1. Description

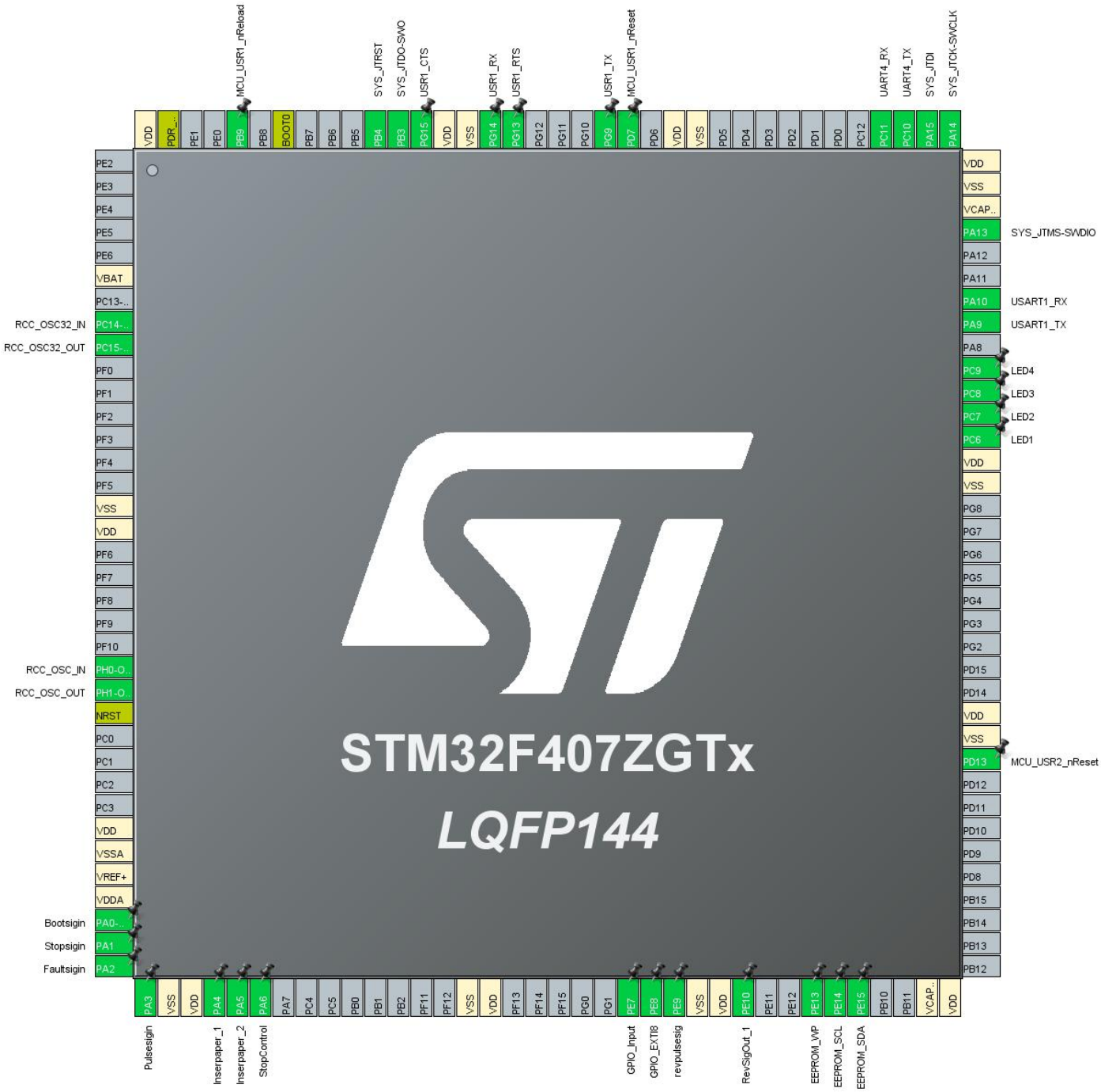
1.1. Project

Project Name	DataCollectSoftware
Board Name	custom
Generated with:	STM32CubeMX 5.4.0
Date	04/13/2020

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407ZGTx
MCU Package	LQFP144
MCU Pin number	144

2. Pinout Configuration



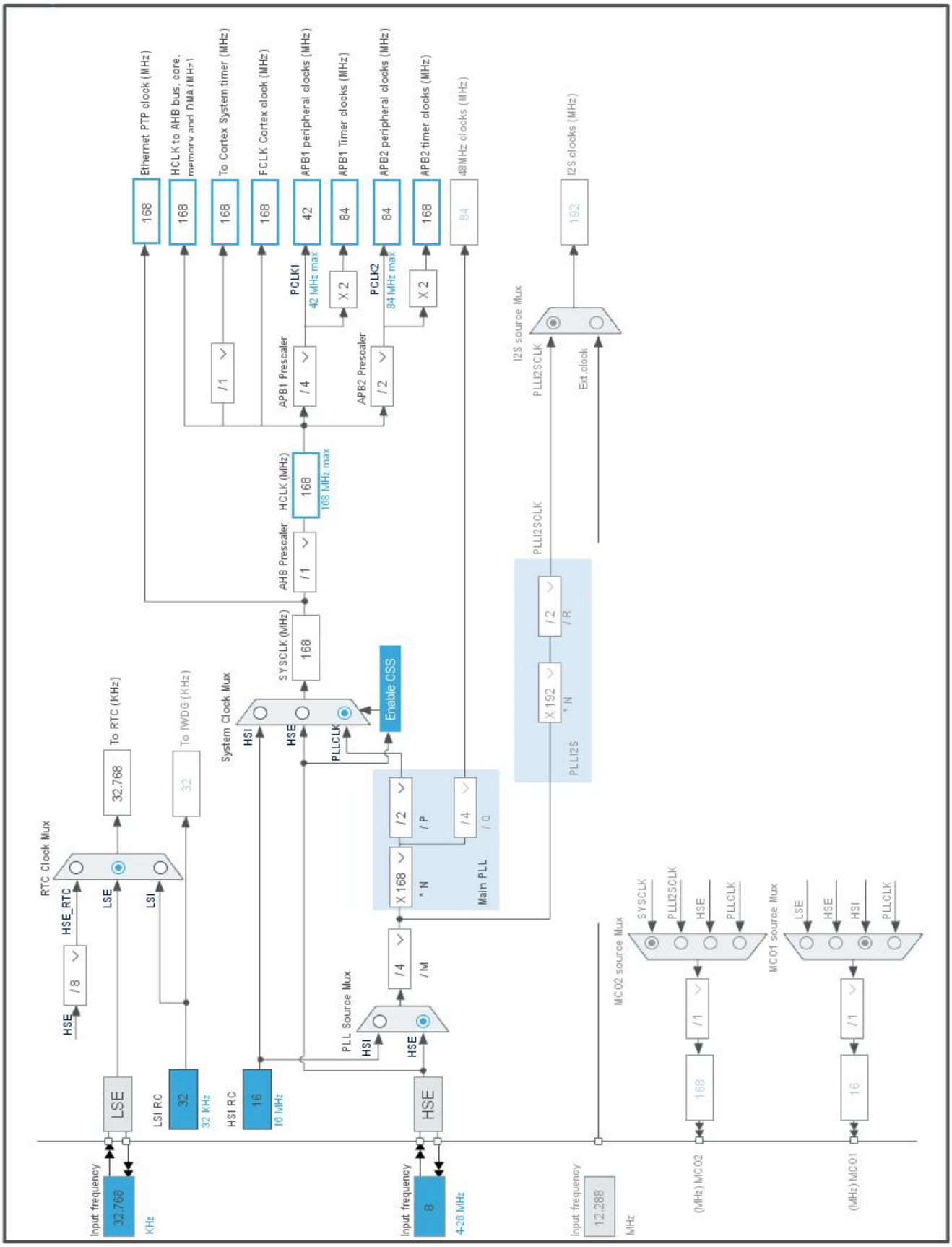
3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
16	VSS	Power		
17	VDD	Power		
23	PH0-OSC_IN	I/O	RCC_OSC_IN	
24	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
34	PA0-WKUP *	I/O	GPIO_Input	Bootsigin
35	PA1 *	I/O	GPIO_Input	Stopsigin
36	PA2 *	I/O	GPIO_Input	Faultsigin
37	PA3	I/O	GPIO_EXTI3	Pulsesigin
38	VSS	Power		
39	VDD	Power		
40	PA4 *	I/O	GPIO_Output	Inserpaper_1
41	PA5 *	I/O	GPIO_Output	Inserpaper_2
42	PA6 *	I/O	GPIO_Output	StopControl
51	VSS	Power		
52	VDD	Power		
58	PE7 *	I/O	GPIO_Input	
59	PE8	I/O	GPIO_EXTI8	
60	PE9	I/O	DAC_EXTI9, GPIO_EXTI9	revpulsesig
61	VSS	Power		
62	VDD	Power		
63	PE10 *	I/O	GPIO_Output	RevSigOut_1
66	PE13 *	I/O	GPIO_Output	EEPROM_WP
67	PE14 *	I/O	GPIO_Output	EEPROM_SCL
68	PE15 *	I/O	GPIO_Output	EEPROM_SDA
71	VCAP_1	Power		
72	VDD	Power		
82	PD13 *	I/O	GPIO_Output	MCU_USR2_nReset
83	VSS	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
84	VDD	Power		
94	VSS	Power		
95	VDD	Power		
96	PC6 *	I/O	GPIO_Output	LED1
97	PC7 *	I/O	GPIO_Output	LED2
98	PC8 *	I/O	GPIO_Output	LED3
99	PC9 *	I/O	GPIO_Output	LED4
101	PA9	I/O	USART1_TX	
102	PA10	I/O	USART1_RX	
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
110	PA15	I/O	SYS_JTDI	
111	PC10	I/O	UART4_TX	
112	PC11	I/O	UART4_RX	
120	VSS	Power		
121	VDD	Power		
123	PD7 *	I/O	GPIO_Output	MCU_USR1_nReset
124	PG9	I/O	USART6_RX	USR1_TX
128	PG13 *	I/O	GPIO_Output	USR1_RTS
129	PG14	I/O	USART6_TX	USR1_RX
130	VSS	Power		
131	VDD	Power		
132	PG15 *	I/O	GPIO_Input	USR1_CTS
133	PB3	I/O	SYS_JTDO-SWO	
134	PB4	I/O	SYS_JTRST	
138	BOOT0	Boot		
140	PB9 *	I/O	GPIO_Output	MCU_USR1_nReload
143	PDR_ON	Reset		
144	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	DataCollectSoftware
Project Folder	D:\Job\2.Code\printlink\work\printlink_v2.0\print_link_v2.0\DataCollectSoftware
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.24.1

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	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	STM32F407ZGTx
Datasheet	022152_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. GPIO

7.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	5 WS (6 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

7.3. RTC

mode: Activate Clock Source

7.3.1. Parameter Settings:

General:

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

7.4. SYS

Debug: JTAG (5 pins)

Timebase Source: TIM14

7.5. TIM2

Clock Source : Internal Clock

7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**83 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**1000 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

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

7.6. TIM3

Clock Source : Internal Clock

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**8399 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**9999 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

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

7.7. TIM4

Clock Source : Internal Clock

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**83 ***
Counter Mode	Up

Counter Period (AutoReload Register - 16 bits value)	**1000 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

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

7.8. UART4

Mode: Asynchronous

7.8.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.9. USART1

Mode: Asynchronous

7.9.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.10. USART6

Mode: Asynchronous

7.10.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.11. FREERTOS

Interface: CMSIS_V1

7.11.1. Config parameters:

API:

FreeRTOS API	CMSIS v1

Versions:

FreeRTOS version	10.0.1
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

RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
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

7.11.2. 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	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	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	
	PA15	SYS_JTDI	n/a	n/a	n/a	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
	PB4	SYS_JTRST	n/a	n/a	n/a	
UART4	PC10	UART4_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PC11	UART4_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
USART6	PG9	USART6_RX	Alternate Function Push Pull	Pull-up	**Very High ***	USR1_TX
	PG14	USART6_TX	Alternate Function Push Pull	Pull-up	**Very High ***	USR1_RX
GPIO	PA0-WKUP	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Bootsigin
	PA1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Stopsigin
	PA2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Faultsigin
	PA3	GPIO_EXTI3	**External Interrupt Mode with Rising/Falling edge**	No pull-up and no pull-down	n/a	Pulsesigin
	PA4	GPIO_Output	Output Push Pull	**Pull-up ***	Low	Inserpaper_1

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA5	GPIO_Output	Output Push Pull	**Pull-up ***	Low	Inserpaper_2
	PA6	GPIO_Output	Output Push Pull	**Pull-up ***	Low	StopControl
	PE7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PE8	GPIO_EXTI8	**External Interrupt Mode with Rising/Falling edge**	No pull-up and no pull-down	n/a	
	PE9	GPIO_EXTI9	**External Interrupt Mode with Rising/Falling edge**	No pull-up and no pull-down	n/a	revpulsesig
	PE10	GPIO_Output	Output Push Pull	**Pull-up ***	Low	RevSigOut_1
	PE13	GPIO_Output	Output Push Pull	**Pull-up ***	Low	EEPROM_WP
	PE14	GPIO_Output	Output Push Pull	**Pull-up ***	**High ***	EEPROM_SCL
	PE15	GPIO_Output	**Output Open Drain ***	**Pull-up ***	**High ***	EEPROM_SDA
	PD13	GPIO_Output	Output Push Pull	**Pull-up ***	Low	MCU_USR2_nReset
	PC6	GPIO_Output	Output Push Pull	**Pull-up ***	Low	LED1
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED2
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED3
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED4
	PD7	GPIO_Output	Output Push Pull	**Pull-up ***	Low	MCU_USR1_nReset
	PG13	GPIO_Output	Output Push Pull	**Pull-up ***	Low	USR1_RTS
	PG15	GPIO_Input	Input mode	**Pull-up ***	n/a	USR1_CTS
	PB9	GPIO_Output	Output Push Pull	**Pull-up ***	Low	MCU_USR1_nReload

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART6_TX	DMA2_Stream6	Memory To Peripheral	Low
UART4_TX	DMA1_Stream4	Memory To Peripheral	Low
UART4_RX	DMA1_Stream2	Peripheral To Memory	Low
USART6_RX	DMA2_Stream1	Peripheral To Memory	Low
USART1_RX	DMA2_Stream2	Peripheral To Memory	Low
USART1_TX	DMA2_Stream7	Memory To Peripheral	Low

USART6_TX: DMA2_Stream6 DMA request Settings:

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

UART4_TX: DMA1_Stream4 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

USART6_RX: DMA2_Stream1 DMA request Settings:

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

USART1_RX: DMA2_Stream2 DMA request Settings:

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

USART1_TX: DMA2_Stream7 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	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
EXTI line3 interrupt	true	5	0
DMA1 stream2 global interrupt	true	5	0
DMA1 stream4 global interrupt	true	5	0
EXTI line[9:5] interrupts	true	5	0
TIM2 global interrupt	true	5	0
TIM3 global interrupt	true	5	0
TIM4 global interrupt	true	5	0
USART1 global interrupt	true	5	0
TIM8 trigger and commutation interrupts and TIM14 global interrupt	true	0	0
UART4 global interrupt	true	5	0
DMA2 stream1 global interrupt	true	5	0
DMA2 stream2 global interrupt	true	5	0
DMA2 stream6 global interrupt	true	5	0
DMA2 stream7 global interrupt	true	5	0
USART6 global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

9. Software Pack Report