

## 1. Description

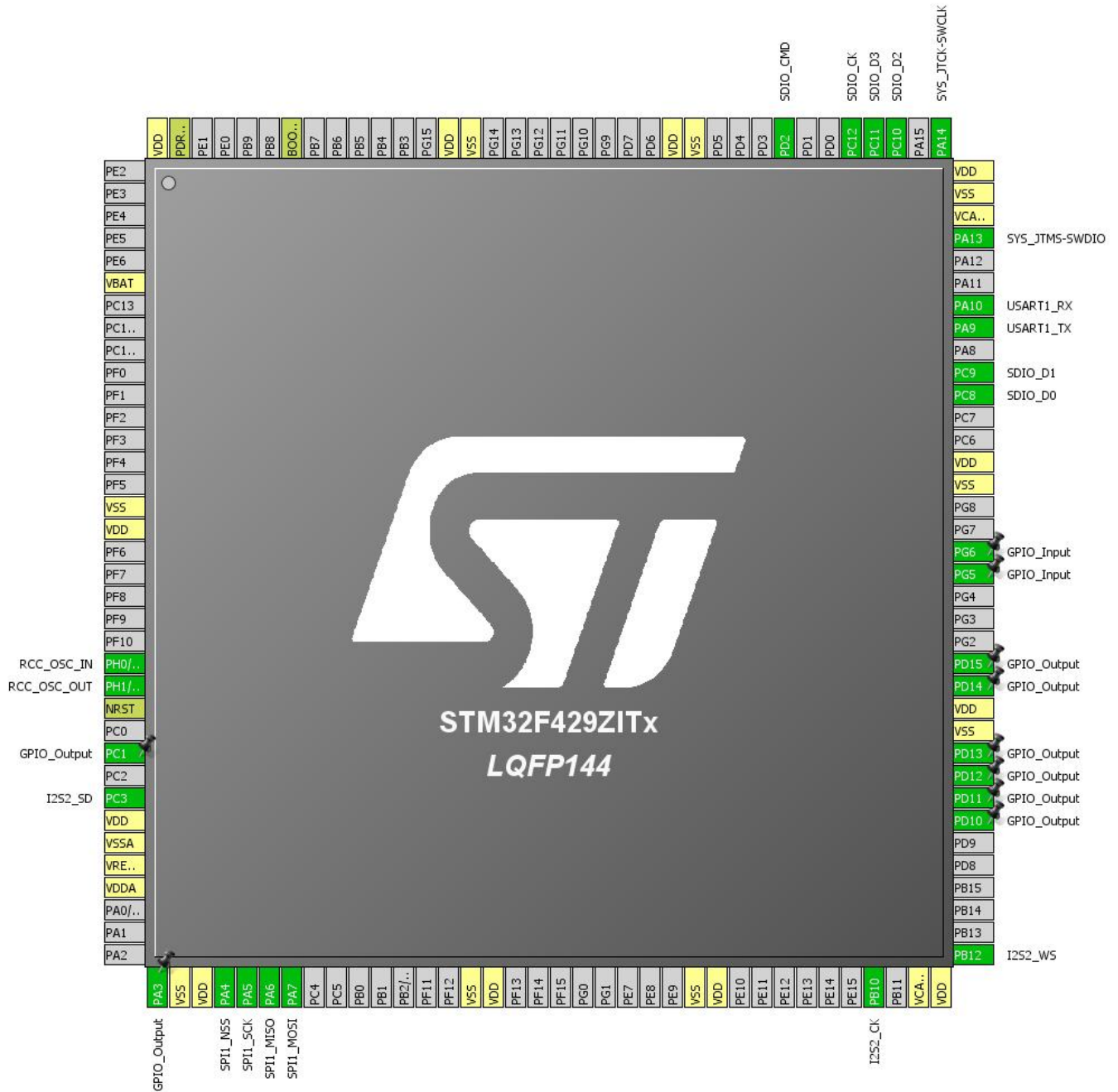
### 1.1. Project

Project Name	SpeakerRecognition
Board Name	SpeakerRecognition
Generated with:	STM32CubeMX 4.23.0
Date	12/20/2017

### 1.2. MCU

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

## 2. Pinout Configuration



### 3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
16	VSS	Power		
17	VDD	Power		
23	PH0/OSC_IN	I/O	RCC_OSC_IN	
24	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
27	PC1 *	I/O	GPIO_Output	
29	PC3	I/O	I2S2_SD	
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
37	PA3 *	I/O	GPIO_Output	
38	VSS	Power		
39	VDD	Power		
40	PA4	I/O	SPI1_NSS	
41	PA5	I/O	SPI1_SCK	
42	PA6	I/O	SPI1_MISO	
43	PA7	I/O	SPI1_MOSI	
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
69	PB10	I/O	I2S2_CK	
71	VCAP_1	Power		
72	VDD	Power		
73	PB12	I/O	I2S2_WS	
79	PD10 *	I/O	GPIO_Output	
80	PD11 *	I/O	GPIO_Output	
81	PD12 *	I/O	GPIO_Output	
82	PD13 *	I/O	GPIO_Output	
83	VSS	Power		
84	VDD	Power		
85	PD14 *	I/O	GPIO_Output	
86	PD15 *	I/O	GPIO_Output	
90	PG5 *	I/O	GPIO_Input	

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
91	PG6 *	I/O	GPIO_Input	
94	VSS	Power		
95	VDD	Power		
98	PC8	I/O	SDIO_D0	
99	PC9	I/O	SDIO_D1	
101	PA9	I/O	USART1_TX	
102	PA10	I/O	USART1_RX	
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
111	PC10	I/O	SDIO_D2	
112	PC11	I/O	SDIO_D3	
113	PC12	I/O	SDIO_CK	
116	PD2	I/O	SDIO_CMD	
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
138	BOOT0	Boot		
143	PDR_ON	Reset		
144	VDD	Power		

\* The pin is affected with an I/O function



## 5. IPs and Middleware Configuration

### 5.1. I2S2

**Mode: Half-Duplex Master**

#### 5.1.1. Parameter Settings:

##### Generic Parameters:

Transmission Mode	Mode Master Receive *
Communication Standard	MSB First (Left Justified) *
Data and Frame Format	24 Bits Data on 32 Bits Frame *
Selected Audio Frequency	48 KHz *
Real Audio Frequency	47.669 KHz *
Error between Selected and Real	-0.68 % *

##### Clock Parameters:

Clock Source	I2S PLL Clock
Clock Polarity	Low

### 5.2. RCC

**High Speed Clock (HSE): Crystal/Ceramic Resonator**

#### 5.2.1. 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 Over Drive

Power Regulator Voltage Scale 1  
Enabled

## 5.3. SDIO

**Mode: SD 4 bits Wide bus**

### 5.3.1. Parameter Settings:

#### SDIO parameters:

Clock transition on which the bit capture is made	Rising transition
SDIO Clock divider bypass	Disable
SDIO Clock output enable when the bus is idle	Disable the power save for the clock
SDIO hardware flow control	The hardware control flow is disabled
SDIOCLK clock divide factor	<b>3 *</b>

## 5.4. SPI1

**Mode: Full-Duplex Master**

**Hardware NSS Signal: Hardware NSS Output Signal**

### 5.4.1. Parameter Settings:

#### Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

#### Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	<b>45.0 MBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

#### Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Output Hardware

## 5.5. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 5.6. TIM1

**Slave Mode: External Clock Mode 1**

**Trigger Source: ITR0**

### 5.6.1. Parameter Settings:

#### Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	0
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
Slave Mode Controller	ETR mode 1

#### Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

## 5.7. TIM2

**Slave Mode: Trigger Mode**

**Trigger Source: ITR0**

### 5.7.1. Parameter Settings:

#### Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value )	0
Internal Clock Division (CKD)	No Division
Slave Mode Controller	Trigger Mode

#### Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection	Reset (UG bit from TIMx_EGR)



## 5.8. USART1

Mode: Asynchronous

### 5.8.1. 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

## 5.9. FATFS

mode: SD Card

### 5.9.1. Set Defines:

#### Version:

FATFS version	R0.12c
---------------	--------

#### Function Parameters:

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

#### Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	Latin 1
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255

LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8
FS_RPATH (Relative Path)	Disabled

#### Physical Drive Parameters:

VOLUMES (Logical drives)	1
MAX_SS (Maximum Sector Size)	<b>4096 *</b>
MIN_SS (Minimum Sector Size)	512
MULTI_PARTITION (Volume partitions feature)	Disabled
USE_TRIM (Erase feature)	Disabled
FS_NOFSINFO (Force full FAT scan)	0

#### System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_EXFAT (Support of exFAT file system)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp
NORTC_YEAR (Year for timestamp)	2015
NORTC_MON (Month for timestamp)	6
NORTC_MDAY (Day for timestamp)	4
FS_REENTRANT (Re-Entrancy)	Disabled
FS_TIMEOUT (Timeout ticks)	1000
SYNC_t (O/S sync object)	osSemaphoreId
FS_LOCK (Number of files opened simultaneously)	2

### 5.9.2. IPs instances:

#### SDIO/SDMMC:

SDIO instance	SDIO
Use dma template	Enabled

\* User modified value

## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2S2	PC3	I2S2_SD	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB10	I2S2_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB12	I2S2_WS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
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	
SDIO	PC8	SDIO_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC9	SDIO_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC10	SDIO_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC11	SDIO_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC12	SDIO_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD2	SDIO_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	Very High *	
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	Very High *	
GPIO	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PG5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PG6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	

## 6.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI2_RX	DMA1_Stream3	Peripheral To Memory	Low

### SPI2\_RX: DMA1\_Stream3 DMA request Settings:

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

### 6.3. NVIC configuration

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 stream3 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 break interrupt and TIM9 global interrupt	unused		
TIM1 update interrupt and TIM10 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
USART1 global interrupt	unused		
SDIO global interrupt	unused		
FPU global interrupt	unused		

\* User modified value

## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F429/439
MCU	STM32F429ZITx
Datasheet	024030_Rev9

### 7.2. Parameter Selection

Temperature	25
Vdd	null

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	SpeakerRecognition
Project Folder	C:\Users\Thanos\Documents\STMDiscovery\Mic\SpeakerRecognition
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_F4 V1.18.0

### 8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	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
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No