

## 1. Description

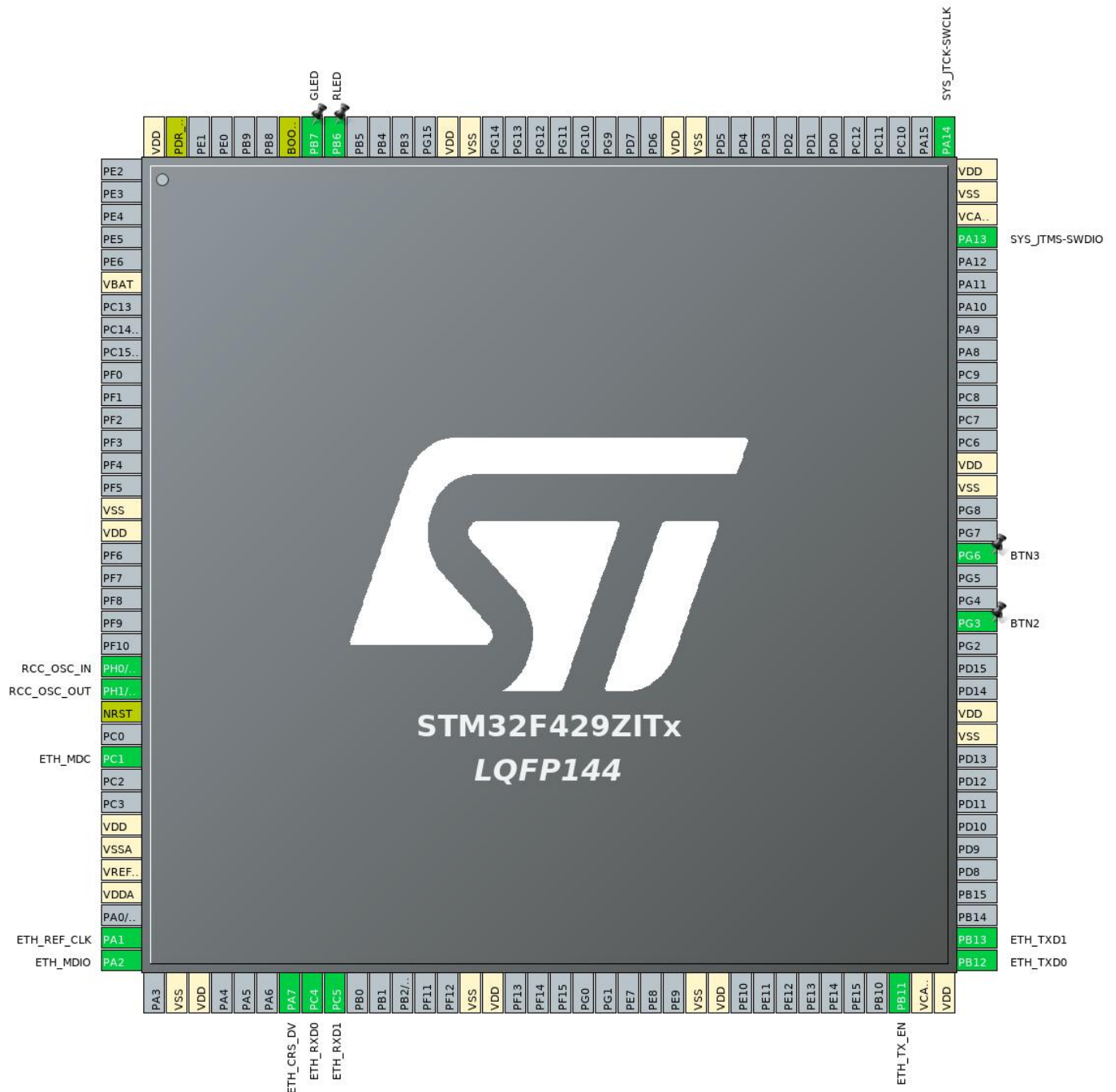
### 1.1. Project

Project Name	t429
Board Name	custom
Generated with:	STM32CubeMX 5.3.0
Date	10/01/2019

### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F429/439
MCU name	STM32F429ZITx
MCU Package	LQFP144
MCU Pin number	144

## 2. Pinout Configuration



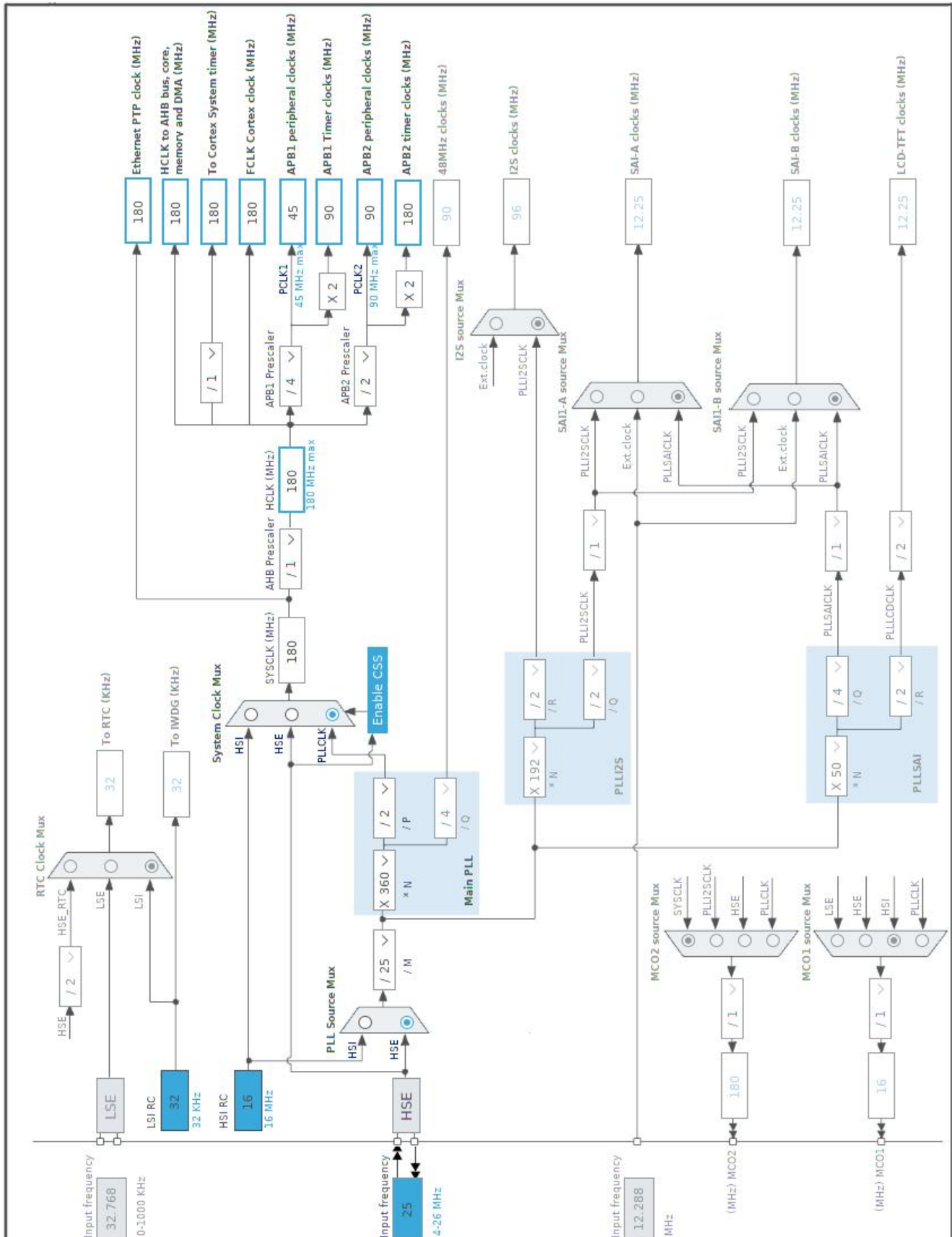
### 3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
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		
27	PC1	I/O	ETH_MDC	
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
35	PA1	I/O	ETH_REF_CLK	
36	PA2	I/O	ETH_MDIO	
38	VSS	Power		
39	VDD	Power		
43	PA7	I/O	ETH_CRSDV	
44	PC4	I/O	ETH_RXD0	
45	PC5	I/O	ETH_RXD1	
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
70	PB11	I/O	ETH_TX_EN	
71	VCAP_1	Power		
72	VDD	Power		
73	PB12	I/O	ETH_TXD0	
74	PB13	I/O	ETH_TXD1	
83	VSS	Power		
84	VDD	Power		
88	PG3 *	I/O	GPIO_Input	BTN2
91	PG6 *	I/O	GPIO_Input	BTN3
94	VSS	Power		
95	VDD	Power		
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
136	PB6 *	I/O	GPIO_Output	RLED
137	PB7 *	I/O	GPIO_Output	GLED
138	BOOT0	Boot		
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	t429.5
Project Folder	/home/alex/test/t429.5
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	STM32F429/439
MCU	STM32F429ZITx
Datasheet	024030_Rev9

### 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:E1:11:11:11 \*

PHY Address 1

###### Ethernet Basic Configuration:

Rx Mode Interrupt Mode

TX IP Header Checksum Computation By hardware

##### 7.1.2. Advanced Parameters:

###### External PHY Configuration:

PHY LAN8742A\_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 interrupt	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
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

**Power Parameters:**

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
Power Over Drive	Enabled

## 7.3. SYS

### Debug: Serial Wire

### Timebase Source: TIM2

## 7.4. FREERTOS

## Interface: CMSIS\_V2

### 7.4.1. Config parameters:

#### API:

FreeRTOS API CMSIS v2

#### Versions:

FreeRTOS version 10.0.1

CMSIS-RTOS version 2.00

#### Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	<b>1000 *</b>
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

#### Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	<b>16000 *</b>
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	Enabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

#### Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

#### Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	<b>1024 *</b>

#### Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

### 7.4.2. Include parameters:

#### Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Enabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Enabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Enabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

### 7.5. LWIP

#### mode: Enabled

Advanced parameters are not listed except if modified by user.

### 7.5.1. 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 \*\*) Enabled

CMSIS\_VERSION (CMSIS API Version used) CMSIS v2

#### 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

### 7.5.2. Key Options:

#### Infrastructure - OS Awareness Option:

NO\_SYS (OS Awareness) OS Used

#### Infrastructure - Timers Options:

LWIP\_TIMERS (Use Support For sys\_timeout) Enabled

#### Infrastructure - Core Locking and MPU Options:

SYS\_LIGHTWEIGHT\_PROT (Memory Functions Protection) Enabled

#### Infrastructure - Heap and Memory Pools Options:

MEM\_SIZE (Heap Memory Size) **4096 \***

#### 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) 16

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
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#### 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)	1072
TCP_SND_QUEUELEN (Number of Packet Buffers Allowed for TCP Sender)	9

#### 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
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#### Infrastructure - Threading Options:

TCPIP_THREAD_NAME (TCPIP Thread Name)	"tcpip_thread"
TCPIP_THREAD_STACKSIZE (TCPIP Thread Stack Size)	1024
TCPIP_THREAD_PRIO (TCPIP Thread Priority Level)	3
TCPIP_MBOX_SIZE (TCPIP Mailbox Size)	6
DEFAULT_THREAD_NAME (Default LwIP Thread Name)	"lwip"
DEFAULT_THREAD_STACKSIZE (Default LwIP Thread Stack Size)	1024
DEFAULT_THREAD_PRIO (Default LwIP Thread Priority Level)	3
DEFAULT_RAW_RECVMBOX_SIZE (Default Mailbox Size on a NETCONN Raw)	0
DEFAULT_TCP_RECVMBOX_SIZE (Default Mailbox Size on a NETCONN TCP)	6
DEFAULT_ACCEPTMBOX_SIZE (Default Mailbox Size for Incoming Connections)	6

#### Thread Safe APIs - Netconn Options:

LWIP_NETCONN (NETCONN API)	Enabled
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#### Thread Safe APIs - Socket Options:

LWIP_SOCKET (Socket API)	Enabled
LWIP_COMPAT_SOCKETS (BSD-style Socket Functions Names)	1
LWIP_SOCKET_OFFSET (Socket Offset Number)	0

### 7.5.3. PPP:

#### PPP Options:

PPP_SUPPORT (PPP Module)	Disabled
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#### 7.5.4. IPv6:

##### IPv6 Options:

LWIP_IPV6 (IPv6 Protocol)	Disabled
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#### 7.5.5. HTTPD:

##### HTTPD Options:

LWIP_HTTPD (LwIP HTTPD Support ** CubeMX specific **)	Disabled
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#### 7.5.6. SNMP:

##### SNMP Options:

LWIP_SNMP (LwIP SNMP Agent)	Disabled
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#### 7.5.7. SNTP:

##### SNTP Options:

LWIP_SNTP (LWIP SNTP Support ** CubeMX specific **)	Disabled
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#### 7.5.8. MDNS/TFTP:

##### MDNS Options:

LWIP_MDNS (Multicast DNS Support ** CubeMX specific **)	Disabled
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##### TFTP Options:

LWIP_TFTP (TFTP Support ** CubeMX specific **)	Disabled
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#### 7.5.9. Perf/Checks:

##### Sanity Checks:

LWIP_DISABLE_TCP_SANITY_CHECKS (TCP Sanity Checks)	Disabled
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LWIP_DISABLE_MEMP_SANITY_CHECKS (MEMP Sanity Checks)	Disabled
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##### Performance Options:

LWIP_PERF (Performace Testing for LwIP)	Disabled
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#### 7.5.10. Statistics:

#### Debug - Statistics Options:

LWIP_STATS (Statistics Collection)	Disabled
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### 7.5.11. 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

### 7.5.12. Debug:

#### LwIP Main Debugging Options:

LWIP_DBG_MIN_LEVEL (Minimum Level)	All
LWIP_DBG_TYPES_ON (Only certain Debug Message Types)	<b>Disabled *</b>

\* 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	
	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	
GPIO	PG3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN2
	PG6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BTN3
	PB6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RLED
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GLLED

### 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
TIM2 global interrupt	true	0	0
Ethernet global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
Ethernet wake-up interrupt through EXTI line 19	unused		
FPU global interrupt	unused		

\* User modified value

## ***9. Software Pack Report***