI5_Init	SPI5
10	MX_DAC_Init	DAC
11	MX_TIM8_Init	TIM8

Rank	Function Name	Peripheral Instance Name
12	MX_USB_DEVICE_Init	USB_DEVICE
13	MX_TIM9_Init	TIM9
14	MX_ADC3_Init	ADC3
15	MX_ADC1_Init	ADC1

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F429/439
MCU	STM32F429ZITx
Datasheet	DS9405_Rev9

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

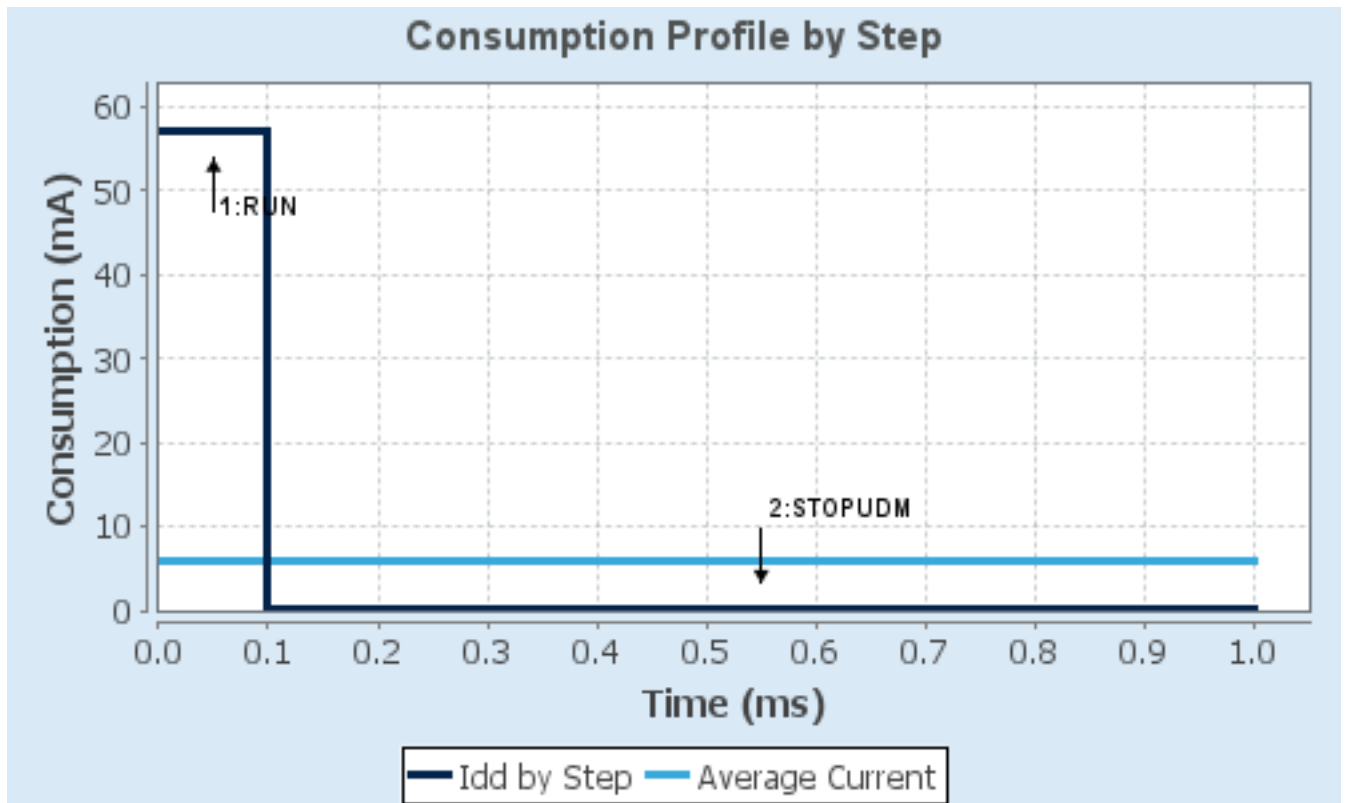
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP UDM (Under Drive)
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	180 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	57 mA	100 μ A
Duration	0.1 ms	0.9 ms
DMIPS	225.0	0.0
Ta Max	97.48	104.99
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	5.79 mA
Battery Life	24 days, 10 hours	Average DMIPS	225.0 DMIPS

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. ADC1

mode: IN4

mode: External-Trigger-for-Regular-conversion

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler PCLK2 divided by 4

Resolution **6 bits (9 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 EXTI Line11

External Trigger Conversion Edge Trigger detection on the rising edge

Rank 1

Channel Channel 4

Sampling Time 3 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

7.2. ADC3

mode: IN1

mode: IN2

7.2.1. Parameter Settings:

ADC_Settings:

Clock Prescaler PCLK2 divided by 4

Resolution **6 bits (9 ADC Clock cycles) ***

Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Enabled *
End Of Conversion Selection	EOC flag at the end of all conversions *
ADC_Regular_ConversionMode:	
Number Of Conversion	2 *
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
<u>Rank</u>	1
Channel	Channel 1
Sampling Time	144 Cycles *
<u>Rank</u>	2 *
Channel	Channel 2 *
Sampling Time	144 Cycles *
ADC_Injected_ConversionMode:	
Number Of Conversions	0
WatchDog:	
Enable Analog WatchDog Mode	false

7.3. DAC

mode: OUT2 Configuration

7.3.1. Parameter Settings:

DAC Out2 Settings:

Output Buffer	Enable
Trigger	Timer 8 Trigger Out event *
Wave generation mode	Disabled

7.4. FMC

SDRAM 2

Clock and chip enable: SDCKE1+SDNE1

Internal bank number: 2 banks

Address: 12 bits

Data: 8 bits

7.4.1. SDRAM 2:

SDRAM control:

Bank	SDRAM bank 2
Number of column address bits	8 bits
Number of row address bits	12 bits
CAS latency	1 memory clock cycle
Write protection	Disabled
SDRAM common clock	Disabled
SDRAM common burst read	Disabled
SDRAM common read pipe delay	0 HCLK clock cycle

SDRAM timing in memory clock cycles:

Load mode register to active delay	16
Exit self-refresh delay	16
Self-refresh time	16
SDRAM common row cycle delay	16
Write recovery time	16
SDRAM common row precharge delay	16
Row to column delay	16

7.5. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.5.1. 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
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
Power Over Drive	Disabled

7.6. SPI3

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)	4 *
Baud Rate	10.5 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	2 Edge *

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.7. SPI5

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)	8 *
Baud Rate	10.5 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.8. SYS

Timebase Source: SysTick

7.9. TIM2

Clock Source : Internal Clock

7.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	104 *
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	799 *
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)

7.10. TIM4

Clock Source : Internal Clock

7.10.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	37499 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	299 *
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)

7.11. TIM8

Clock Source : Internal Clock

7.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	399 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	27 *
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

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

7.12. TIM9

mode: Clock Source

7.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	199 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	199 *
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

7.13. USART1

Mode: Multiprocessor Communication

7.13.1. Parameter Settings:

Basic Parameters:

Baud Rate	31250 *
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

Wake-Up Method

Idle Line

7.14. USB_OTG_HS

Internal FS Phy: Device_Only

7.14.1. Parameter Settings:

Speed	Device Full Speed 12MBit/s
Enable internal IP DMA	Disabled
Physical interface	Internal Phy
Low power	Disabled
Link Power Management	Disabled
Use dedicated end point 1 interrupt	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

7.15. USB_DEVICE

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

7.15.1. 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	128 *
USB CDC Tx Buffer Size	128 *

7.15.2. Device Descriptor:

Device Descriptor:

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

Device Descriptor HS:

PID (Product Identifier)	22336
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PRODUCT_STRING (Product Identifier)

CONFIGURATION_STRING (Configuration Identifier)

INTERFACE_STRING (Interface Identifier)

STM32 Looper *

CDC Config

CDC 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
ADC1	PA4	ADC1_IN4	Analog mode	No pull-up and no pull-down	n/a	AD_KBD
	PG11	ADC1_EXTI11	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	AD_KBD_INT
ADC3	PA1	ADC3_IN1	Analog mode	No pull-up and no pull-down	n/a	Joystick_X
	PA2	ADC3_IN2	Analog mode	No pull-up and no pull-down	n/a	Joystick_Y
DAC	PA5	DAC_OUT2	Analog mode	No pull-up and no pull-down	n/a	
FMC	PF0	FMC_A0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A0
	PF1	FMC_A1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A1
	PF2	FMC_A2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A2
	PF3	FMC_A3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A3
	PF4	FMC_A4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A4
	PF5	FMC_A5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A5
	PC0	FMC_SDNWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDNWE
	PF11	FMC_SDNRAS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDNRAS
	PF12	FMC_A6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A6
	PF13	FMC_A7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A7
	PF14	FMC_A8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A8
	PF15	FMC_A9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A9
	PG0	FMC_A10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A10
	PG1	FMC_A11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	A11
	PE7	FMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D4
	PE8	FMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D5
	PE9	FMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D6
	PE10	FMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D7
	PD14	FMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D0
	PD15	FMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D1
	PG4	FMC_BA0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	BA0
	PG8	FMC_SDCLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDCLK
	PD0	FMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD1	FMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG15	FMC_SDNCAS	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDNCAS
	PB5	FMC_SDCKE1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDCKE1
	PB6	FMC_SDNE1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	SDNE1 [SDRAM_CS]
RCC	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

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
SPI3	PC11	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	ADS1256_MISO
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	ADS1256_MOSI
	PB3	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	ADS1256_SCK
SPI5	PF7	SPI5_SCK	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PF8	SPI5_MISO	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PF9	SPI5_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	High *	
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	STLINK_RX [STM32F103CBT6_PA3]
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	STLINK_TX [STM32F103CBT6_PA2]
USB_OTG_HS	PB14	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB15	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Low	OTG_FS_DP
Single Mapped Signals	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
	PE11	FMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D8
	PE12	FMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D9
	PE13	FMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D10
	PE14	FMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D11
	PE15	FMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D12
	PB12	USB_OTG_HS_ID	Alternate Function Push Pull	No pull-up and no pull-down	Low	OTG_FS_ID
	PB13	USB_OTG_HS_VBUS	Input mode	No pull-up and no pull-down	n/a	VBUS_FS
	PD10	FMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	D15
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
	PD6	LTDC_B2	Alternate Function Push Pull	No pull-up and no pull-down	Low	B2
	PE1	FMC_NBL1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	NBL1 [SDRAM_UDQM]
GPIO	PE2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SF3_CS

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PE3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	VS1053_RESET
	PE4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	KEYPAD_COLUMN_1
	PE5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	KEYPAD_COLUMN_2
	PE6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	KEYPAD_COLUMN_3
	PC13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	KEYPAD_COLUMN_4
	PF6	GPIO_EXTI6	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	Recording
	PF10	GPIO_EXTI10	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	AD_KBD_BUT_DOWN
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SRAM_3_CS
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_CS
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	uSD_CS
	PA3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	SRAM_2_CS
	PA6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	SRAM_4_CS
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ACP_RST
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OTG_FS_PSO [OTG_FS_PowerSwitchOn]
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	SRAM_5_CS
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	SRAM_6_CS
	PB2/BOOT1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BOOT1
	PB10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	SRAM_7_CS
	PD11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TE [LCD-RGB_TE]
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_RST
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILI9341_WRX
	PG2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SRAM_1_CS
	PG3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SRAM_0_CS
	PG7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_D7
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_D6
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_D5
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_D4
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_E
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Medium *	HD44780_RS
	PA15	GPIO_EXTI15	External Interrupt Mode with Falling	No pull-up and no pull-down	n/a	Joystick_SW

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			edge trigger detection			
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	ADS1256_CS
	PD2	GPIO_EXTI2	External Interrupt Mode with Falling edge trigger detection	Pull-up *	n/a	ADS1256_DRDY
	PD3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	ADS1256_SYNC
	PD4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	High *	ADS1256_RESET
	PD5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DAC8552_CS
	PD7	GPIO_EXTI7	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	Overdubbing
	PG9	GPIO_EXTI9	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	Playback
	PG10	GPIO_Input	Input mode	Pull-up *	n/a	KEYPAD_ROW_3
	PG12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	uSD_CD
	PG13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD3 [Green Led]
	PG14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD4 [Red Led]
	PB4	GPIO_EXTI4	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	ToggleFunction
	PB7	GPIO_Input	Input mode	Pull-up *	n/a	KEYPAD_ROW_2
	PB8	GPIO_Input	Input mode	Pull-up *	n/a	KEYPAD_ROW_1
	PB9	GPIO_Input	Input mode	Pull-up *	n/a	KEYPAD_ROW_4

8.2. DMA configuration

DMA request	Stream	Direction	Priority
DAC2	DMA1_Stream6	Memory To Peripheral	High *
SPI5_RX	DMA2_Stream3	Peripheral To Memory	Medium *
SPI5_TX	DMA2_Stream4	Memory To Peripheral	Medium *
ADC3	DMA2_Stream1	Peripheral To Memory	Medium *

DAC2: DMA1_Stream6 DMA request Settings:

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

SPI5_RX: DMA2_Stream3 DMA request Settings:

Mode: Normal
 Use fifo: **Enable ***
 FIFO Threshold: **One Quarter Full ***
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte
 Peripheral Burst Size: Single
 Memory Burst Size: Single

SPI5_TX: DMA2_Stream4 DMA request Settings:

Mode: Normal
 Use fifo: **Enable ***
 FIFO Threshold: **One Quarter Full ***
 Peripheral Increment: Disable
 Memory Increment: **Enable ***
 Peripheral Data Width: Byte
 Memory Data Width: Byte

Peripheral Burst Size: Single
Memory Burst Size: Single

ADC3: DMA2_Stream1 DMA request Settings:

Mode: **Circular ***
Use fifo: Disable
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: **Word ***
Memory Data Width: **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
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
PVD interrupt through EXTI line 16	true	0	0
EXTI line2 interrupt	true	0	1
EXTI line4 interrupt	true	2	3
DMA1 stream6 global interrupt	true	1	2
ADC1, ADC2 and ADC3 global interrupts	true	3	0
EXTI line[9:5] interrupts	true	2	3
TIM1 break interrupt and TIM9 global interrupt	true	2	2
TIM2 global interrupt	true	3	2
TIM4 global interrupt	true	3	3
EXTI line[15:10] interrupts	true	0	1
TIM8 update interrupt and TIM13 global interrupt	true	0	0
DMA2 stream1 global interrupt	true	1	3
DMA2 stream3 global interrupt	true	3	0
DMA2 stream4 global interrupt	true	3	2
USB On The Go HS global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
USART1 global interrupt	unused		
TIM8 break interrupt and TIM12 global interrupt	unused		
TIM8 trigger and commutation interrupts and TIM14 global interrupt	unused		
TIM8 capture compare interrupt	unused		
FMC global interrupt	unused		
SPI3 global interrupt	unused		
TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts	unused		
USB On The Go HS End Point 1 Out global interrupt	unused		
USB On The Go HS End Point 1 In global	unused		

Interrupt Table	Enable	Preenmption Priority	SubPriority
interrupt			
FPU global interrupt		unused	
SPI5 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
Memory management fault	false	false	false
Pre-fetch fault, memory access fault	false	false	false
Undefined instruction or illegal state	false	false	false
System service call via SWI instruction	false	true	false
Debug monitor	false	false	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
PVD interrupt through EXTI line 16	false	true	true
EXTI line2 interrupt	false	true	true
EXTI line4 interrupt	false	true	true
DMA1 stream6 global interrupt	false	true	true
ADC1, ADC2 and ADC3 global interrupts	false	true	true
EXTI line[9:5] interrupts	false	true	true
TIM1 break interrupt and TIM9 global interrupt	false	true	true
TIM2 global interrupt	false	true	true
TIM4 global interrupt	false	true	true
EXTI line[15:10] interrupts	false	true	true
TIM8 update interrupt and TIM13 global interrupt	false	true	true
DMA2 stream1 global interrupt	false	true	true
DMA2 stream3 global interrupt	false	true	true
DMA2 stream4 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 ✓						
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA ✓	ADC1 ✓	TIM2 ✓	FMC ✓			
GPIO ⚠	ADC3 ✓	TIM4 ✓	SPI3 ✓			
NVIC ✓	DAC ✓	TIM8 ✓	SPI5 ✓			
RCC ✓		TIM9 ✓	USART1 ✓			
SYS ✓			USB_HS ✓			

10. Docs & Resources

Type	Link
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-stm8_software_development_tools.pdf
Training Material	https://www.st.com/resource/en/sales_guide/sg_sc2154.pdf
Flyers	https://www.st.com/resource/en/flyer/flnucleolrwan.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
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Flyers	https://www.st.com/resource/en/flyer/flstm32trust.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
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for related Tools
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for related Tools
& Software

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