1. Description

1.1. Project

Project Name	t407
Board Name	STM32F407G-DISC1
Generated with:	STM32CubeMX 5.3.0
Date	09/05/2019

1.2. MCU

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

2. Pinout Configuration
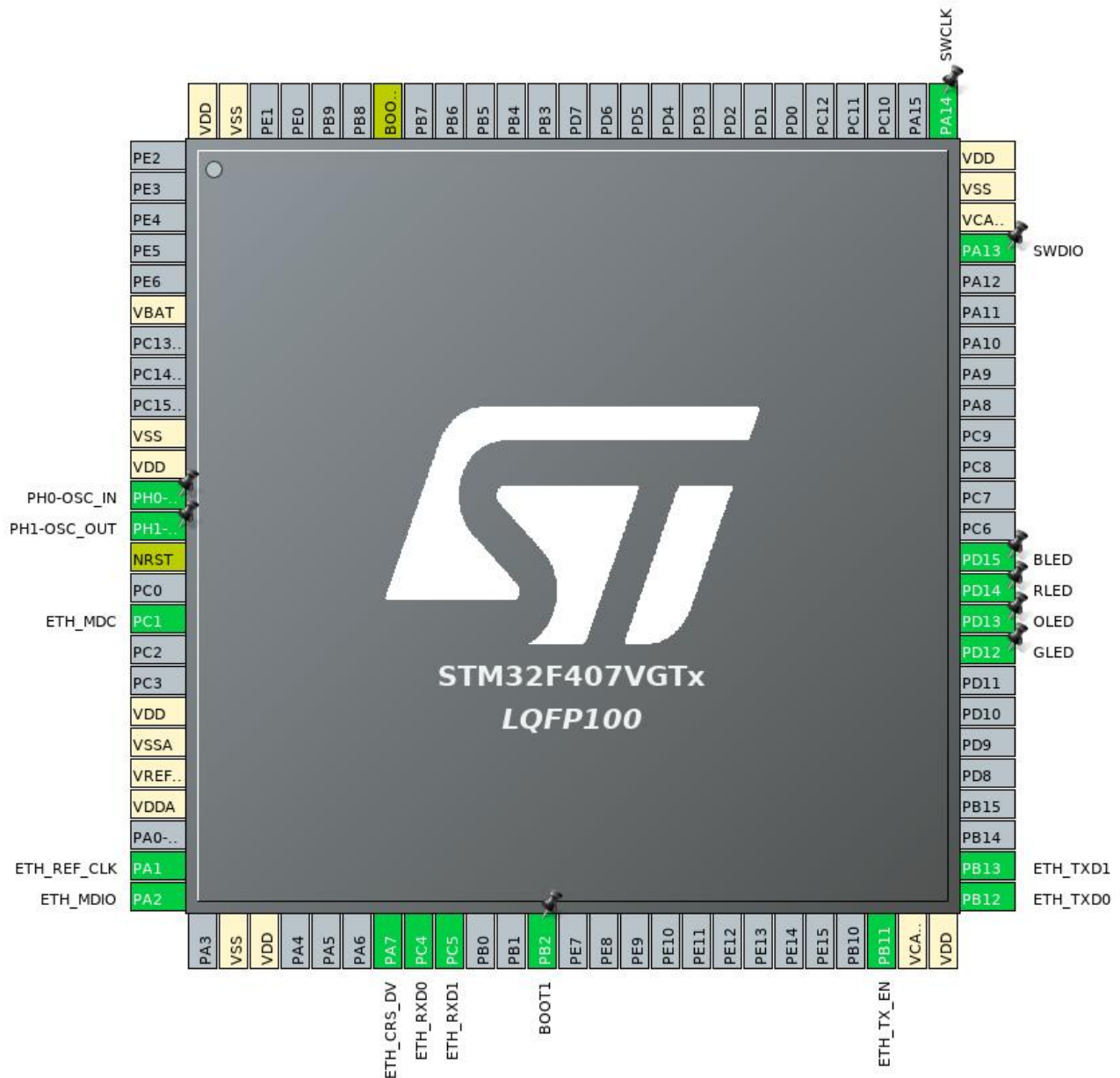
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN	I/O	RCC_OSC_IN	PH0-OSC_IN
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	PH1-OSC_OUT
14	NRST	Reset		
16	PC1	I/O	ETH_MDC	
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
24	PA1	I/O	ETH_REF_CLK	
25	PA2	I/O	ETH_MDIO	
27	VSS	Power		
28	VDD	Power		
32	PA7	I/O	ETH_CRS_DV	
33	PC4	I/O	ETH_RXD0	
34	PC5	I/O	ETH_RXD1	
37	PB2 *	I/O	GPIO_Input	BOOT1
48	PB11	I/O	ETH_TX_EN	
49	VCAP_1	Power		
50	VDD	Power		
51	PB12	I/O	ETH_TXD0	
52	PB13	I/O	ETH_TXD1	
59	PD12 *	I/O	GPIO_Output	GLED
60	PD13 *	I/O	GPIO_Output	OLED
61	PD14 *	I/O	GPIO_Output	RLED
62	PD15 *	I/O	GPIO_Output	BLED
72	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	SWCLK
94	BOOT0	Boot		
99	VSS	Power		
100	VDD	Power		

 * The pin is affected with an I/O function

4. Clock Tree Configuration
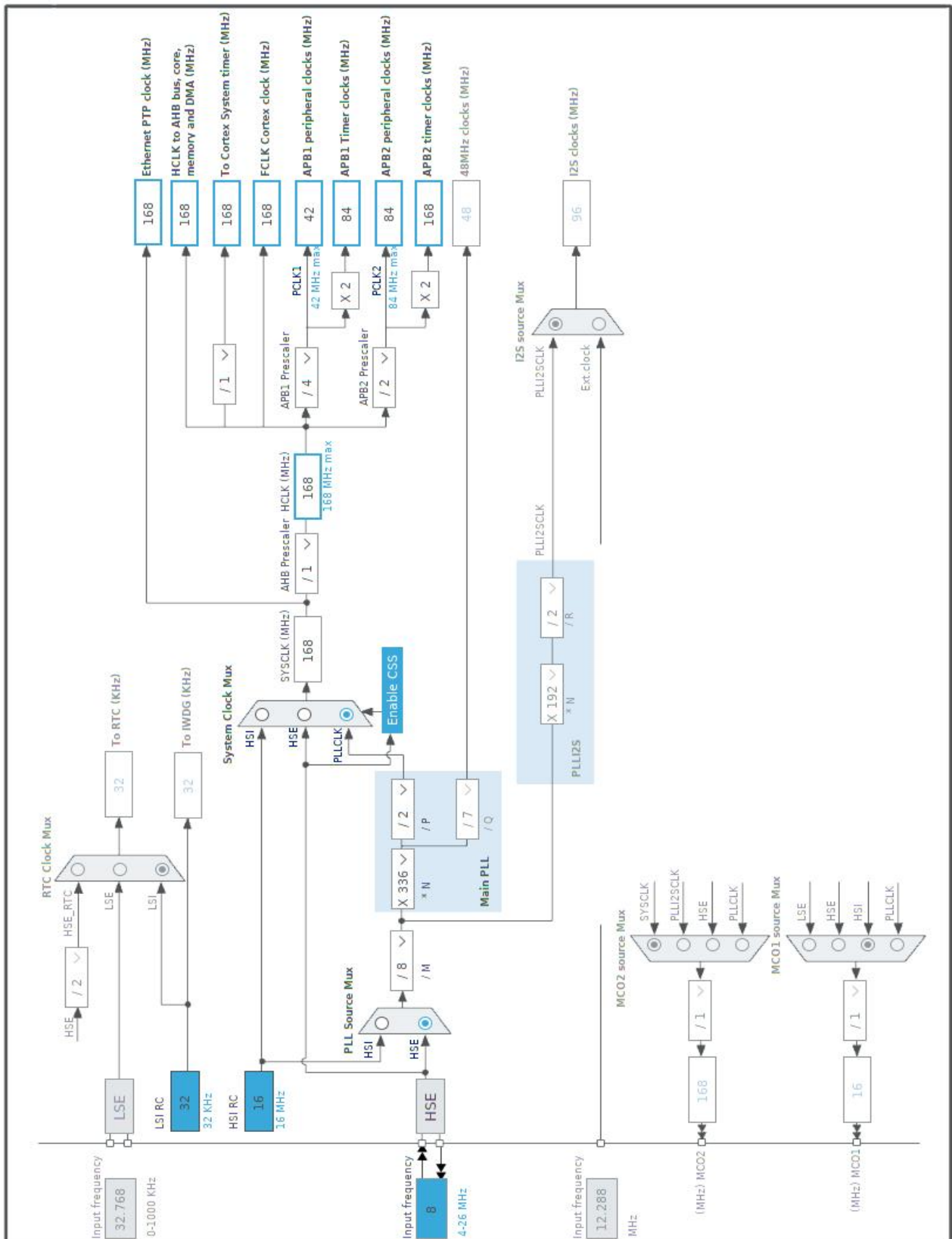
5. Software Project

5.1. Project Settings

Name	Value
Project Name	t407.1
Project Folder	/home/alex/test/t407.1
Toolchain / IDE	Makefile
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 only the necessary library files
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	STM32F407/417
MCU	STM32F407VGTx
Datasheet	022152_Rev8

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. ETH

Mode: RMII

7.1.1. Parameter Settings:

Advanced : Ethernet Media Configuration:

Auto Negotiation	Enabled

General : Ethernet Configuration:

Ethernet MAC Address	**00:80:E1:12:34:56 ***
PHY Address	1

Ethernet Basic Configuration:

Rx Mode	Polling Mode
TX IP Header Checksum Computation	By hardware

7.1.2. Advanced Parameters:

External PHY Configuration:

PHY	**DP83848_PHY_ADDRESS ***
PHY Address Value	1
PHY Reset delay these values are based on a 1 ms Systick interrupt	**0x000000FF ***
PHY Configuration delay	**0x00000FFF ***
PHY Read TimeOut	**0x0000FFFF ***
PHY Write TimeOut	**0x0000FFFF ***

Common : External PHY Configuration:

Transceiver Basic Control Register	**0x00 ***
Transceiver Basic Status Register	**0x01 ***
PHY Reset	**0x8000 ***
Select loop-back mode	**0x4000 ***
Set the full-duplex mode at 100 Mb/s	**0x2100 ***
Set the half-duplex mode at 100 Mb/s	**0x2000 ***
Set the full-duplex mode at 10 Mb/s	**0x0100 ***
Set the half-duplex mode at 10 Mb/s	**0x0000 ***
Enable auto-negotiation function	**0x1000 ***
Restart auto-negotiation function	**0x0200 ***
Select the power down mode	**0x0800 ***
Isolate PHY from MII	

	0x0400 *
Auto-Negotiation process completed	**0x0020** *
Valid link established	**0x0004** *
Jabber condition detected	**0x0002** *

Extended : External PHY Configuration:

PHY special control/status register Offset	**0x1F** *
PHY Speed mask	**0x0004** *
PHY Duplex mask	**0x0010** *
PHY Interrupt Source Flag register Offset	**0x001D** *
PHY Link down inturrupt	**0x000B** *

7.2. RCC

High Speed Clock (HSE): 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. SYS

Debug: Serial Wire
Timebase Source: TIM2

7.4. LWIP

mode: Enabled

Advanced parameters are not listed except if modified by user.

7.4.1. General Settings:

LwIP Version:

LwIP Version (Version of LwIP supported by CubeMX ** CubeMX specific **)	2.0.3

IPv4 - DHCP Options:

LWIP_DHCP (DHCP Module)	**Disabled ***

IP Address Settings:

IP_ADDRESS (IP Address)	**172.016.027.126 ***
NETMASK_ADDRESS (Netmask Address)	**255.255.255.000 ***
GATEWAY_ADDRESS (Gateway Address)	**172.016.027.001 ***

RTOS Dependency:

WITH_RTOS (Use FREERTOS ** CubeMX specific **)	Disabled

Protocols Options:

LWIP_ICMP (ICMP Module Activation)	Enabled
LWIP_IGMP (IGMP Module)	Disabled
LWIP_DNS (DNS Module)	Disabled
LWIP_UDP (UDP Module)	Enabled
MEMP_NUM_UDP_PCB (Number of UDP Connections)	4
LWIP_TCP (TCP Module)	Enabled
MEMP_NUM_TCP_PCB (Number of TCP Connections)	5

7.4.2. Key Options:

Infrastructure - OS Awarness Option:

NO_SYS (OS Awarness)	OS Not Used

Infrastructure - Timers Options:

LWIP_TIMERS (Use Support For sys_timeout)	Enabled

Infrastructure - Core Locking and MPU Options:

SYS_LIGHTWEIGHT_PROT (Memory Functions Protection)	Disabled

Infrastructure - Heap and Memory Pools Options:

MEM_SIZE (Heap Memory Size)	**4000 ***

Infrastructure - Internal Memory Pool Sizes:

MEMP_NUM_PBUF (Number of Memory Pool struct Pbufs)	16
MEMP_NUM_RAW_PCB (Number of Raw Protocol Control Blocks)	4
MEMP_NUM_TCP_PCB_LISTEN (Number of Listening TCP Connections)	8
MEMP_NUM_TCP_SEG (Number of TCP Segments simultaneously queued)	**24 ***

MEMP_NUM_LOCALHOSTLIST (Number of Host Entries in the Local Host List)	1

Pbuf Options:

PBUF_POOL_SIZE (Number of Buffers in the Pbuf Pool)	16
PBUF_POOL_BUFSIZE (Size of each pbuf in the pbuf pool)	592

IPv4 - ARP Options:

LWIP_ARP (ARP Functionality)	Enabled

IPv4 - ICMP Options:

LWIP_BROADCAST_PING (Respond to Broadcast Pings)	**Enabled ***
LWIP_MULTICAST_PING (Respond to Multicast Pings)	**Enabled ***

Callback - TCP Options:

TCP_TTL (Number of Time-To-Live Used by TCP Packets)	255
TCP_WND (TCP Receive Window Maximum Size)	2144
TCP_QUEUE_OOSEQ (Allow Out-Of-Order Incoming Packets)	Enabled
TCP_MSS (Maximum Segment Size)	536
TCP_SND_BUF (TCP Sender Buffer Space)	**2048 ***
TCP_SND_QUEUELEN (Number of Packet Buffers Allowed for TCP Sender)	16

Network Interfaces Options:

LWIP_NETIF_STATUS_CALLBACK (Callback Function on Interface Status Changes)	Disabled
LWIP_NETIF_LINK_CALLBACK (Callback Function on Interface Link Changes)	Disabled

NETIF - Loopback Interface Options:

LWIP_NETIF_LOOPBACK (NETIF Loopback)	Disabled

Thread Safe APIs - Socket Options:

LWIP_SOCKET (Socket API)	Disabled

7.4.3. PPP:

PPP Options:

PPP_SUPPORT (PPP Module)	Disabled

7.4.4. IPv6:

IPv6 Options:

LWIP_IPV6 (IPv6 Protocol)	Disabled

7.4.5. HTTPD:

HTTPD Options:

LWIP_HTTPD (LwIP HTTPD Support ** CubeMX specific **)	Disabled

7.4.6. SNMP:

SNMP Options:

LWIP_SNMP (LwIP SNMP Agent)	Disabled

7.4.7. SNTP:

SNTP Options:

LWIP_SNTP (LWIP SNTP Support ** CubeMX specific **)	Disabled

7.4.8. MDNS/TFTP:

MDNS Options:

LWIP_MDNS (Multicast DNS Support ** CubeMX specific **)	Disabled

TFTP Options:

LWIP_TFTP (TFTP Support ** CubeMX specific **)	Disabled

7.4.9. Perf/Checks:

Sanity Checks:

LWIP_DISABLE_TCP_SANITY_CHECKS (TCP Sanity Checks)	Disabled
LWIP_DISABLE_MEMP_SANITY_CHECKS (MEMP Sanity Checks)	Disabled

Performance Options:

LWIP_PERF (Performace Testing for LwIP)	Disabled

7.4.10. Statistics:

Debug - Statistics Options:

LWIP_STATS (Statictics Collection)	Disabled

7.4.11. Checksum:

Infrastructure - Checksum Options:

CHECKSUM_BY_HARDWARE (Hardware Checksum ** CubeMX specific **)	Disabled
LWIP_CHECKSUM_CTRL_PER_NETIF (Generate/Check Checksum per Netif)	Disabled
CHECKSUM_GEN_IP (Generate Software Checksum for Outgoing IP Packets)	Disabled
CHECKSUM_GEN_UDP (Generate Software Checksum for Outgoing UDP Packets)	Disabled

CHECKSUM_GEN_TCP (Generate Software Checksum for Outgoing TCP Packets)	Disabled
CHECKSUM_GEN_ICMP (Generate Software Checksum for Outgoing ICMP Packets)	Disabled
CHECKSUM_GEN_ICMP6 (Generate Software Checksum for Outgoing ICMP6 Packets)	Disabled
CHECKSUM_CHECK_IP (Generate Software Checksum for Incoming IP Packets)	Disabled
CHECKSUM_CHECK_UDP (Generate Software Checksum for Incoming UDP Packets)	Disabled
CHECKSUM_CHECK_TCP (Generate Software Checksum for Incoming TCP Packets)	Disabled
CHECKSUM_CHECK_ICMP (Generate Software Checksum for Incoming ICMP Packets)	Disabled
CHECKSUM_CHECK_ICMP6 (Generate Software Checksum for Incoming ICMP6 Packets)	Disabled

7.4.12. Debug:

LwIP Main Debugging Options:

LWIP_DBG_MIN_LEVEL (Minimum Level)	All

* User modified value

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ETH	PC1	ETH_MDC	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PA1	ETH_REF_CLK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PA2	ETH_MDIO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PA7	ETH_CRS_DV	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PC4	ETH_RXD0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PC5	ETH_RXD1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB11	ETH_TX_EN	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB12	ETH_TXD0	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
	PB13	ETH_TXD1	Alternate Function Push Pull	No pull-up and no pull-down	**Very High** *	
RCC	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	PH0-OSC_IN
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	PH1-OSC_OUT
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
GPIO	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BOOT1
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GLED
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	OLED
	PD14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RLED
	PD15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BLED

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	0	0
System tick timer	true	0	0
TIM2 global interrupt	true	0	0
Ethernet global interrupt	true	0	0
Ethernet wake-up interrupt through EXTI line 19	true	0	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