1. Description

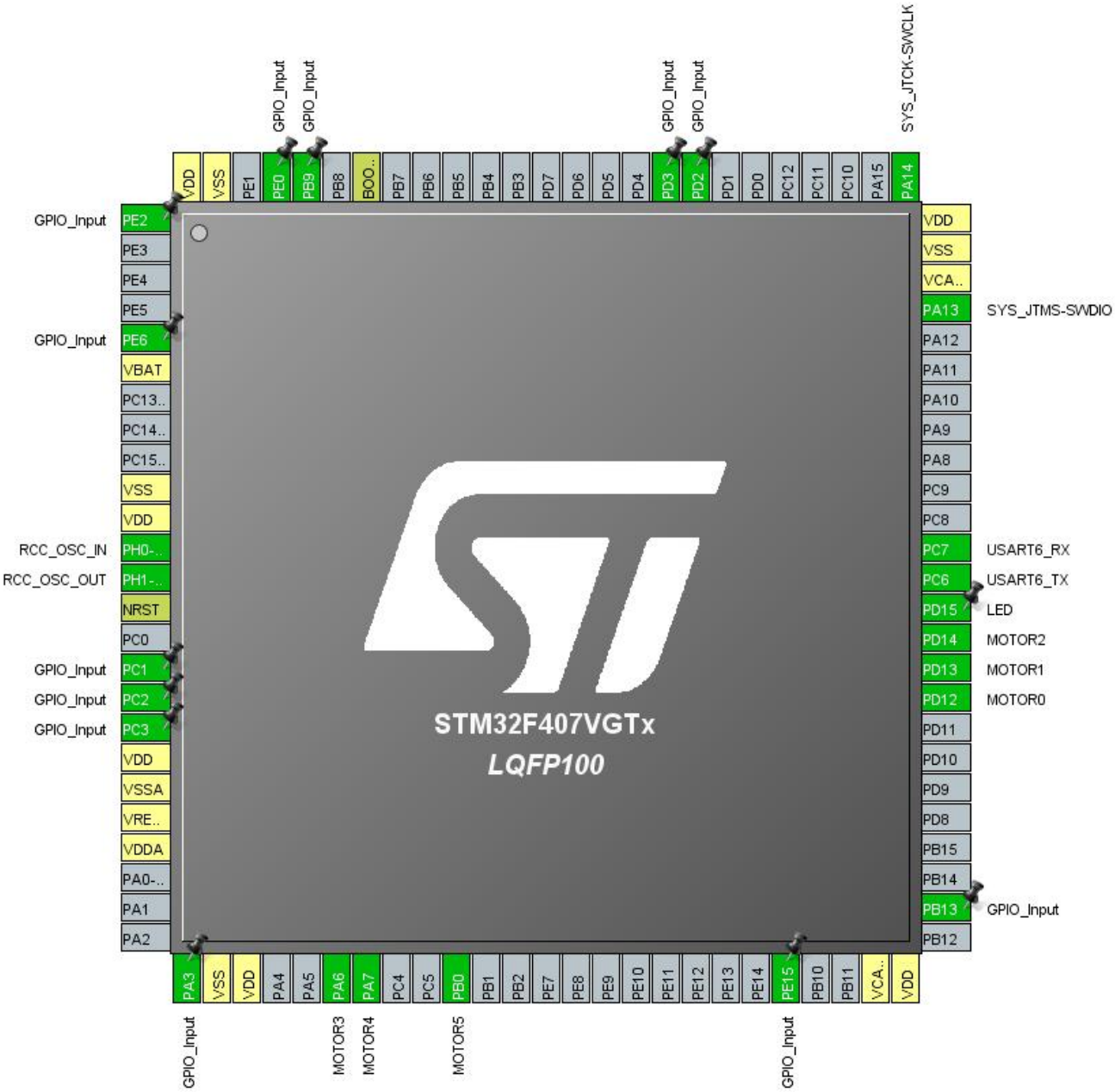
1.1. Project

Project Name	rhex_base
Board Name	custom
Generated with:	STM32CubeMX 5.0.0
Date	12/04/2018

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VGTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



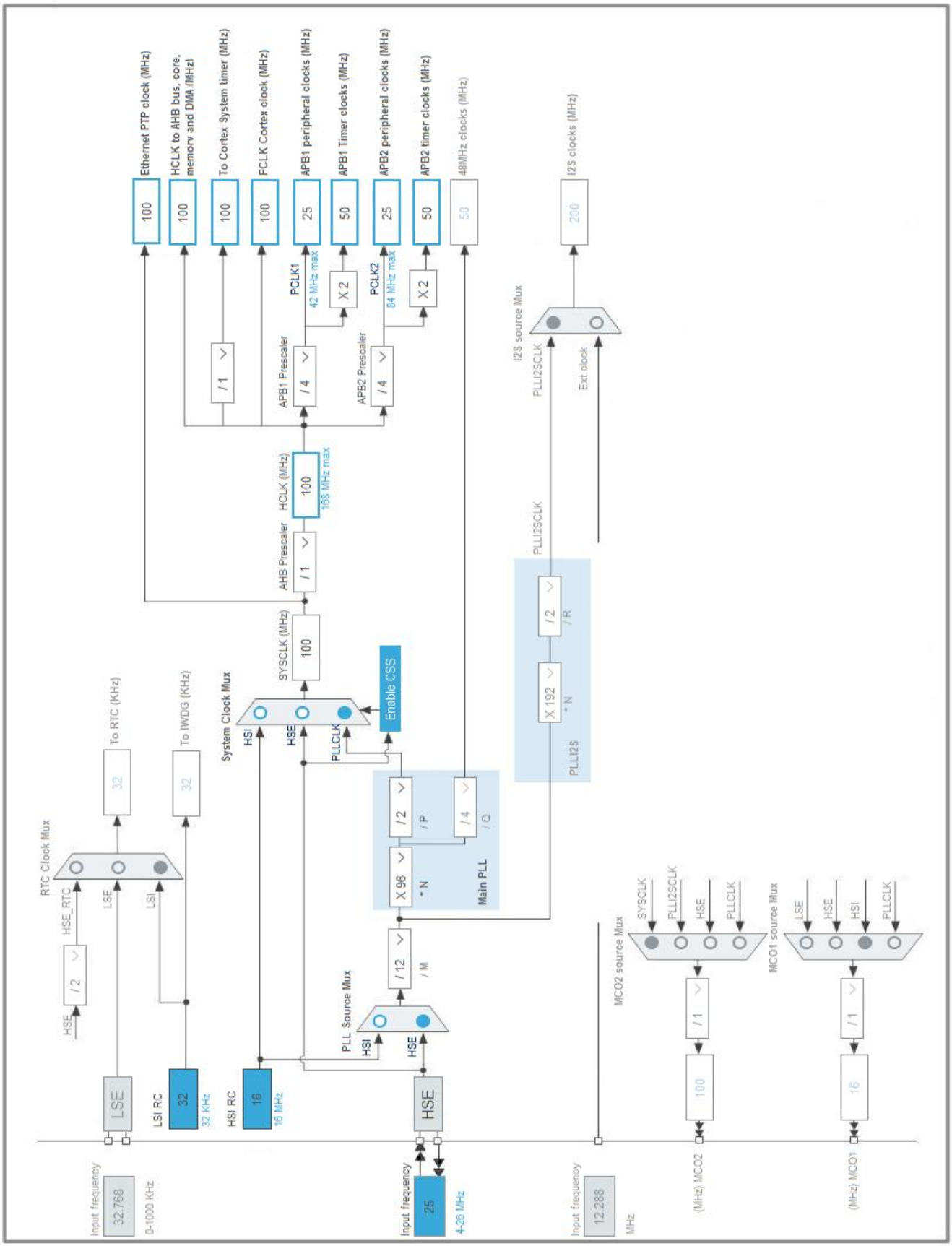
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2 *	I/O	GPIO_Input	
5	PE6 *	I/O	GPIO_Input	
6	VBAT	Power		
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN	I/O	RCC_OSC_IN	
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
16	PC1 *	I/O	GPIO_Input	
17	PC2 *	I/O	GPIO_Input	
18	PC3 *	I/O	GPIO_Input	
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
26	PA3 *	I/O	GPIO_Input	
27	VSS	Power		
28	VDD	Power		
31	PA6	I/O	TIM3_CH1	MOTOR3
32	PA7	I/O	TIM3_CH2	MOTOR4
35	PB0	I/O	TIM3_CH3	MOTOR5
46	PE15 *	I/O	GPIO_Input	
49	VCAP_1	Power		
50	VDD	Power		
52	PB13 *	I/O	GPIO_Input	
59	PD12	I/O	TIM4_CH1	MOTOR0
60	PD13	I/O	TIM4_CH2	MOTOR1
61	PD14	I/O	TIM4_CH3	MOTOR2
62	PD15 *	I/O	GPIO_Output	LED
63	PC6	I/O	USART6_TX	
64	PC7	I/O	USART6_RX	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
83	PD2 *	I/O	GPIO_Input	
84	PD3 *	I/O	GPIO_Input	
94	BOOT0	Boot		
96	PB9 *	I/O	GPIO_Input	
97	PE0 *	I/O	GPIO_Input	
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	rhex_base
Project Folder	C:_workfolder\LEGO\SPYBOT-rHex-demo-v2\rhex_base
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F4 V1.22.0

5.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Copy only the necessary library files
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	STM32F4
Line	STM32F407/417
MCU	STM32F407VGTx
Datasheet	022152_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.1.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	3 WS (4 CPU cycle)

RCC Parameters:

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

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 1

7.2. SYS

Debug: Serial Wire

Timebase Source: TIM1

7.3. TIM3

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

7.3.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**3 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**50000 ***
Internal Clock Division (CKD)	No Division

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 3:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

7.4. TIM4

Channel1: PWM Generation CH1
Channel2: PWM Generation CH2
Channel3: PWM Generation CH3
7.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**3 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**50000 ***
Internal Clock Division (CKD)	No Division

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0

Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 3:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

7.5. USART6

Mode: Asynchronous

7.5.1. 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

7.6. FREERTOS

mode: Enabled

7.6.1. Config parameters:

Versions:

FreeRTOS version	9.0.0
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled

USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Memory management settings:

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	15360
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Disabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

7.6.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled

vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM3	PA6	TIM3_CH1	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR3
	PA7	TIM3_CH2	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR4
	PB0	TIM3_CH3	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR5
TIM4	PD12	TIM4_CH1	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR0
	PD13	TIM4_CH2	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR1
	PD14	TIM4_CH3	Alternate Function Push Pull	**Pull-down ***	Low	MOTOR2
USART6	PC6	USART6_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PC7	USART6_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
GPIO	PE2	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PE6	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PC1	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PC2	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PC3	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PA3	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PE15	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PB13	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PD15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED
	PD2	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PD3	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PB9	GPIO_Input	Input mode	**Pull-up ***	n/a	
	PE0	GPIO_Input	Input mode	**Pull-up ***	n/a	

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
Memory management fault	true	0	0
Pre-fetch 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	15	0
System tick timer	true	15	0
TIM1 update interrupt and TIM10 global interrupt	true	0	0
USART6 global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM3 global interrupt	unused		
TIM4 global interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

9. Software Pack Report