1. Description

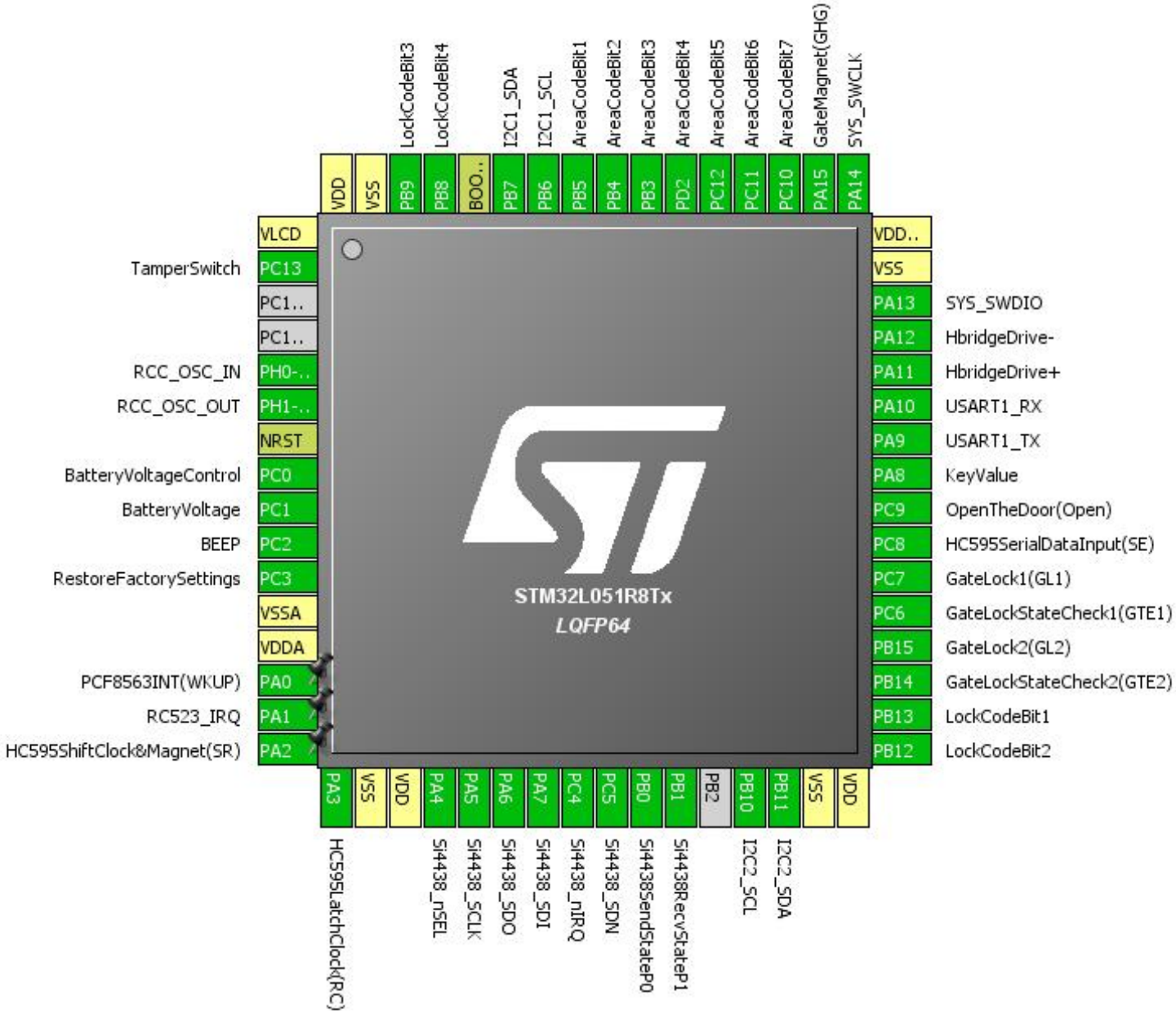
1.1. Project

Project Name	demon
Board Name	demon
Generated with:	STM32CubeMX 4.20.1
Date	09/08/2017

1.2. MCU

MCU Series	STM32L0
MCU Line	STM32L0x1
MCU name	STM32L051R8Tx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



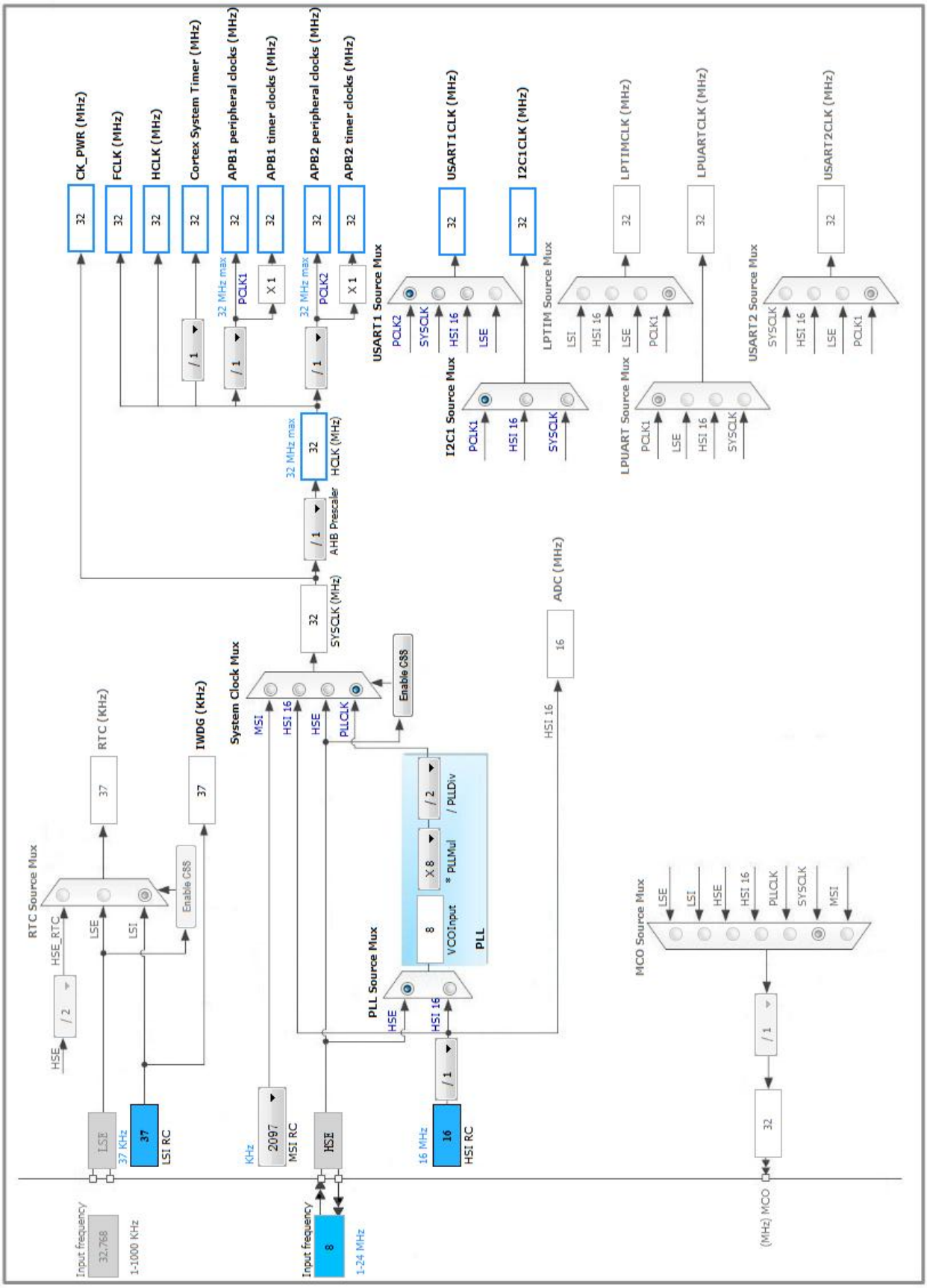
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VLCD	Power		
2	PC13 *	I/O	GPIO_Input	TamperSwitch
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	BatteryVoltageControl
9	PC1	I/O	ADC_IN11	BatteryVoltage
10	PC2 *	I/O	GPIO_Output	BEEP
11	PC3 *	I/O	GPIO_Input	RestoreFactorySettings
12	VSSA	Power		
13	VDDA	Power		
14	PA0	I/O	GPIO_EXTI0	PCF8563INT(WKUP)
15	PA1	I/O	GPIO_EXTI1	RC523_IRQ
16	PA2 *	I/O	GPIO_Input	HC595ShiftClock&Magnet(SR)
17	PA3 *	I/O	GPIO_Output	HC595LatchClock(RC)
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	SPI1_NSS	Si4438_nSEL
21	PA5	I/O	SPI1_SCK	Si4438_SCLK
22	PA6	I/O	SPI1_MISO	Si4438_SDO
23	PA7	I/O	SPI1_MOSI	Si4438_SDI
24	PC4	I/O	GPIO_EXTI4	Si4438_nIRQ
25	PC5 *	I/O	GPIO_Output	Si4438_SDN
26	PB0 *	I/O	GPIO_Input	Si4438SendStateP0
27	PB1 *	I/O	GPIO_Input	Si4438RecvStateP1
29	PB10	I/O	I2C2_SCL	
30	PB11	I/O	I2C2_SDA	
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Input	LockCodeBit2
34	PB13 *	I/O	GPIO_Input	LockCodeBit1
35	PB14 *	I/O	GPIO_Input	GateLockStateCheck2(GTE2)
36	PB15 *	I/O	GPIO_Output	GateLock2(GL2)

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6 *	I/O	GPIO_Input	GateLockStateCheck1(GTE 1)
38	PC7 *	I/O	GPIO_Output	GateLock1(GL1)
39	PC8 *	I/O	GPIO_Input	HC595SerialDataInput(SE)
40	PC9 *	I/O	GPIO_Input	OpenTheDoor(Open)
41	PA8 *	I/O	GPIO_Input	KeyValue
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
44	PA11 *	I/O	GPIO_Output	HbridgeDrive+
45	PA12 *	I/O	GPIO_Output	HbridgeDrive-
46	PA13	I/O	SYS_SWDIO	
47	VSS	Power		
48	VDD_USB	Power		
49	PA14	I/O	SYS_SWCLK	
50	PA15 *	I/O	GPIO_Input	GateMagnet(GHG)
51	PC10 *	I/O	GPIO_Input	AreaCodeBit7
52	PC11 *	I/O	GPIO_Input	AreaCodeBit6
53	PC12 *	I/O	GPIO_Input	AreaCodeBit5
54	PD2 *	I/O	GPIO_Input	AreaCodeBit4
55	PB3 *	I/O	GPIO_Input	AreaCodeBit3
56	PB4 *	I/O	GPIO_Input	AreaCodeBit2
57	PB5 *	I/O	GPIO_Input	AreaCodeBit1
58	PB6	I/O	I2C1_SCL	
59	PB7	I/O	I2C1_SDA	
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Input	LockCodeBit4
62	PB9 *	I/O	GPIO_Input	LockCodeBit3
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. ADC

mode: IN11

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Synchronous clock mode divided by 2
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Direction	Forward
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Frequency Mode	Disabled
Auto Off	Disabled
Oversampling Mode	Disabled

ADC_Regular_ConversionMode:

Sampling Time	1.5 Cycles
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None

WatchDog:

Enable Analog WatchDog Mode	false

5.2. I2C1

I2C: I2C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0

Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x00707CBB ***

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

5.3. I2C2

mode: I2C

5.3.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x00707CBB ***

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

5.4. IWDG

mode: Activated

5.4.1. Parameter Settings:

Watchdog Clocking:

IWDG counter clock prescaler	**128 ***
IWDG window value	**3125 ***
IWDG down-counter reload value	4095

5.5. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.5.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Buffer Cache	Enabled
Prefetch	Disabled
Preread	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

5.6. SPI1

Mode: Full-Duplex Master
Hardware NSS Signal: Hardware NSS Output Signal

5.6.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**16.0 MBits/s ***

Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Output Hardware

5.7. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

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
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PC1	ADC_IN11	Analog mode	No pull-up and no pull-down	n/a	BatteryVoltage
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
	PB11	I2C2_SDA	Alternate Function Open Drain	Pull-up	**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	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	Si4438_nSEL
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	Si4438_SCLK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	Si4438_SDO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	Si4438_SDI
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_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	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TamperSwitch
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BatteryVoltageControl
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BEEP
	PC3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	RestoreFactorySettings
	PA0	GPIO_EXTI0	**External Interrupt**	**Pull-up ***	n/a	PCF8563INT(WKUP)

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			Mode with Falling edge trigger detection			
	PA1	GPIO_EXTI1	**External Interrupt Mode with Falling edge trigger detection**	**Pull-up ***	n/a	RC523_IRQ
	PA2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	HC595ShiftClock&Magnet(SR)
	PA3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	HC595LatchClock(RC)
	PC4	GPIO_EXTI4	**External Interrupt Mode with Falling edge trigger detection**	**Pull-up ***	n/a	Si4438_nIRQ
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Si4438_SDN
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Si4438SendStateP0
	PB1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Si4438RecvStateP1
	PB12	GPIO_Input	Input mode	**Pull-up ***	n/a	LockCodeBit2
	PB13	GPIO_Input	Input mode	**Pull-up ***	n/a	LockCodeBit1
	PB14	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	GateLockStateCheck2(GTE2)
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GateLock2(GL2)
	PC6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	GateLockStateCheck1(GTE1)
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GateLock1(GL1)
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	HC595SerialDataInput(SE)
	PC9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OpenTheDoor(Open)
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	KeyValue
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	HbridgeDrive+
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	HbridgeDrive-
	PA15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	GateMagnet(GHG)
	PC10	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit7
	PC11	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit6
	PC12	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit5
	PD2	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit4
	PB3	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit3
	PB4	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit2
	PB5	GPIO_Input	Input mode	**Pull-up ***	n/a	AreaCodeBit1
	PB8	GPIO_Input	Input mode	**Pull-up ***	n/a	LockCodeBit4
	PB9	GPIO_Input	Input mode	**Pull-up ***	n/a	LockCodeBit3

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	Low

ADC: DMA1_Channel1 DMA request Settings:

Mode:	**Circular ***
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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA1 channel 1 interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash and EEPROM global interrupt	unused		
RCC global interrupt	unused		
EXTI line 0 and line 1 interrupts	unused		
EXTI line 4 to 15 interrupts	unused		
ADC1, COMP1 and COMP2 interrupts (COMP interrupts through EXTI lines 21 and 22)	unused		
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	unused		
I2C2 interrupt	unused		
SPI1 global interrupt	unused		
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L0
Line	STM32L0x1
MCU	STM32L051R8Tx
Datasheet	025938_Rev6

7.2. Parameter Selection

Temperature	25
Vdd	3.0

8. Software Project

8.1. Project Settings

Name	Value
Project Name	demon
Project Folder	D:\Workspace\Stm32\template(stm32L051)\demon
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_L0 V1.9.0

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	Yes
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