1. Description

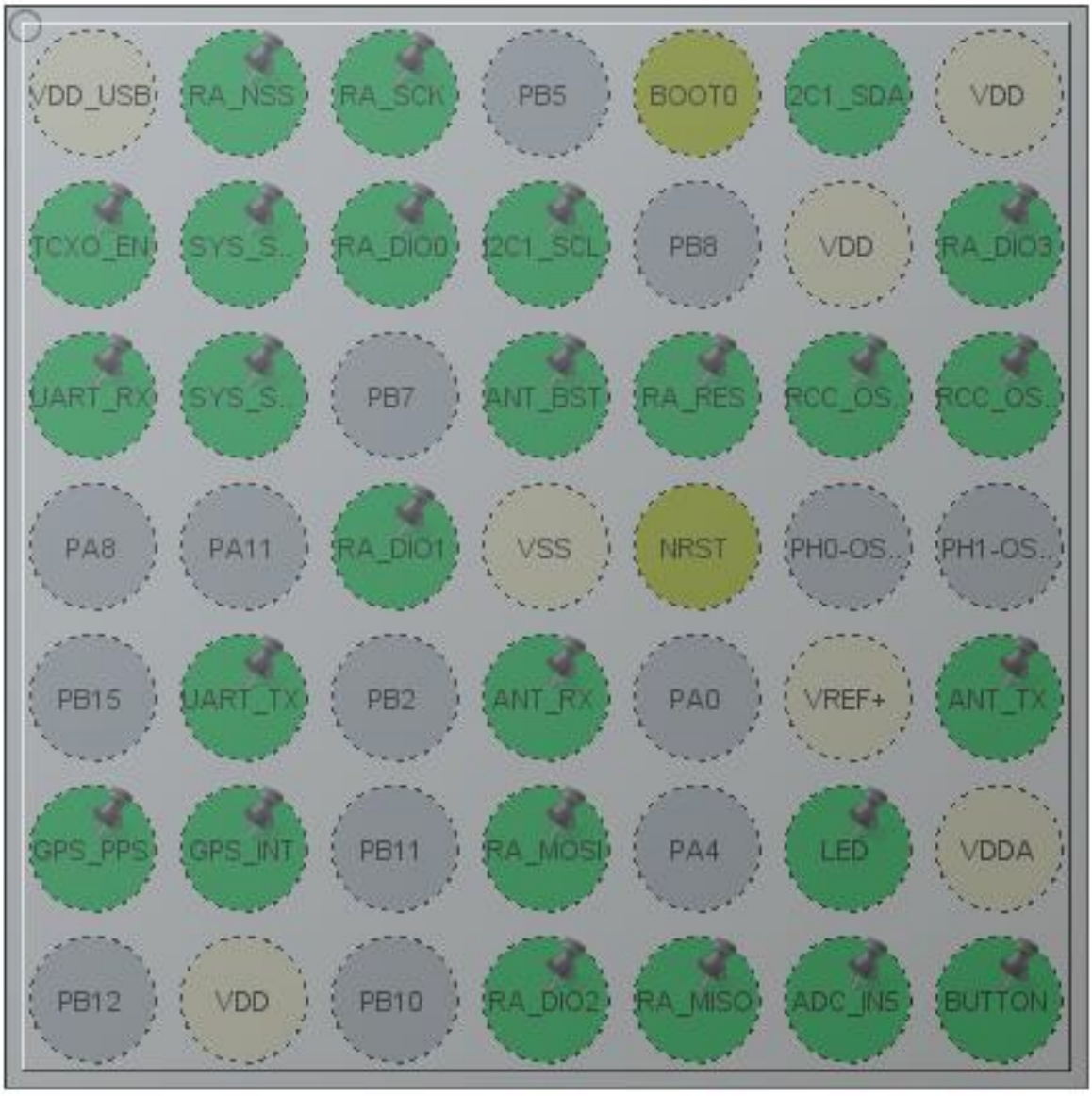
1.1. Project

Project Name	ICSS_Tracker_1
Board Name	B-L072Z-LRWAN1
Generated with:	STM32CubeMX 5.4.0
Date	12/19/2019

1.2. MCU

MCU Series	STM32L0
MCU Line	STM32L0x2
MCU name	STM32L072CZYx
MCU Package	WLCSP49
MCU Pin number	49

2. Pinout Configuration



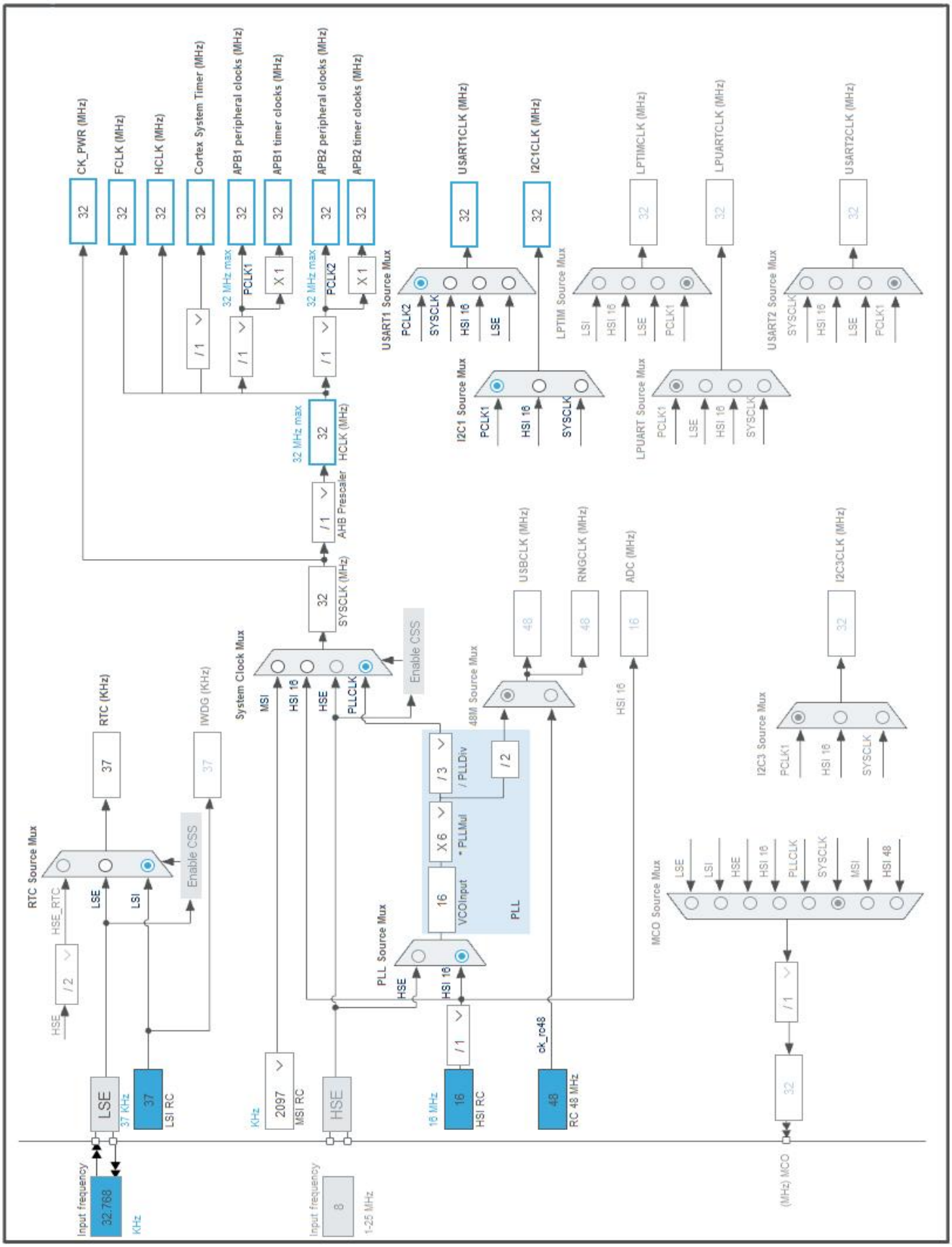
WLCSP49 (Top view)

3. Pins Configuration

Pin Number WLCSP49	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
A1	VDD_USB	Power		
A2	PA15 *	I/O	GPIO_Output	RA_NSS
A3	PB3	I/O	SPI1_SCK	RA_SCK
A5	BOOT0	Boot		
A6	PB9	I/O	I2C1_SDA	
A7	VDD	Power		
B1	PA12 *	I/O	GPIO_Output	TCXO_EN
B2	PA14	I/O	SYS_SWCLK	
B3	PB4	I/O	GPIO_EXTI4	RA_DIO0
B4	PB6	I/O	I2C1_SCL	
B6	VDD	Power		
B7	PC13	I/O	GPIO_EXTI13	RA_DIO3
C1	PA10	I/O	USART1_RX	UART_RX
C2	PA13	I/O	SYS_SWDIO	
C4	PC1 *	I/O	GPIO_Output	ANT_BST
C5	PC0 *	I/O	GPIO_Output	RA_RES
C6	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
C7	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
D3	PB1	I/O	GPIO_EXTI1	RA_DIO1
D4	VSS	Power		
D5	NRST	Reset		
E2	PA9	I/O	USART1_TX	UART_TX
E4	PA1 *	I/O	GPIO_Output	ANT_RX
E6	VREF+	Power		
E7	PC2 *	I/O	GPIO_Output	ANT_TX
F1	PB14 *	I/O	GPIO_Input	GPS_PPS
F2	PB13 *	I/O	GPIO_Input	GPS_INT
F4	PA7	I/O	SPI1_MOSI	RA_MOSI
F6	PA2 *	I/O	GPIO_Output	LED
F7	VDDA	Power		
G2	VDD	Power		
G4	PB0	I/O	GPIO_EXTI0	RA_DIO2
G5	PA6	I/O	SPI1_MISO	RA_MISO
G6	PA5	I/O	ADC_IN5	
G7	PA3 *	I/O	GPIO_Input	BUTTON

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	ICSS_Tracker_1.1a
Project Folder	C:\Users\Richard Ibbotson\Documents\RTE\Device\ICSS_Tracker_1.1a
Toolchain / IDE	EWARM V8.32
Firmware Package Name and Version	STM32Cube FW_L0 V1.11.2

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
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32L0
Line	STM32L0x2
MCU	STM32L072CZYx
Datasheet	027100_Rev3

6.2. Parameter Selection

Temperature	25
Vdd	3.0

7. IPs and Middleware Configuration

7.1. ADC

mode: IN5

7.1.1. 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

7.2. GPIO

7.3. I2C1

I2C: I2C

7.3.1. 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

7.4. RCC

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.4.1. 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

7.5. RTC

mode: Activate Clock Source

mode: Activate Calendar

Alarm A: Internal Alarm A

7.5.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	

	31 *
Synchronous Predivider value	**1023 ***

Calendar Time:

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

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

Alarm A:

Hours	0
Minutes	0
Seconds	0
Sub Seconds	0
Alarm Mask Date Week day	Disable
Alarm Mask Hours	Disable
Alarm Mask Minutes	Disable
Alarm Mask Seconds	Disable
Alarm Sub Second Mask	**SS[14:0] are compared and must match to activate alarm. ***
Alarm Date Week Day Sel	Date
Alarm Date	1

7.6. SPI1

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)	**32 ***
Baud Rate	**1000.0 KBits/s ***

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

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.7. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

7.8. USART1

Mode: Asynchronous

7.8.1. 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**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PA5	ADC_IN5	Analog mode	No pull-up and no pull-down	n/a	
I2C1	PB9	I2C1_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	
	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
SPI1	PB3	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	RA_SCK
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	RA_MOSI
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	RA_MISO
SYS	PA14	SYS_SWCLK	n/a	n/a	n/a	
	PA13	SYS_SWDIO	n/a	n/a	n/a	
USART1	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART_RX
	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	UART_TX
GPIO	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	RA_NSS
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	TCXO_EN
	PB4	GPIO_EXTI4	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	**n/a**	RA_DIO0
	PC13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	**n/a**	RA_DIO3
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	ANT_BST
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	RA_RES
	PB1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	**n/a**	RA_DIO1
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	ANT_RX
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	ANT_TX

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB14	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	GPS_PPS
	PB13	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	GPS_INT
	PA2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED
	PB0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	RA_DIO2
	PA3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BUTTON

8.2. DMA configuration

nothing configured in DMA service

8.3. 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
RTC global interrupt through EXTI lines 17, 19 and 20 and LSE CSS interrupt through EXTI line 19	true	0	0
EXTI line 0 and line 1 interrupts	true	0	0
EXTI line 4 to 15 interrupts	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash and EEPROM global interrupt	unused		
RCC and CRS global interrupt	unused		
ADC, 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		
SPI1 global interrupt	unused		
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	unused		

*** User modified value**

9. Software Pack Report