1. Description

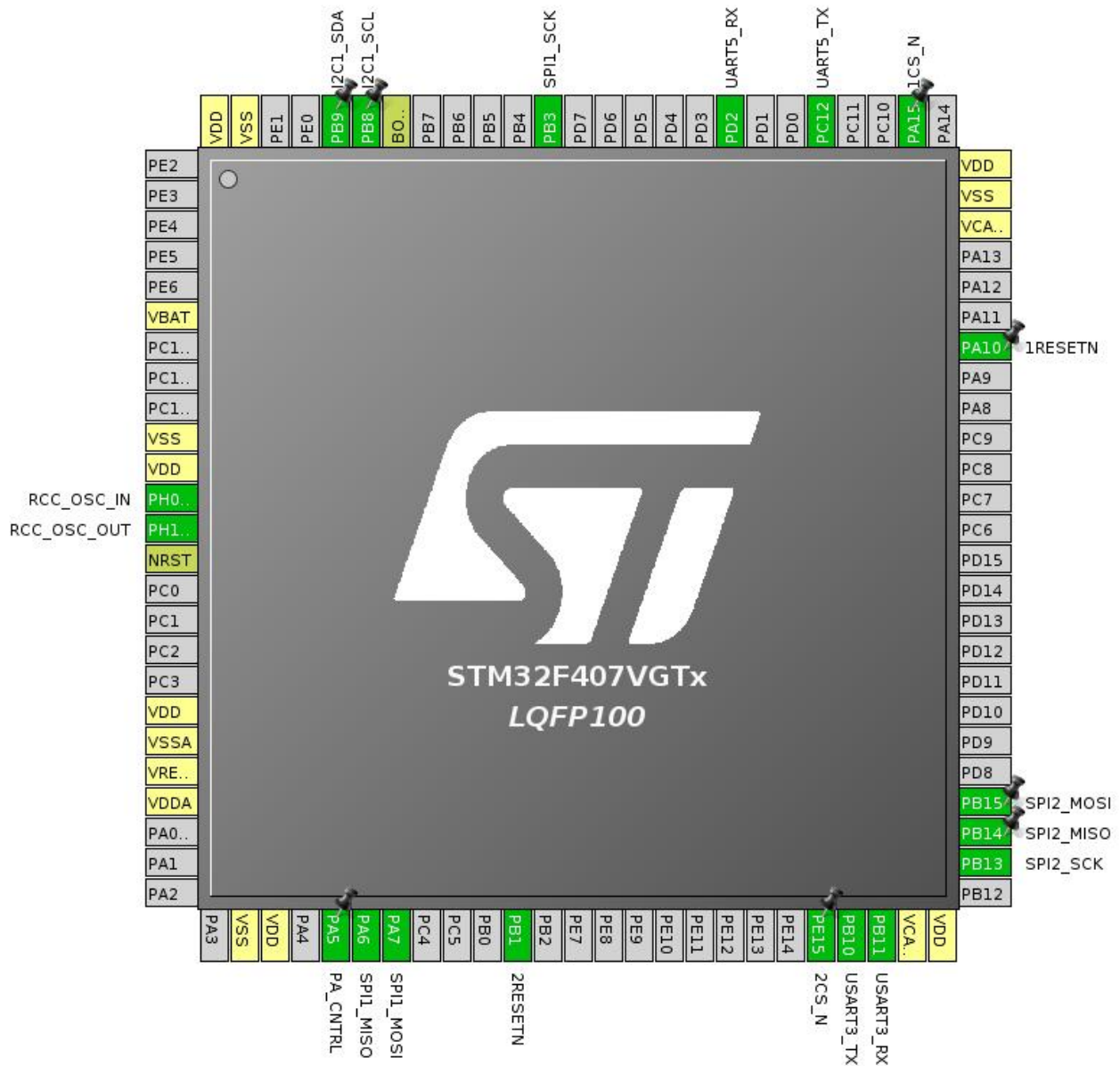## 1.1. Project

Project Name	comms
Board Name	comms
Generated with:	STM32CubeMX 4.14.0
Date	04/29/2016

1.2. MCU

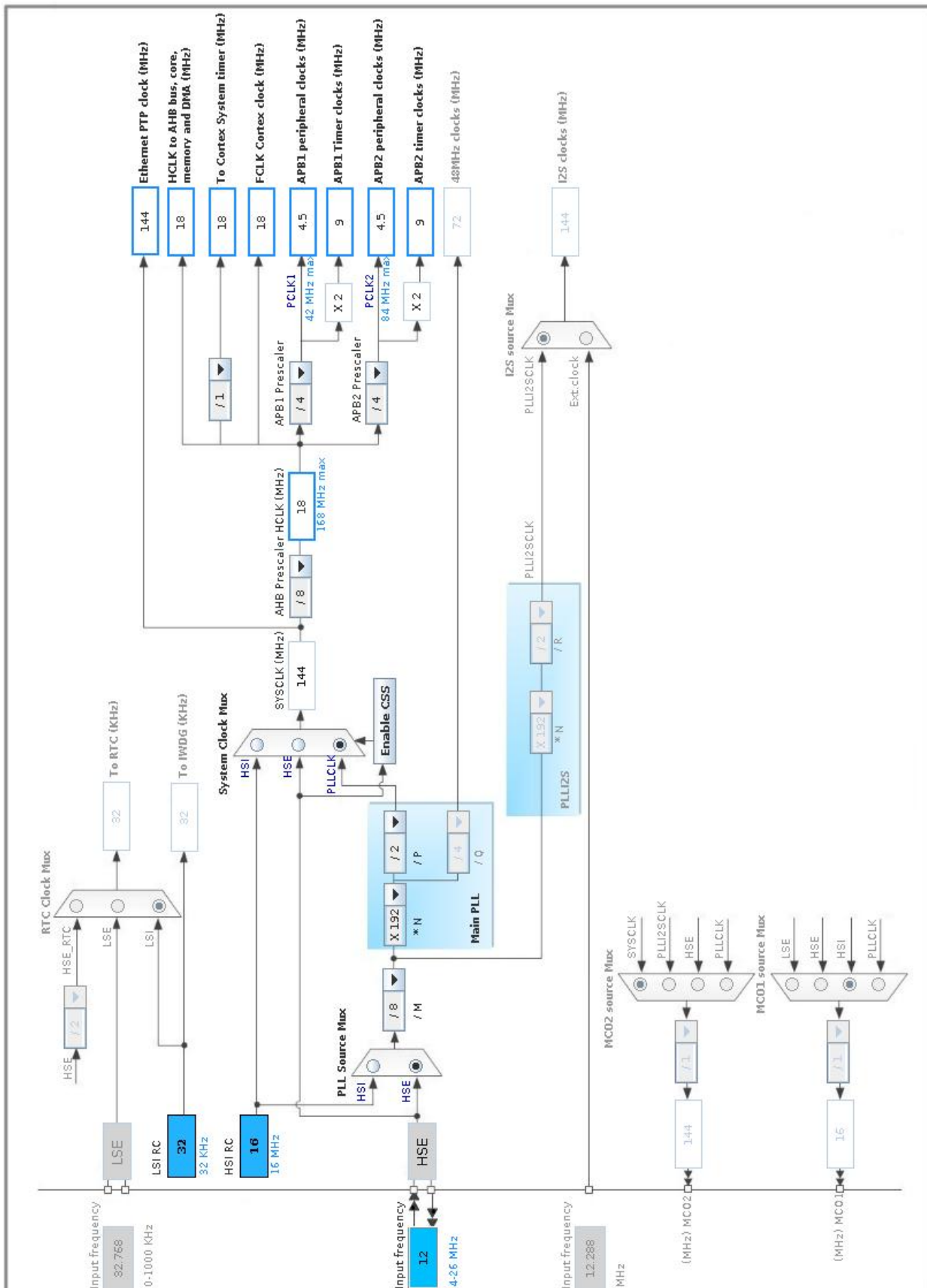|	
MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407VGTx
MCU Package	LQFP100
MCU Pin number	100

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	
13	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
19	VDD	Power		
20	VSSA	Power		
21	VREF+	Power		
22	VDDA	Power		
27	VSS	Power		
28	VDD	Power		
30	PA5 *	I/O	GPIO_Output	PA_CNTRL
31	PA6	I/O	SPI1_MISO	
32	PA7	I/O	SPI1_MOSI	
36	PB1 *	I/O	GPIO_Output	2RESETN
46	PE15 *	I/O	GPIO_Output	2CS_N
47	PB10	I/O	USART3_TX	
48	PB11	I/O	USART3_RX	
49	VCAP_1	Power		
50	VDD	Power		
52	PB13	I/O	SPI2_SCK	
53	PB14	I/O	SPI2_MISO	
54	PB15	I/O	SPI2_MOSI	
69	PA10 *	I/O	GPIO_Output	1RESETN
73	VCAP_2	Power		
74	VSS	Power		
75	VDD	Power		
77	PA15 *	I/O	GPIO_Output	1CS_N
80	PC12	I/O	UART5_TX	
83	PD2	I/O	UART5_RX	
89	PB3	I/O	SPI1_SCK	
94	BOOT0	Boot		
95	PB8	I/O	I2C1_SCL	
96	PB9	I/O	I2C1_SDA	
99	VSS	Power		

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration

Ethernet PTP clock (MHz): 144

HCLK to AHB bus, core, memory and DMA (MHz): 18

To Cortex System timer (MHz): 18

FCLK Cortex clock (MHz): 18

APB1 peripheral clocks (MHz): 4.5

APB1 Timer clocks (MHz): 9

APB2 peripheral clocks (MHz): 4.5

APB2 timer clocks (MHz): 9

48MHz clocks (MHz): 72

I2S clocks (MHz): 144

PCLK1 — 42 MHz max — X 2

PCLK2 — 84 MHz max — X 2

APB1 Prescaler /4

APB2 Prescaler /4

/1

AHB Prescaler HCLK (MHz): 18 — 168 MHz max

AHB Prescaler /8

SYSCLK (MHz): 144

System Clock Mux: HSI / HSE / PLLCLK

Enable CSS

Main PLL: X 192 (*N), /2 (/P), /4 (/Q)

/8 (/M)

PLL Source Mux: HSI / HSE

PLLI2S: X 192 (*N), /2 (/R)

I2S source Mux: PLLI2SCLK / Ext.clock

PLLI2SCLK

RTC Clock Mux: HSE_RTC / LSE / LSI

To RTC (KHz): 32

To IWDG (KHz): 32

HSE /2

LSE — Input frequency 32.768 — 0-1000 KHz

LSI RC: 32 — 32 KHz

HSI RC: 16 — 16 MHz

HSE — Input frequency 12 — 4-26 MHz

Input frequency 12.288 MHz

MCO2 source Mux: SYSCLK / PLLI2SCLK / HSE / PLLCLK — /1 — 144 — (MHz) MCO2

MCO1 source Mux: LSE / HSE / HSI / PLLCLK — /1 — 16 — (MHz) MCO1

5. IPs and Middleware Configuration

5.1. I2C1

I2C: I2C

5.1.1. Parameter Settings:

Master Features:

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

Slave Features:

Clock No Stretch Mode	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

RCC Parameters:

HSI Calibration Value	16

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 1

5.3. SPI1

Mode: Full-Duplex Master

5.3.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**128 ***
Baud Rate	**35.156 KBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.4. SPI2

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**128 ***
Baud Rate	**35.156 KBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.5. SYS

Timebase Source: SysTick

5.6. UART5

Mode: Asynchronous

5.6.1. 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

5.7. USART3

Mode: Asynchronous

5.7.1. 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

* User modified value

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB8	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	
	PB9	I2C1_SDA	Alternate Function Open Drain	Pull-up	**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	
SPI1	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB3	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Low	
UART5	PC12	UART5_TX	Alternate Function Push Pull	Pull-up	**High ***	
	PD2	UART5_RX	Alternate Function Push Pull	Pull-up	**High ***	
USART3	PB10	USART3_TX	Alternate Function Push Pull	Pull-up	**High ***	
	PB11	USART3_RX	Alternate Function Push Pull	Pull-up	**High ***	
GPIO	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	PA_CNTRL
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	2RESETN
	PE15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	2CS_N
	PA10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	1RESETN
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	1CS_N

6.2. DMA configuration

nothing configured in DMA service

6.3. 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
Debug monitor	true	0	0
System tick timer	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
USART3 global interrupt	unused		
UART5 global interrupt	unused		

* User modified value

7. Power Plugin report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407VGTx
Datasheet	022152_Rev6

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	comms
Project Folder	/home/manos/upsat-comms-software/cubeMX/comms/comms
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F4 V1.11.0

8.2. 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