1. Description

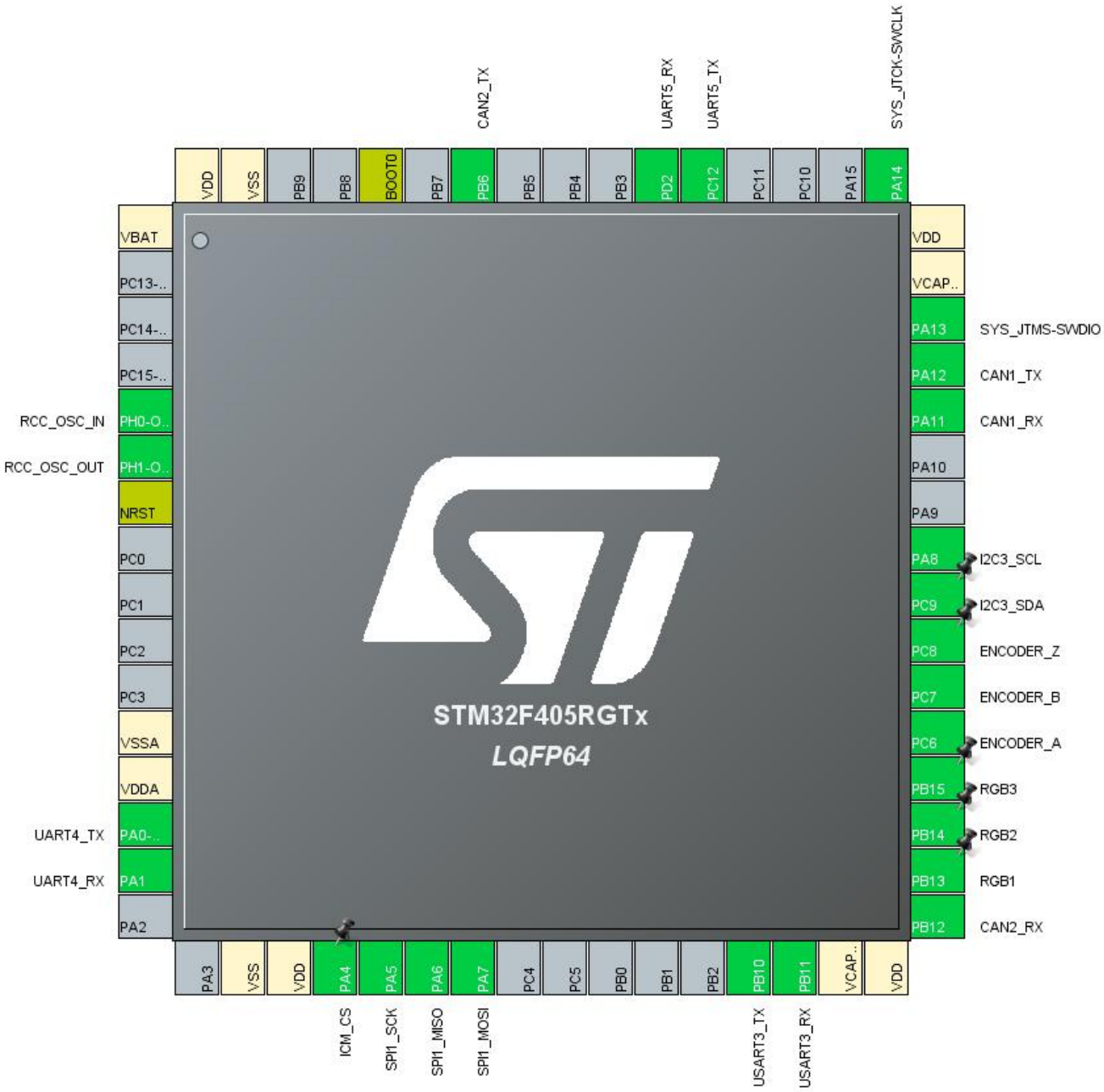
1.1. Project

Project Name	SentryChassis
Board Name	custom
Generated with:	STM32CubeMX 5.3.0
Date	06/03/2020

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F405/415
MCU name	STM32F405RGTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



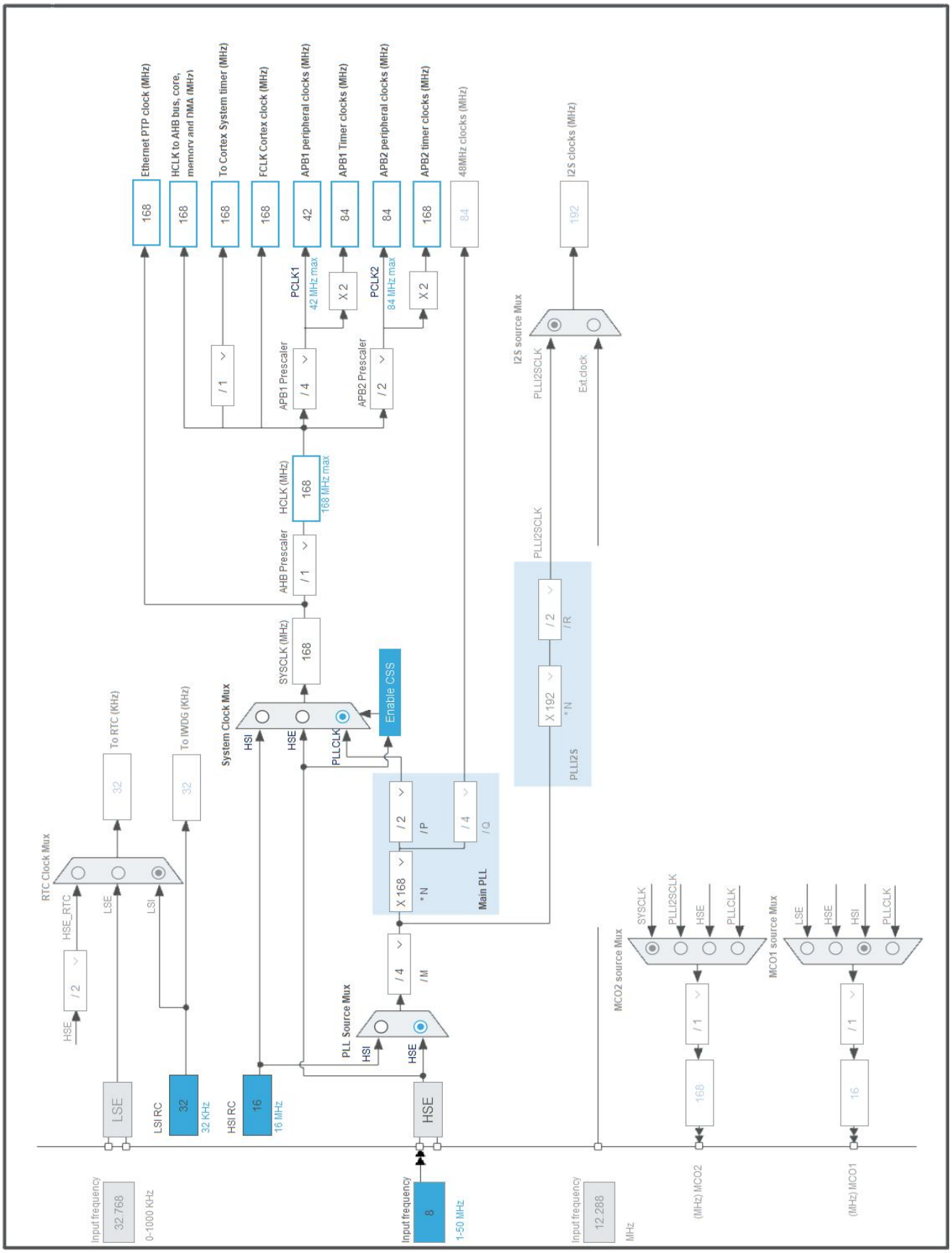
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	UART4_TX	
15	PA1	I/O	UART4_RX	
18	VSS	Power		
19	VDD	Power		
20	PA4 *	I/O	GPIO_Output	ICM_CS
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
29	PB10	I/O	USART3_TX	
30	PB11	I/O	USART3_RX	
31	VCAP_1	Power		
32	VDD	Power		
33	PB12	I/O	CAN2_RX	
34	PB13 *	I/O	GPIO_Output	RGB1
35	PB14 *	I/O	GPIO_Output	RGB2
36	PB15 *	I/O	GPIO_Output	RGB3
37	PC6	I/O	TIM3_CH1	ENCODER_A
38	PC7	I/O	TIM3_CH2	ENCODER_B
39	PC8 *	I/O	GPIO_Input	ENCODER_Z
40	PC9	I/O	I2C3_SDA	
41	PA8	I/O	I2C3_SCL	
44	PA11	I/O	CAN1_RX	
45	PA12	I/O	CAN1_TX	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VCAP_2	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
53	PC12	I/O	UART5_TX	
54	PD2	I/O	UART5_RX	
58	PB6	I/O	CAN2_TX	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
60	BOOT0	Boot		
63	VSS	Power		
64	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	SentryChassis
Project Folder	D:\RM_TdDg_PrivLib\Sentry_\SentryChassis
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.24.0

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	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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F405/415
MCU	STM32F405RGTx
Datasheet	022152_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. CAN1

mode: Mode

7.1.1. Parameter Settings:

rameters:

Quantum)	**3 ***
	71.42857142857143 *
egment 1	**9 Times ***
egment 2	**4 Times ***
ump Width	1 Time

rs:

munication Mode	Disable
lanagement	**Enable ***
Mode	**Enable ***
nsmission	**Enable ***
Mode	Disable
	Disable

meters:

	Normal

7.2. CAN2

mode: Mode

7.2.1. Parameter Settings:

rameters:

Quantum)	**3 ***
	71.42857142857143 *
egment 1	**9 Times ***
egment 2	**4 Times ***
ump Width	1 Time

rs:

munication Mode	Disable
lanagement	**Enable ***
Mode	**Enable ***

nsmission	**Enable ***
Mode	Disable
y	Disable

meters:

	Normal

7.3. I2C3

I2C: I2C

7.3.1. Parameter Settings:

s:

	Standard Mode
z)	100000

:

de	Disabled
ngth selection	7-bit
wledged	Disabled
ss	0
s detection	Disabled

7.4. RCC

High Speed Clock (HSE): BYPASS Clock Source

7.4.1. Parameter Settings:

eters:

	3.3
	Enabled
	Enabled
	Enabled
	5 WS (6 CPU cycle)

rs:

e	16
Value (ms)	100
Value (ms)	5000

ers:

oltage Scale	Power Regulator Voltage Scale 1

7.5. SPI1

Mode: Full-Duplex Master

7.5.1. Parameter Settings:

ers:

	Motorola
	8 Bits
	MSB First

ers:

Rate)	2
	42.0 MBits/s *
L)	Low
)	1 Edge

meters:

	Disabled
	Software

7.6. SYS

Debug: Serial Wire

Timebase Source: TIM14

7.7. TIM3

Combined Channels: Encoder Mode

7.7.1. Parameter Settings:

gs:

bits value)	0
	Up
oReload Register - 16 bits value)	0
on (CKD)	No Division
	Disable

(TRGO) Parameters:

(MSM bit)	Disable (Trigger input effect not delayed)
ion	Reset (UG bit from TIMx_EGR)

	Encoder Mode TI1
ers for Channel 1 ____	
	Rising Edge
	Direct
atio	No division
	0
ers for Channel 2 ____	
	Rising Edge
	Direct
atio	No division
	0

7.8. UART4

Mode: Asynchronous

7.8.1. Parameter Settings:

ers:

	115200
	8 Bits (including Parity)
	None
	1

meters:

	Receive and Transmit
	16 Samples

7.9. UART5

Mode: Asynchronous

7.9.1. Parameter Settings:

ers:

	115200
	8 Bits (including Parity)
	None
	1

meters:

	Receive and Transmit
	16 Samples

7.10. USART3

Mode: Asynchronous

7.10.1. Parameter Settings:

rs:

115200

8 Bits (including Parity)

None

1

meters:

Receive and Transmit

16 Samples

7.11. FREERTOS

Interface: CMSIS_V1

7.11.1. Config parameters:

CMSIS v1

10.0.1

on 1.02

:

l Enabled

SystemCoreClock

1000

7

SIZE 128

_LEN **32 ***

S Disabled

LD Enabled

Enabled

MUTEXES Disabled

EMAPHORES Disabled

Y_SIZE 8

I_TASK_TAG Disabled

RD_COMPATIBILITY	Enabled
ISED_TASK_SELECTION	Enabled
LE	Disabled
CATIONS	Enabled
HIGH_ADDRESS	**Enabled ***

ement settings:

	Dynamic *
E	15360
nt scheme	heap_4

related definitions:

	Disabled
	Disabled
LED_HOOK	Disabled
SK_STARTUP_HOOK	Disabled
CK_OVERFLOW	Disabled

ask stats gathering related definitions:

TIME_STATS	Disabled
LITY	Disabled
MATTING_FUNCTIONS	Disabled

ted definitions:

ES	Disabled
E_PRIORITIES	2

definitions:

	Disabled

g behaviour configuration:

_INTERRUPT_PRIORITY	15
SCALL_INTERRUPT_PRIORITY	5

7.11.2. Include parameters:

ons:

	Enabled
	Enabled
	Enabled
urces	Disabled
	Enabled
	Enabled *
	Enabled
State	Enabled
SR	Enabled

lder	Disabled
exHolder	Disabled
e	Disabled
nWaterMark	**Enabled ***
skHandle	Disabled
	Disabled
romISR	Disabled
Call	Disabled
	Disabled
	Disabled

*** User modified value**

8. System Configuration

8.1. GPIO configuration

in	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	
A11	CAN1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
A12	CAN1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
B12	CAN2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
B6	CAN2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
C9	I2C3_SDA	Alternate Function Open Drain	Pull-up	**Very High ***	
A8	I2C3_SCL	Alternate Function Open Drain	Pull-up	**Very High ***	
SC_IN	RCC_OSC_IN	n/a	n/a	n/a	
SC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
A5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
A6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
A7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
A13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
A14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
C6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
C7	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
WKUP	UART4_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
A1	UART4_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
C12	UART5_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
D2	UART5_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
B10	USART3_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
B11	USART3_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
A4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
B13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
B14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
B15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
C8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART3_RX	DMA1_Stream1	Peripheral To Memory	Low
UART5_RX	DMA1_Stream0	Peripheral To Memory	Low
UART4_RX	DMA1_Stream2	Peripheral To Memory	Low

USART3_RX: DMA1_Stream1 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

UART5_RX: DMA1_Stream0 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

UART4_RX: DMA1_Stream2 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

8.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriori
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
re-fetch fault, memory access fault	true	0	0
ndefined instruction or illegal state	true	0	0
stem service call via SWI instruction	true	0	0
Debug monitor	true	0	0
endable request for system service	true	15	0
System tick timer	true	15	0
DMA1 stream0 global interrupt	true	5	0
DMA1 stream1 global interrupt	true	5	0
DMA1 stream2 global interrupt	true	5	0
CAN1 RX0 interrupts	true	1	0
USART3 global interrupt	true	5	0
commutation interrupts and TIM14 global interrupt	true	0	0
UART4 global interrupt	true	5	0
UART5 global interrupt	true	5	0
CAN2 RX0 interrupts	true	2	0
VD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
CAN1 TX interrupts	unused		
CAN1 RX1 interrupt	unused		
CAN1 SCE interrupt	unused		
TIM3 global interrupt	unused		
SPI1 global interrupt	unused		
CAN2 TX interrupts	unused		
CAN2 RX1 interrupt	unused		
CAN2 SCE interrupt	unused		
I2C3 event interrupt	unused		
I2C3 error interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

9. Software Pack Report