1. Description

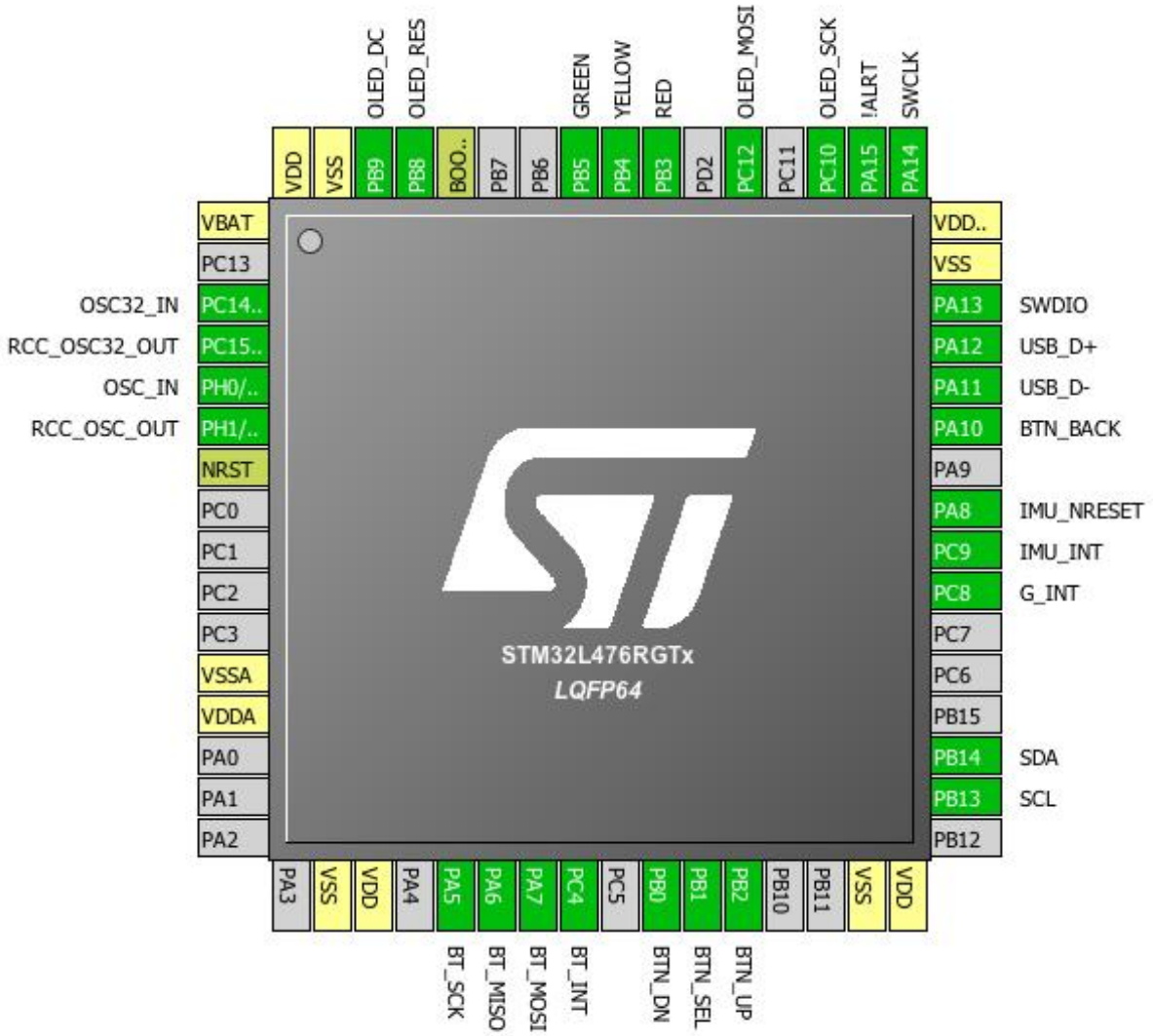
1.1. Project

Project Name	SmartWatch
Board Name	SmartWatch
Generated with:	STM32CubeMX 4.11.0
Date	11/09/2015

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L476RGTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



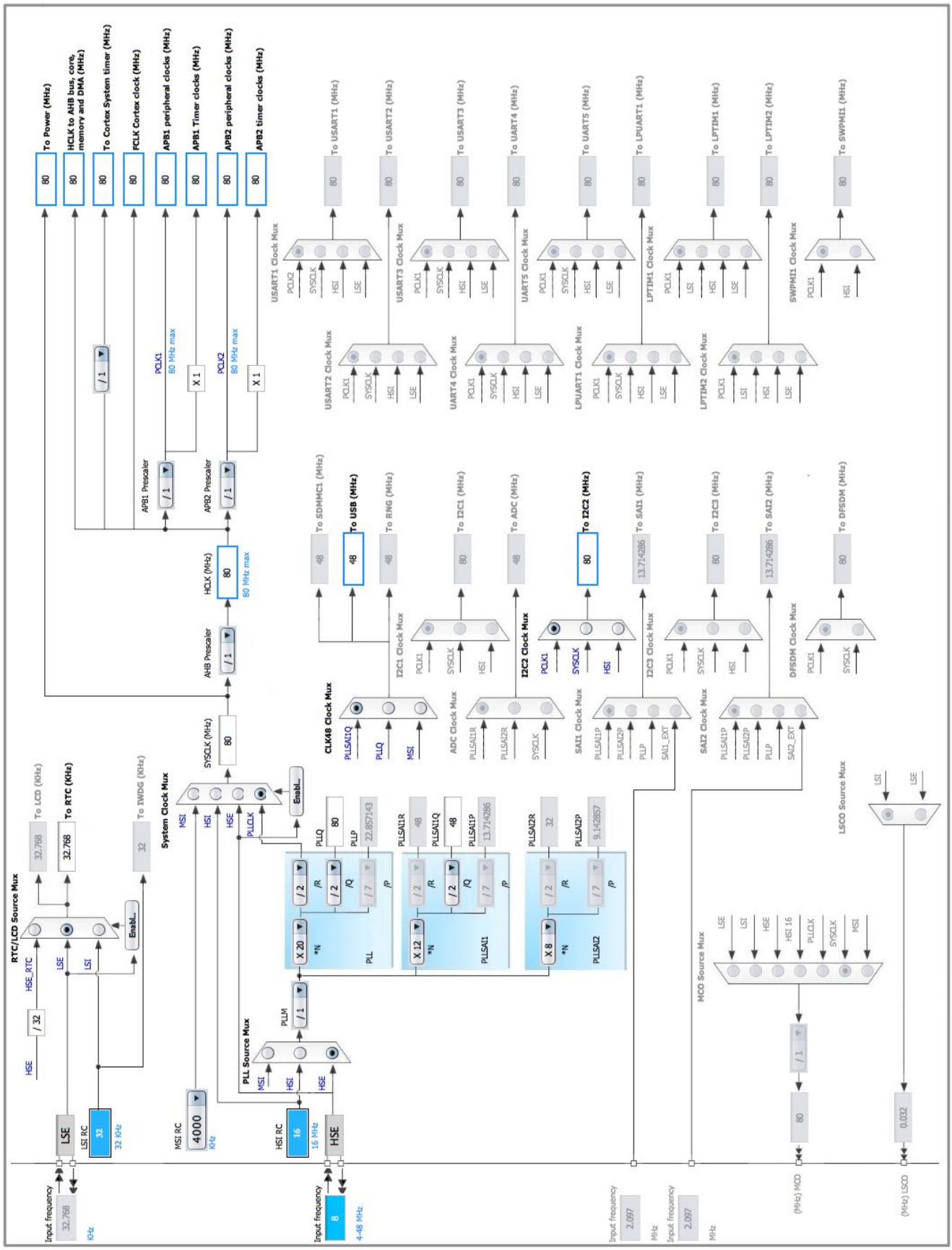
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
3	PC14/OSC32_IN	I/O	RCC_OSC32_IN	OSC32_IN
4	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PH0/OSC_IN	I/O	RCC_OSC_IN	OSC_IN
6	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
18	VSS	Power		
19	VDD	Power		
21	PA5	I/O	SPI1_SCK	BT_SCK
22	PA6	I/O	SPI1_MISO	BT_MISO
23	PA7	I/O	SPI1_MOSI	BT_MOSI
24	PC4 *	I/O	GPIO_Input	BT_INT
26	PB0 *	I/O	GPIO_Input	BTN_DN
27	PB1 *	I/O	GPIO_Input	BTN_SEL
28	PB2 *	I/O	GPIO_Input	BTN_UP
31	VSS	Power		
32	VDD	Power		
34	PB13	I/O	I2C2_SCL	SCL
35	PB14	I/O	I2C2_SDA	SDA
39	PC8 *	I/O	GPIO_Input	G_INT
40	PC9 *	I/O	GPIO_Input	IMU_INT
41	PA8 *	I/O	GPIO_Output	IMU_NRESET
43	PA10 *	I/O	GPIO_Input	BTN_BACK
44	PA11	I/O	USB_OTG_FS_DM	USB_D-
45	PA12	I/O	USB_OTG_FS_DP	USB_D+
46	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
47	VSS	Power		
48	VDDUSB	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	SWCLK
50	PA15 *	I/O	GPIO_Input	!ALRT
51	PC10	I/O	SPI3_SCK	OLED_SCK
53	PC12	I/O	SPI3_MOSI	OLED_MOSI
55	PB3 *	I/O	GPIO_Output	RED
56	PB4 *	I/O	GPIO_Output	YELLOW

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
57	PB5 *	I/O	GPIO_Output	GREEN
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	OLED_RES
62	PB9 *	I/O	GPIO_Output	OLED_DC
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. I2C2

I2C: I2C

5.1.1. 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	0x00000000

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

5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : 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)	4 WS (5 CPU cycle)

RCC Parameters:

HSI Calibration Value	16

MSI Calibration Value	0
MSI Auto Calibration	Disabled

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

5.3. RTC

Alarm A: Internal Alarm A

5.3.1. Parameter Settings:

General:

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

Calendar Time:

Data Format	BCD 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
Alarm Mask	Alarm Mask None
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

5.4. SPI1

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**8 ***
Baud Rate	**10.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

5.5. SPI3

Mode: Transmit Only Master

5.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**8 ***
Baud Rate	**10.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

5.6. SYS

Debug: Serial Wire Debug (SWD)

5.7. USB_OTG_FS

Mode: Device_Only

5.7.1. Parameter Settings:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Enable internal IP DMA	Disabled
Low power	Disabled
Link Power Management	Disabled
VBUS sensing	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
I2C2	PB13	I2C2_SCL	Alternate Function Open Drain	Pull-up	**High ***	SCL
	PB14	I2C2_SDA	Alternate Function Open Drain	Pull-up	**High ***	SDA
RCC	PC14/OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	OSC32_IN
	PC15/OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	PH0/OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	OSC_IN
	PH1/OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	BT_SCK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	BT_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	BT_MOSI
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	OLED_SCK
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	OLED_MOSI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USB_D-
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	USB_D+
GPIO	PC4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BT_INT
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_DN
	PB1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_SEL
	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_UP
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	G_INT
	PC9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	IMU_INT
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IMU_NRESET
	PA10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN_BACK
	PA15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	!ALRT
	PB3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RED

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	YELLOW
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GREEN
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OLED_RES
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OLED_DC

6.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI3_TX	DMA2_Channel2	Memory To Peripheral	Low
SPI1_TX	DMA1_Channel3	Memory To Peripheral	Low
SPI1_RX	DMA1_Channel2	Peripheral To Memory	Low

SPI3_TX: DMA2_Channel2 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: Disable
Peripheral Data Width: Byte
Memory Data Width: Byte

SPI1_TX: DMA1_Channel3 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: Disable
Peripheral Data Width: Byte
Memory Data Width: Byte

SPI1_RX: DMA1_Channel2 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: Disable
Peripheral Data Width: Byte
Memory Data Width: Byte

6.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
System tick timer	true	0	0
DMA1 channel2 global interrupt	true	0	0
DMA1 channel3 global interrupt	true	0	0
DMA2 channel2 global interrupt	true	0	0
Non maskable interrupt	unused		
Memory management fault	unused		
Prefetch fault, memory access fault	unused		
Undefined instruction or illegal state	unused		
Debug monitor	unused		
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
SPI1 global interrupt	unused		
RTC alarm interrupt through EXTI line 18	unused		
SPI3 global interrupt	unused		
USB OTG FS global interrupt	unused		

*** User modified value**

7. Power Plugin report

7.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x6
MCU	STM32L476RGTx
Datasheet	025976_Rev3

7.2. Parameter Selection

Temperature	25
Vdd	3.0

8. Software Project

8.1. Project Settings

Name	Value
Project Name	SmartWatch
Project Folder	/Users/nmolo/ECE477/Software/SmartWatch
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_L4 V1.1.1

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	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