1. Description

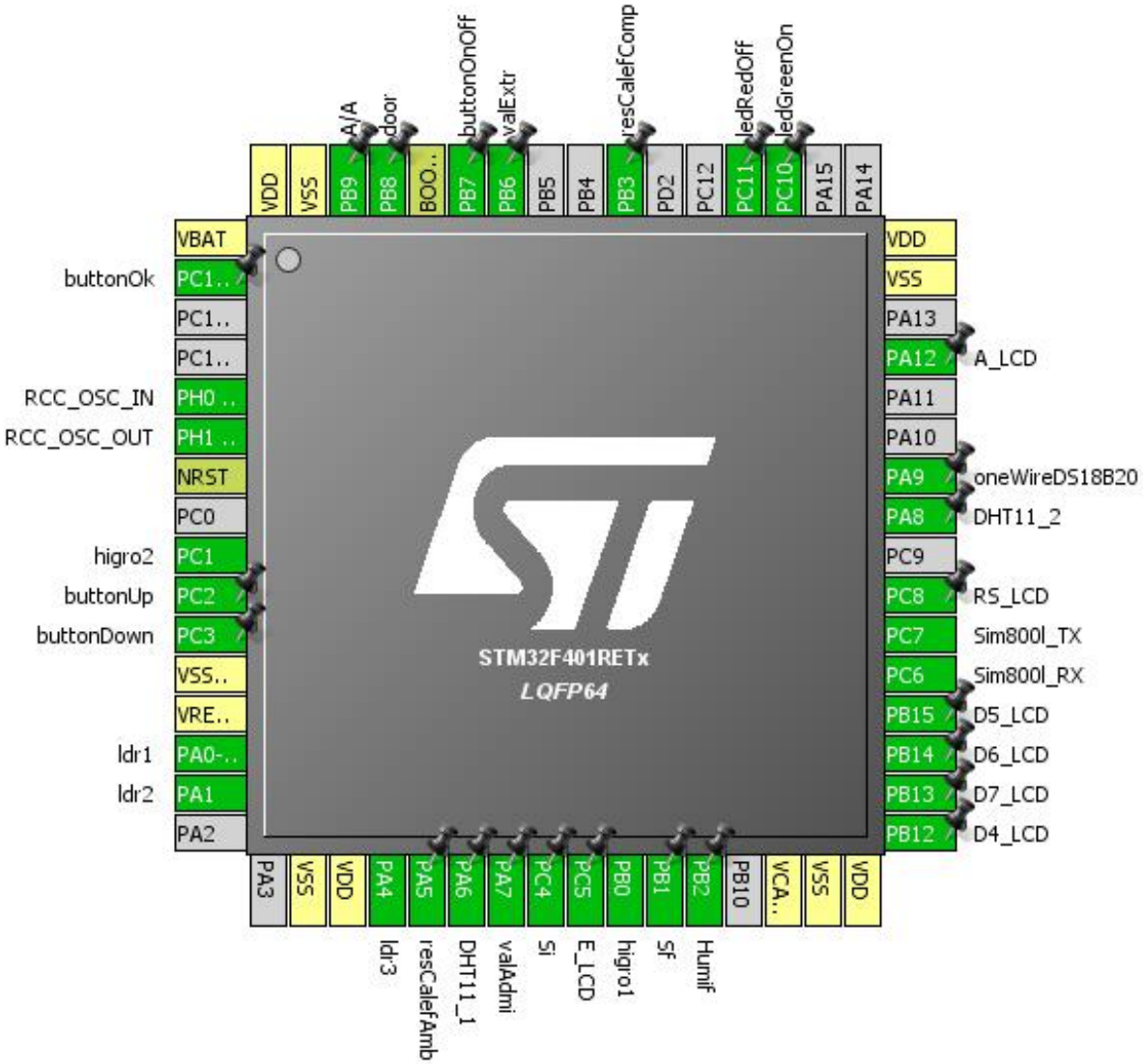
1.1. Project

Project Name	ejProyectoMushrooms
Board Name	NUCLEO-F401RE
Generated with:	STM32CubeMX 4.21.0
Date	05/30/2018

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F401
MCU name	STM32F401RETx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



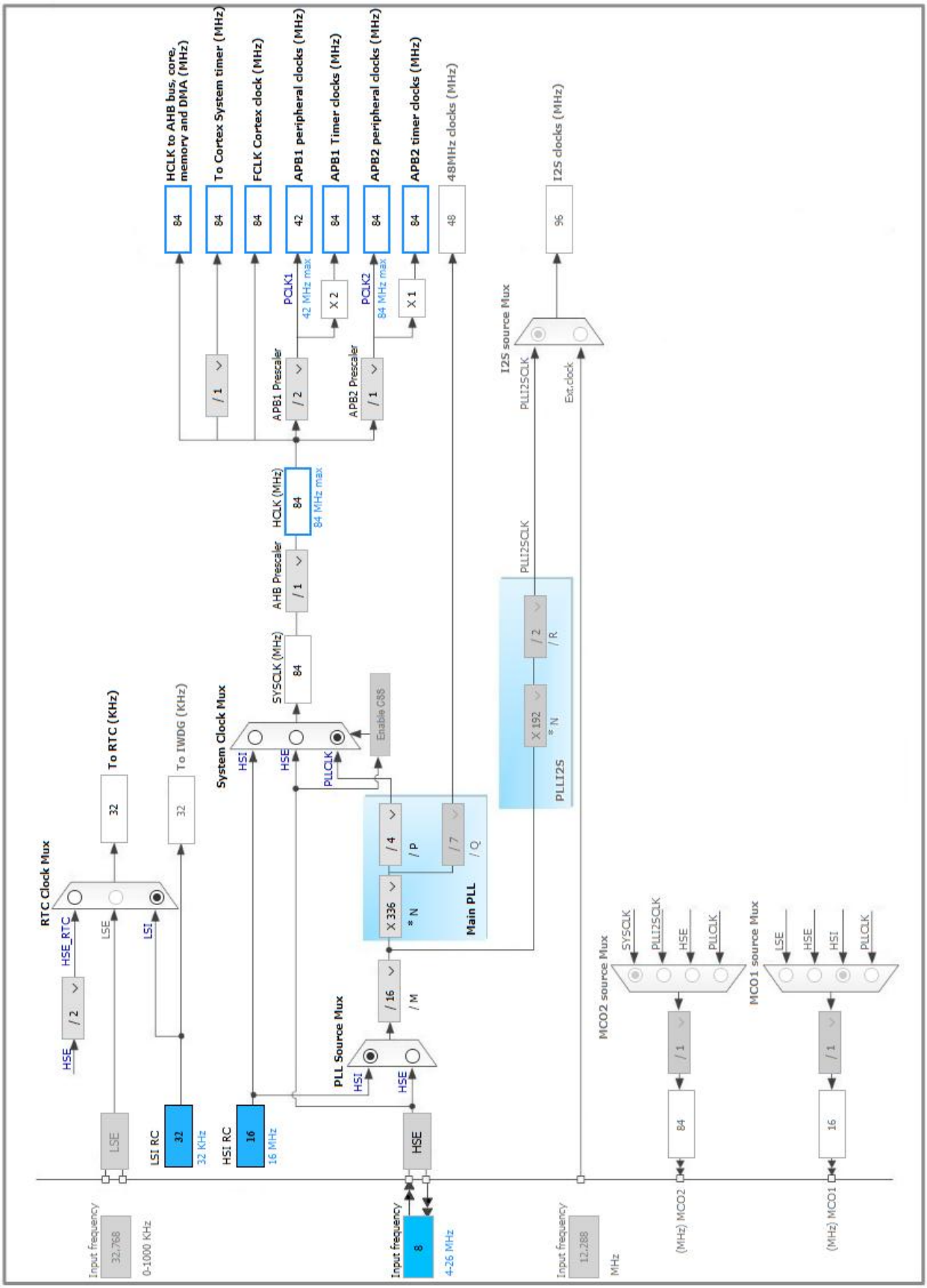
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-ANTI_TAMP	I/O	GPIO_EXTI13	buttonOk
5	PH0 - OSC_IN	I/O	RCC_OSC_IN	
6	PH1 - OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
9	PC1	I/O	ADC1_IN11	higro2
10	PC2	I/O	GPIO_EXTI2	buttonUp
11	PC3	I/O	GPIO_EXTI3	buttonDown
12	VSSA/VREF-	Power		
13	VREF+	Power		
14	PA0-WKUP	I/O	ADC1_IN0	ldr1
15	PA1	I/O	ADC1_IN1	ldr2
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	ADC1_IN4	ldr3
21	PA5 *	I/O	GPIO_Output	resCalefAmb
22	PA6 *	I/O	GPIO_Input	DHT11_1
23	PA7 *	I/O	GPIO_Output	valAdmi
24	PC4	I/O	GPIO_EXTI4	Si
25	PC5 *	I/O	GPIO_Output	E_LCD
26	PB0	I/O	ADC1_IN8	higro1
27	PB1	I/O	GPIO_EXTI1	Sf
28	PB2 *	I/O	GPIO_Output	Humif
30	VCAP1	Power		
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	D4_LCD
34	PB13 *	I/O	GPIO_Output	D7_LCD
35	PB14 *	I/O	GPIO_Output	D6_LCD
36	PB15 *	I/O	GPIO_Output	D5_LCD
37	PC6	I/O	USART6_TX	Sim800l_RX
38	PC7	I/O	USART6_RX	Sim800l_TX
39	PC8 *	I/O	GPIO_Output	RS_LCD
41	PA8 *	I/O	GPIO_Input	DHT11_2
42	PA9 *	I/O	GPIO_Output	oneWireDS18B20
45	PA12 *	I/O	GPIO_Output	A_LCD

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
47	VSS	Power		
48	VDD	Power		
51	PC10 *	I/O	GPIO_Output	ledGreenOn
52	PC11 *	I/O	GPIO_Output	ledRedOff
55	PB3 *	I/O	GPIO_Output	resCalefComp
58	PB6 *	I/O	GPIO_Output	valExtr
59	PB7	I/O	GPIO_EXTI7	buttonOnOff
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	door
62	PB9 *	I/O	GPIO_Output	A/A
63	VSS	Power		
64	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

mode: IN0

mode: IN1

mode: IN4

mode: IN8

mode: IN11

mode: Temperature Sensor Channel

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	PCLK2 divided by 4
Resolution	**8 bits (11 ADC Clock cycles) ***
Data Alignment	Right alignment
Scan Conversion Mode	**Enabled ***
Continuous Conversion Mode	**Enabled ***
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	EOC flag at the end of single channel conversion

ADC_Regular_ConversionMode:

Number Of Conversion	**6 ***
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 0
Sampling Time	**144 Cycles ***
Rank	**2 ***
Channel	**Channel 1 ***
Sampling Time	**144 Cycles ***
Rank	**3 ***
Channel	**Channel 4 ***
Sampling Time	**144 Cycles ***
Rank	**4 ***
Channel	**Channel 8 ***

Sampling Time	**144 Cycles ***
Rank	**5 ***
Channel	**Channel 11 ***
Sampling Time	**144 Cycles ***
Rank	**6 ***
Channel	**Channel Temperature Sensor ***
Sampling Time	**144 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

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)	2 WS (3 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 2

5.3. RTC

mode: Activate Clock Source

mode: Activate Calendar

5.3.1. Parameter Settings:

General:

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

Calendar Time:

Data Format	**Binary data format ***
Hours	**7 ***
Minutes	**20 ***
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	**Friday ***
Month	**October ***
Date	**20 ***
Year	**17 ***

5.4. SYS

Timebase Source: SysTick

5.5. TIM2

Clock Source : Internal Clock

5.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**65535 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**40000 ***
Internal Clock Division (CKD)	No Division

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)

5.6. TIM5

mode: Clock Source

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**84 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**0xffffffff ***
Internal Clock Division (CKD)	No Division

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. USART6

Mode: Asynchronous

5.7.1. 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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PC1	ADC1_IN11	Analog mode	No pull-up and no pull-down	n/a	higro2
	PA0-WKUP	ADC1_IN0	Analog mode	No pull-up and no pull-down	n/a	ldr1
	PA1	ADC1_IN1	Analog mode	No pull-up and no pull-down	n/a	ldr2
	PA4	ADC1_IN4	Analog mode	No pull-up and no pull-down	n/a	ldr3
	PB0	ADC1_IN8	Analog mode	No pull-up and no pull-down	n/a	higro1
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	
USART6	PC6	USART6_TX	Alternate Function Push Pull	Pull-up	**Very High ***	Sim800l_RX
	PC7	USART6_RX	Alternate Function Push Pull	Pull-up	**Very High ***	Sim800l_TX
GPIO	PC13-ANTI_TAMP	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	buttonOk
	PC2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	buttonUp
	PC3	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	buttonDown
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	resCalefAmb
	PA6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DHT11_1
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	valAdmi
	PC4	GPIO_EXTI4	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Si
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	E_LCD
	PB1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Sf
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Humif
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D4_LCD
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D7_LCD
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D6_LCD
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D5_LCD
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RS_LCD
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DHT11_2
	PA9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	oneWireDS18B20

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	A_LCD
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ledGreenOn
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ledRedOff
	PB3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	resCalefComp
	PB6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	valExtr
	PB7	GPIO_EXTI7	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	buttonOnOff
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	door
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	A/A

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC1	DMA2_Stream0	Peripheral To Memory	Low

ADC1: DMA2_Stream0 DMA request Settings:

Mode:	**Circular ***
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
RCC global interrupt	true	0	0
EXTI line1 interrupt	true	0	0
EXTI line2 interrupt	true	0	0
EXTI line3 interrupt	true	0	0
EXTI line4 interrupt	true	0	0
EXTI line[9:5] interrupts	true	0	0
TIM2 global interrupt	true	0	0
EXTI line[15:10] interrupts	true	0	0
DMA2 stream0 global interrupt	true	0	0
USART6 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
ADC1 global interrupt	unused		
TIM5 global interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F401
MCU	STM32F401RETx
Datasheet	025644_Rev3

7.2. Parameter Selection

Temperature	25
Vdd	null

8. Software Project

8.1. Project Settings

Name	Value
Project Name	ejProyectoMushrooms
Project Folder	C:\Users\Usuario\Desktop\Codigo del sistema Tesis\SistMushrooms
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.16.0

8.2. Code Generation Settings

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