1. Description

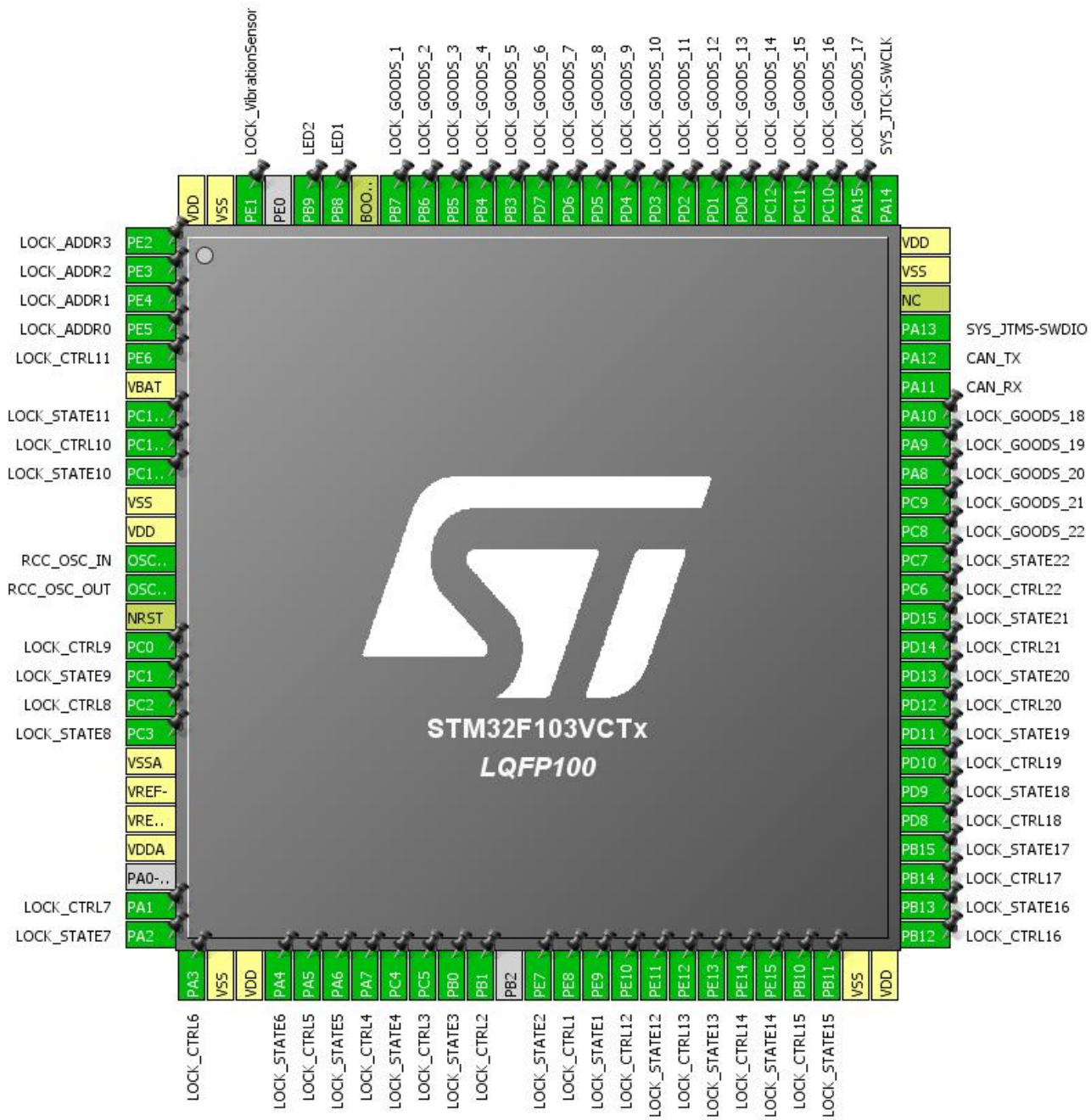
1.1. Project

Project Name	MSmartBoxV1
Board Name	MSmartBoxV1.0
Generated with:	STM32CubeMX 4.24.0
Date	03/29/2018

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103VCTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



3. Pins Configuration

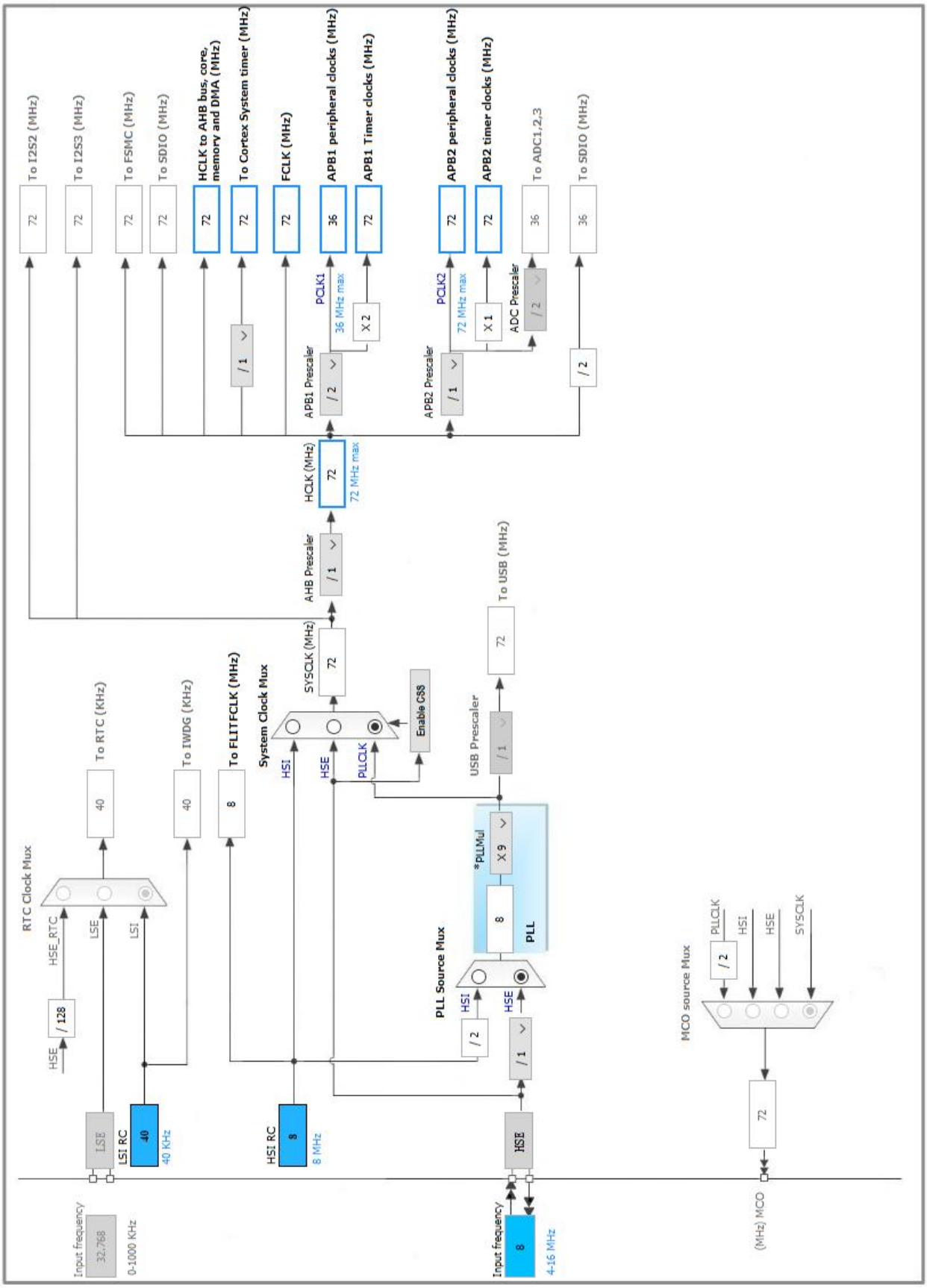
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2 *	I/O	GPIO_Input	LOCK_ADDR3
2	PE3 *	I/O	GPIO_Input	LOCK_ADDR2
3	PE4 *	I/O	GPIO_Input	LOCK_ADDR1
4	PE5 *	I/O	GPIO_Input	LOCK_ADDR0
5	PE6 *	I/O	GPIO_Output	LOCK_CTRL11
6	VBAT	Power		
7	PC13-TAMPER-RTC *	I/O	GPIO_Input	LOCK_STATE11
8	PC14-OSC32_IN *	I/O	GPIO_Output	LOCK_CTRL10
9	PC15-OSC32_OUT *	I/O	GPIO_Input	LOCK_STATE10
10	VSS	Power		
11	VDD	Power		
12	OSC_IN	I/O	RCC_OSC_IN	
13	OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
15	PC0 *	I/O	GPIO_Output	LOCK_CTRL9
16	PC1 *	I/O	GPIO_Input	LOCK_STATE9
17	PC2 *	I/O	GPIO_Output	LOCK_CTRL8
18	PC3 *	I/O	GPIO_Input	LOCK_STATE8
19	VSSA	Power		
20	VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
24	PA1 *	I/O	GPIO_Output	LOCK_CTRL7
25	PA2 *	I/O	GPIO_Input	LOCK_STATE7
26	PA3 *	I/O	GPIO_Output	LOCK_CTRL6
27	VSS	Power		
28	VDD	Power		
29	PA4 *	I/O	GPIO_Input	LOCK_STATE6
30	PA5 *	I/O	GPIO_Output	LOCK_CTRL5
31	PA6 *	I/O	GPIO_Input	LOCK_STATE5
32	PA7 *	I/O	GPIO_Output	LOCK_CTRL4
33	PC4 *	I/O	GPIO_Input	LOCK_STATE4
34	PC5 *	I/O	GPIO_Output	LOCK_CTRL3
35	PB0 *	I/O	GPIO_Input	LOCK_STATE3
36	PB1 *	I/O	GPIO_Output	LOCK_CTRL2
38	PE7 *	I/O	GPIO_Input	LOCK_STATE2

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
39	PE8 *	I/O	GPIO_Output	LOCK_CTRL1
40	PE9 *	I/O	GPIO_Input	LOCK_STATE1
41	PE10 *	I/O	GPIO_Output	LOCK_CTRL12
42	PE11 *	I/O	GPIO_Input	LOCK_STATE12
43	PE12 *	I/O	GPIO_Output	LOCK_CTRL13
44	PE13 *	I/O	GPIO_Input	LOCK_STATE13
45	PE14 *	I/O	GPIO_Output	LOCK_CTRL14
46	PE15 *	I/O	GPIO_Input	LOCK_STATE14
47	PB10 *	I/O	GPIO_Output	LOCK_CTRL15
48	PB11 *	I/O	GPIO_Input	LOCK_STATE15
49	VSS	Power		
50	VDD	Power		
51	PB12 *	I/O	GPIO_Output	LOCK_CTRL16
52	PB13 *	I/O	GPIO_Input	LOCK_STATE16
53	PB14 *	I/O	GPIO_Output	LOCK_CTRL17
54	PB15 *	I/O	GPIO_Input	LOCK_STATE17
55	PD8 *	I/O	GPIO_Output	LOCK_CTRL18
56	PD9 *	I/O	GPIO_Input	LOCK_STATE18
57	PD10 *	I/O	GPIO_Output	LOCK_CTRL19
58	PD11 *	I/O	GPIO_Input	LOCK_STATE19
59	PD12 *	I/O	GPIO_Output	LOCK_CTRL20
60	PD13 *	I/O	GPIO_Input	LOCK_STATE20
61	PD14 *	I/O	GPIO_Output	LOCK_CTRL21
62	PD15 *	I/O	GPIO_Input	LOCK_STATE21
63	PC6 *	I/O	GPIO_Output	LOCK_CTRL22
64	PC7 *	I/O	GPIO_Input	LOCK_STATE22
65	PC8 *	I/O	GPIO_Input	LOCK_GOODS_22
66	PC9 *	I/O	GPIO_Input	LOCK_GOODS_21
67	PA8 *	I/O	GPIO_Input	LOCK_GOODS_20
68	PA9 *	I/O	GPIO_Input	LOCK_GOODS_19
69	PA10 *	I/O	GPIO_Input	LOCK_GOODS_18
70	PA11	I/O	CAN_RX	
71	PA12	I/O	CAN_TX	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	NC	NC		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
77	PA15 *	I/O	GPIO_Input	LOCK_GOODS_17

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
78	PC10 *	I/O	GPIO_Input	LOCK_GOODS_16
79	PC11 *	I/O	GPIO_Input	LOCK_GOODS_15
80	PC12 *	I/O	GPIO_Input	LOCK_GOODS_14
81	PD0 *	I/O	GPIO_Input	LOCK_GOODS_13
82	PD1 *	I/O	GPIO_Input	LOCK_GOODS_12
83	PD2 *	I/O	GPIO_Input	LOCK_GOODS_11
84	PD3 *	I/O	GPIO_Input	LOCK_GOODS_10
85	PD4 *	I/O	GPIO_Input	LOCK_GOODS_9
86	PD5 *	I/O	GPIO_Input	LOCK_GOODS_8
87	PD6 *	I/O	GPIO_Input	LOCK_GOODS_7
88	PD7 *	I/O	GPIO_Input	LOCK_GOODS_6
89	PB3 *	I/O	GPIO_Input	LOCK_GOODS_5
90	PB4 *	I/O	GPIO_Input	LOCK_GOODS_4
91	PB5 *	I/O	GPIO_Input	LOCK_GOODS_3
92	PB6 *	I/O	GPIO_Input	LOCK_GOODS_2
93	PB7 *	I/O	GPIO_Input	LOCK_GOODS_1
94	BOOT0	Boot		
95	PB8 *	I/O	GPIO_Output	LED1
96	PB9 *	I/O	GPIO_Output	LED2
98	PE1 *	I/O	GPIO_Input	LOCK_VibrationSensor
99	VSS	Power		
100	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)	**45 ***
Time Quantum	**1250.0 ***
Time Quanta in Bit Segment 1	**4 Times ***
Time Quanta in Bit Segment 2	**3 Times ***
Time for one Bit	**10000 ***
ReSynchronization Jump Width	1 Time

Basic Parameters:

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

Advanced Parameters:

Operating Mode	Normal

5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.2.1. 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

5.3. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.4. TIM4

Clock Source : Internal Clock

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**72-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**1000-1 ***
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)

5.5. TIM5

mode: Clock Source

5.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**3600-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**2000-1 ***
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)

*** 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	PA11	CAN_RX	Input mode	No pull-up and no pull-down	n/a	
	PA12	CAN_TX	Alternate Function Push Pull	n/a	**High ***	
RCC	OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
GPIO	PE2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_ADDR3
	PE3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_ADDR2
	PE4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_ADDR1
	PE5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_ADDR0
	PE6	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL11
	PC13-TAMPER-RTC	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE11
	PC14-OSC32_IN	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL10
	PC15-OSC32_OUT	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE10
	PC0	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL9
	PC1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE9
	PC2	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL8
	PC3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE8
	PA1	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL7
	PA2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE7
	PA3	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL6
	PA4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE6
	PA5	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL5
	PA6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE5
	PA7	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL4
	PC4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE4
	PC5	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL3
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE3

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB1	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL2
	PE7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE2
	PE8	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL1
	PE9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE1
	PE10	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL12
	PE11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE12
	PE12	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL13
	PE13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE13
	PE14	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL14
	PE15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE14
	PB10	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL15
	PB11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE15
	PB12	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL16
	PB13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE16
	PB14	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL17
	PB15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE17
	PD8	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL18
	PD9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE18
	PD10	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL19
	PD11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE19
	PD12	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL20
	PD13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE20
	PD14	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL21
	PD15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE21
	PC6	GPIO_Output	Output Push Pull	n/a	Low	LOCK_CTRL22
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_STATE22
	PC8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_22
	PC9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_21
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_20
	PA9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_19
	PA10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_18
	PA15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_17
	PC10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_16
	PC11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_15
	PC12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_14
	PD0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_13
	PD1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_12
	PD2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_11
	PD3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_10
	PD4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_9

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PD5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_8
	PD6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_7
	PD7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_6
	PB3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_5
	PB4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_4
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_3
	PB6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_2
	PB7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_GOODS_1
	PB8	GPIO_Output	Output Push Pull	n/a	Low	LED1
	PB9	GPIO_Output	Output Push Pull	n/a	Low	LED2
	PE1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	LOCK_VibrationSensor

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 low priority or CAN RX0 interrupts	true	0	0
CAN RX1 interrupt	true	0	0
CAN SCE interrupt	true	0	0
TIM4 global interrupt	true	0	0
TIM5 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USB high priority or CAN TX interrupts	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103VCTx
Datasheet	14611_Rev12

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	MSmartBoxV1.0
Project Folder	E:\Users\bertz\Documents\GitHub\SmartBoxPro
Toolchain / IDE	EWARM
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	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

9. Software Pack Report