1. Description

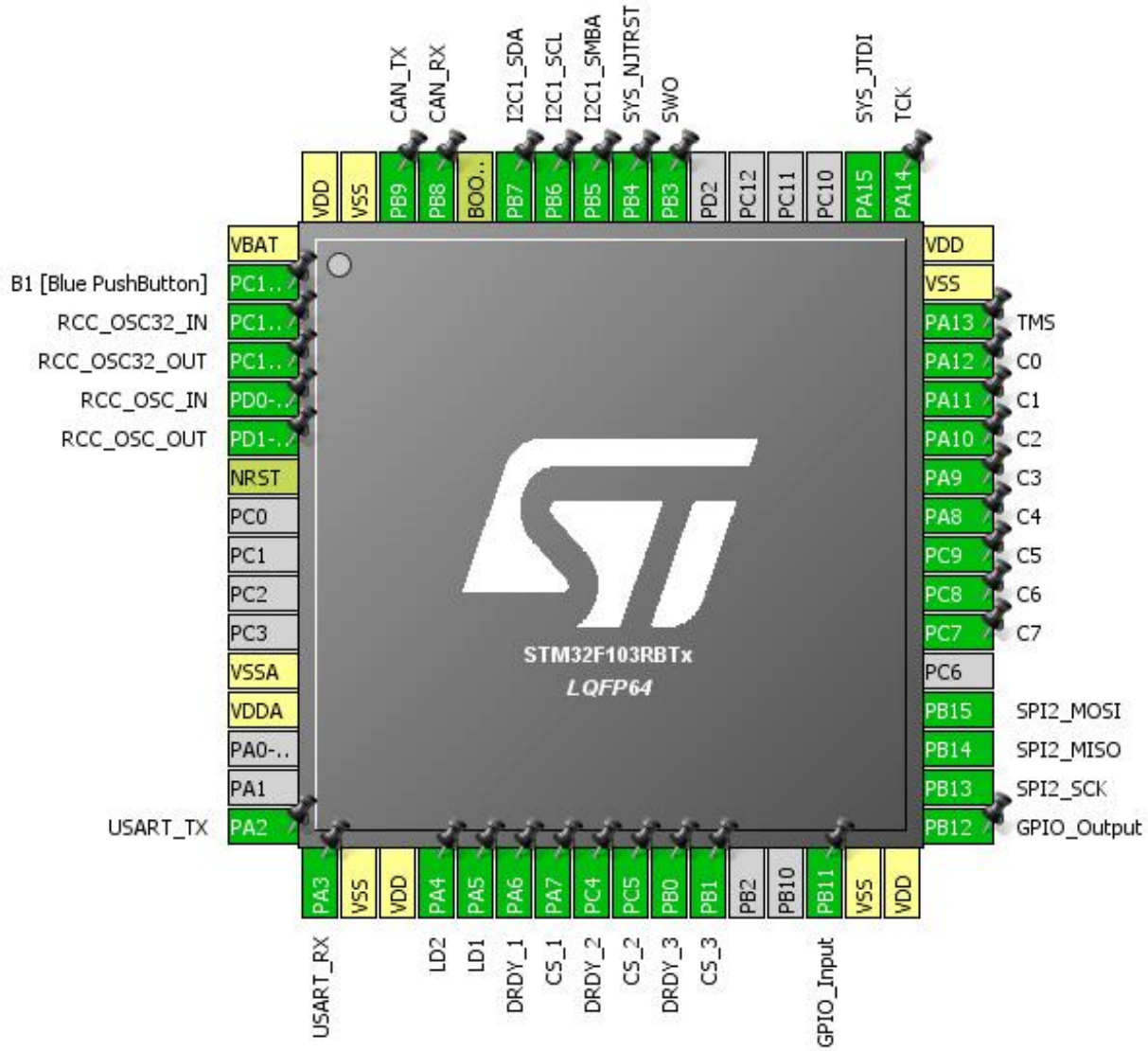
1.1. Project

Project Name	Solarregler
Board Name	NUCLEO-F103RB
Generated with:	STM32CubeMX 4.27.0
Date	12/06/2018

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RBTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



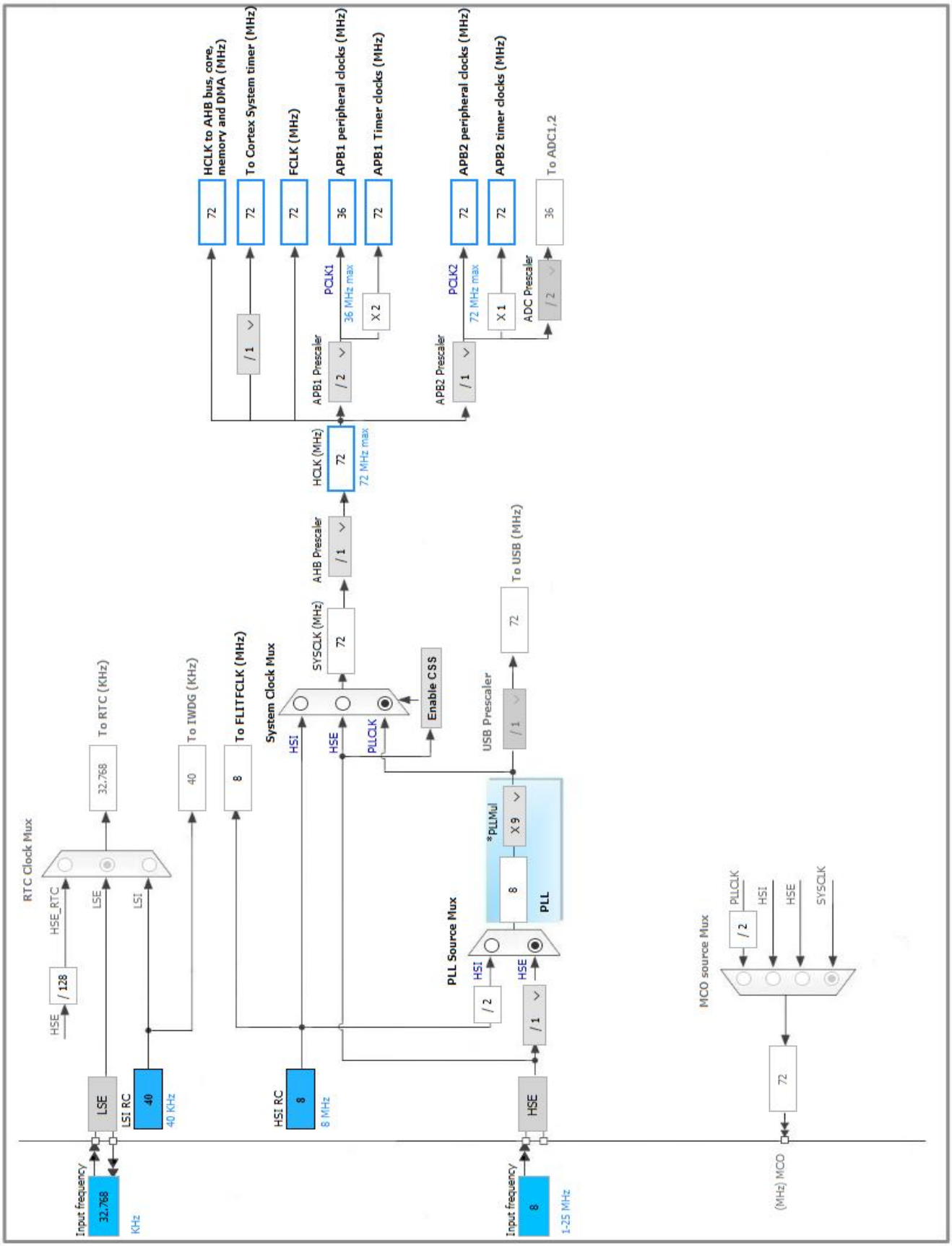
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC	I/O	GPIO_EXTI13	B1 [Blue PushButton]
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
16	PA2	I/O	USART2_TX	USART_TX
17	PA3	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
20	PA4 *	I/O	GPIO_Output	LD2
21	PA5 *	I/O	GPIO_Output	LD1
22	PA6 *	I/O	GPIO_Input	DRDY_1
23	PA7 *	I/O	GPIO_Output	CS_1
24	PC4 *	I/O	GPIO_Input	DRDY_2
25	PC5 *	I/O	GPIO_Output	CS_2
26	PB0 *	I/O	GPIO_Input	DRDY_3
27	PB1 *	I/O	GPIO_Output	CS_3
30	PB11 *	I/O	GPIO_Input	
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	
34	PB13	I/O	SPI2_SCK	
35	PB14	I/O	SPI2_MISO	
36	PB15	I/O	SPI2_MOSI	
38	PC7 *	I/O	GPIO_Input	C7
39	PC8 *	I/O	GPIO_Input	C6
40	PC9 *	I/O	GPIO_Input	C5
41	PA8 *	I/O	GPIO_Input	C4
42	PA9 *	I/O	GPIO_Input	C3
43	PA10 *	I/O	GPIO_Input	C2
44	PA11 *	I/O	GPIO_Input	C1
45	PA12 *	I/O	GPIO_Input	C0

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
46	PA13	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	TCK
50	PA15	I/O	SYS_JTDI	
55	PB3	I/O	SYS_JTDO-TRACESWO	SWO
56	PB4	I/O	SYS_NJTRST	
57	PB5	I/O	I2C1_SMBA	
58	PB6	I/O	I2C1_SCL	
59	PB7	I/O	I2C1_SDA	
60	BOOT0	Boot		
61	PB8	I/O	CAN_RX	
62	PB9	I/O	CAN_TX	
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. CAN

mode: Mode

5.1.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	**8 ***
Time Quantum	**222.22222222222223 ***
Time Quanta in Bit Segment 1	**12 Times ***
Time Quanta in Bit Segment 2	**5 Times ***
Time for one Bit	**4000 ***
ReSynchronization Jump Width	1 Time

Basic Parameters:

Time Triggered Communication Mode	Disable
Automatic Bus-Off Management	Disable
Automatic Wake-Up Mode	Disable
No-Automatic Retransmission	Disable
Receive Fifo Locked Mode	Disable
Transmit Fifo Priority	Disable

Advanced Parameters:

Operating Mode	**Loopback ***

5.2. I2C1

I2C: SMBus-Alert-mode

5.3. RCC

High Speed Clock (HSE): BYPASS Clock Source

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

5.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

RCC Parameters:

HSI Calibration Value	16

HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.4. SPI2

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**256 ***
Baud Rate	**140.625 KBits/s ***
Clock Polarity (CPOL)	**High ***
Clock Phase (CPHA)	**2 Edge ***

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.5. SYS

Debug: JTAG (5 pins)

Timebase Source: SysTick

5.6. TIM2

Clock Source : Internal Clock

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**4096 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**65535 ***
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)

5.7. USART2

Mode: Asynchronous

5.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	**9600 ***
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
CAN	PB8	CAN_RX	Input mode	No pull-up and no pull-down	n/a	
	PB9	CAN_TX	Alternate Function Push Pull	n/a	**High ***	
I2C1	PB5	I2C1_SMBA	Alternate Function Open Drain	n/a	**High ***	
	PB6	I2C1_SCL	Alternate Function Open Drain	n/a	**High ***	
	PB7	I2C1_SDA	Alternate Function Open Drain	n/a	**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	
	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	**High ***	
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	**n/a**	
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	**High ***	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
	PA15	SYS_JTDI	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	SWO
	PB4	SYS_NJTRST	n/a	n/a	n/a	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	USART_TX
	PA3	USART2_RX	****	No pull-up and no pull-down	**n/a**	USART_RX
GPIO	PC13-TAMPER-RTC	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	B1 [Blue PushButton]
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD1
	PA6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DRDY_1
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS_1

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DRDY_2
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS_2
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DRDY_3
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS_3
	PB11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC7	GPIO_Input	Input mode	**Pull-up ***	n/a	C7
	PC8	GPIO_Input	Input mode	**Pull-up ***	n/a	C6
	PC9	GPIO_Input	Input mode	**Pull-up ***	n/a	C5
	PA8	GPIO_Input	Input mode	**Pull-up ***	n/a	C4
	PA9	GPIO_Input	Input mode	**Pull-up ***	n/a	C3
	PA10	GPIO_Input	Input mode	**Pull-up ***	n/a	C2
	PA11	GPIO_Input	Input mode	**Pull-up ***	n/a	C1
	PA12	GPIO_Input	Input mode	**Pull-up ***	n/a	C0

6.2. DMA configuration

nothing configured in DMA service

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
Prefetch 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
USB high priority or CAN TX interrupts	true	0	0
USB low priority or CAN RX0 interrupts	true	0	0
CAN RX1 interrupt	true	0	0
CAN SCE interrupt	true	0	0
TIM2 global interrupt	true	0	0
SPI2 global interrupt	true	0	0
USART2 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line[15:10] interrupts	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103RBTx
Datasheet	13587_Rev17

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	Solarregler
Project Folder	C:\Users\Alex\Documents\GitHub\VMCB\Software\Solarregler
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.1

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

9. Software Pack Report