1. Description

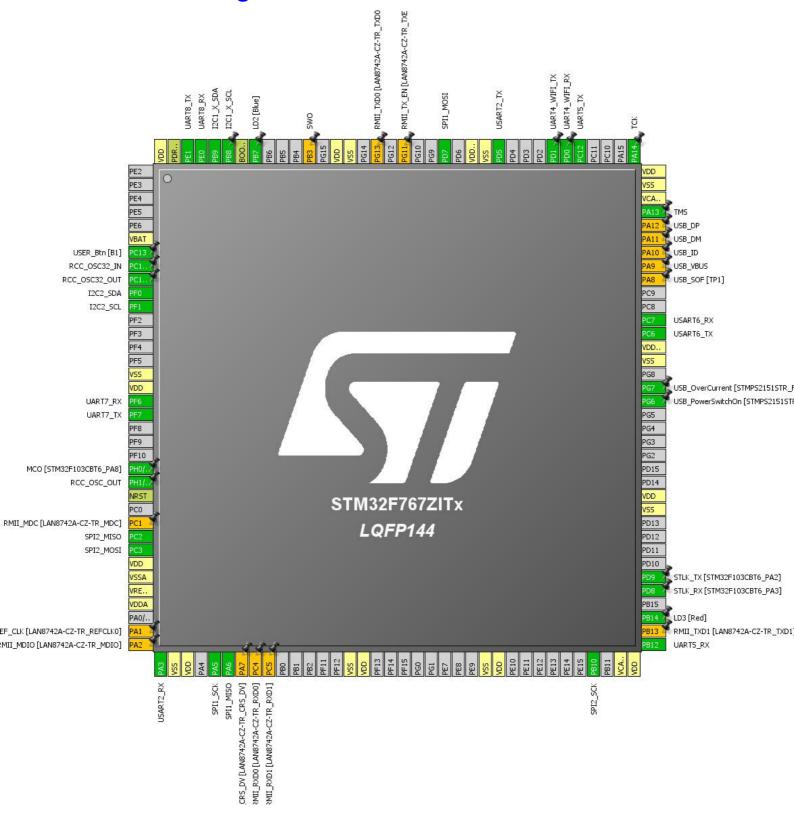
1.1. Project

Project Name	RobotSTCOM
Board Name	NUCLEO-F767ZI
Generated with:	STM32CubeMX 4.27.0
Date	11/08/2018

1.2. MCU

MCU Series	STM32F7
MCU Line	STM32F7x7
MCU name	STM32F767ZITx
MCU Package	LQFP144
MCU Pin number	144

2. Pinout Configuration



3. Pins Configuration

Pin Number	Pin Name	Pin Type	Alternate	Label
LQFP144	(function after reset)		Function(s)	
6	VBAT	Power		
7	PC13	I/O	GPIO_EXTI13	USER_Btn [B1]
8	PC14/OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
10	PF0	I/O	I2C2_SDA	
11	PF1	I/O	I2C2_SCL	
16	VSS	Power		
17	VDD	Power		
18	PF6	I/O	UART7_RX	
19	PF7	I/O	UART7_TX	
23	PH0/OSC_IN	I/O	RCC_OSC_IN	MCO [STM32F103CBT6_PA8]
24	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
27	PC1 *	I/O	ETH_MDC	RMII_MDC [LAN8742A-CZ- TR_MDC]
28	PC2	I/O	SPI2_MISO	
29	PC3	I/O	SPI2_MOSI	
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
35	PA1 *	I/O	ETH_REF_CLK	RMII_REF_CLK [LAN8742A-CZ- TR_REFCLK0]
36	PA2 *	I/O	ETH_MDIO	RMII_MDIO [LAN8742A-CZ- TR_MDIO]
37	PA3	I/O	USART2_RX	
38	VSS	Power		
39	VDD	Power		
41	PA5	I/O	SPI1_SCK	
42	PA6	I/O	SPI1_MISO	
43	PA7 *	I/O	ETH_CRS_DV	RMII_CRS_DV [LAN8742A- CZ-TR_CRS_DV]
44	PC4 *	I/O	ETH_RXD0	RMII_RXD0 [LAN8742A-CZ- TR_RXD0]

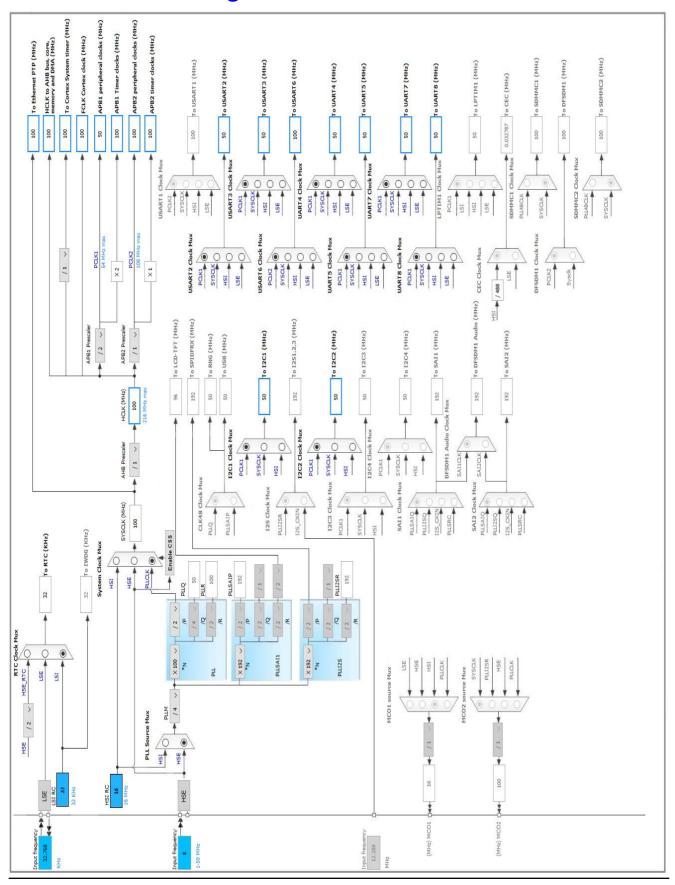
Pin Number	Pin Name	Pin Type	Alternate	Label
LQFP144	(function after		Function(s)	
	reset)		()	
45	PC5 *	I/O	ETH_RXD1	RMII_RXD1 [LAN8742A-CZ- TR_RXD1]
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
69	PB10	I/O	SPI2_SCK	
71	VCAP_1	Power		
72	VDD	Power		
73	PB12	I/O	UART5_RX	
74	PB13 *	I/O	ETH_TXD1	RMII_TXD1 [LAN8742A-CZ- TR_TXD1]
75	PB14 **	I/O	GPIO_Output	LD3 [Red]
77	PD8	I/O	USART3_TX	STLK_RX [STM32F103CBT6_PA3]
78	PD9	I/O	USART3_RX	STLK_TX [STM32F103CBT6_PA2]
83	VSS	Power		
84	VDD	Power		
91	PG6 **	I/O	GPIO_Output	USB_PowerSwitchOn [STMPS2151STR_EN]
92	PG7 **	I/O	GPIO_Input	USB_OverCurrent [STMPS2151STR_FAULT]
94	VSS	Power		
95	VDDUSB	Power		
96	PC6	I/O	USART6_TX	
97	PC7	I/O	USART6_RX	
100	PA8 *	I/O	USB_OTG_FS_SOF	USB_SOF [TP1]
101	PA9 *	I/O	USB_OTG_FS_VBUS	USB_VBUS
102	PA10 *	I/O	USB_OTG_FS_ID	USB_ID
103	PA11 *	I/O	USB_OTG_FS_DM	USB_DM
104	PA12 *	I/O	USB_OTG_FS_DP	USB_DP
105	PA13	I/O	SYS_JTMS-SWDIO	TMS
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	TCK
113	PC12	I/O	UART5_TX	
114	PD0	I/O	UART4_RX	UART4_WIFI_RX
115	PD1	I/O	UART4_TX	UART4_WIFI_TX

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
119	PD5	I/O	USART2_TX	
120	VSS	Power		
121	VDDSDMMC	Power		
123	PD7	I/O	SPI1_MOSI	
126	PG11 *	I/O	ETH_TX_EN	RMII_TX_EN [LAN8742A- CZ-TR_TXEN]
128	PG13 *	I/O	ETH_TXD0	RMII_TXD0 [LAN8742A-CZ- TR_TXD0]
130	VSS	Power		
131	VDD	Power		
133	PB3 *	I/O	SYS_JTDO-SWO	SWO
137	PB7 **	I/O	GPIO_Output	LD2 [Blue]
138	воото	Boot		
139	PB8	I/O	I2C1_SCL	I2C1_X_SCL
140	PB9	I/O	I2C1_SDA	I2C1_X_SDA
141	PE0	I/O	UART8_RX	
142	PE1	I/O	UART8_TX	
143	PDR_ON	Reset		
144	VDD	Power		

^{**} The pin is affected with an I/O function

^{*} The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. CRC

mode: Activated

5.1.1. Parameter Settings:

Basic Parameters:

Default Polynomial State Enable

Default Init Value State Enable

Advanced Parameters:

Input Data Inversion Mode None
Output Data Inversion Mode Disable
Input Data Format Bytes

5.2. I2C1

12C: 12C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode Standard Mode

I2C Speed Frequency (KHz)100Rise Time (ns)0Fall Time (ns)0Coefficient of Digital Filter0

Analog Filter Enabled

Timing 0x00C0EAFF *

Slave Features:

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

5.3. I2C2

12C: 12C

5.3.1. Parameter Settings:

Timing configuration:

I2C Speed Mode Standard Mode

I2C Speed Frequency (KHz)100Rise Time (ns)0Fall Time (ns)0Coefficient of Digital Filter0

Analog Filter Enabled

Timing 0x00C0EAFF *

Slave Features:

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

5.4. RCC

High Speed Clock (HSE): BYPASS Clock Source

Low Speed Clock (LSE): Crystal/Ceramic Resonator

5.4.1. Parameter Settings:

System Parameters:

VDD voltage (V) 3.3

Flash Latency(WS) 3 WS (4 CPU cycle)

RCC Parameters:

HSI Calibration Value 16

TIM Prescaler Selection Disabled

HSE Startup Timout Value (ms) 100

LSE Startup Timout Value (ms) 5000

Power Parameters:

Power Over Drive Enabled

Power Regulator Voltage Scale Power Regulator Voltage Scale 3

5.5. RTC

mode: Activate Clock Source 5.5.1. Parameter Settings:

General:

Hour Format Hourformat 24

Asynchronous Predivider value 127
Synchronous Predivider value 255

5.6. SPI1

Mode: Full-Duplex Master 5.6.1. Parameter Settings:

Basic Parameters:

Frame Format Motorola

Data Size 4 Bits

First Bit MSB First

Clock Parameters:

Prescaler (for Baud Rate) 2

Baud Rate 50.0 MBits/s *

Clock Polarity (CPOL) Low
Clock Phase (CPHA) 1 Edge

Advanced Parameters:

CRC Calculation Disabled

NSSP Mode Enabled

NSS Signal Type Software

5.7. SPI2

Mode: Full-Duplex Master 5.7.1. Parameter Settings:

Basic Parameters:

Frame Format Motorola

Data Size 4 Bits

First Bit MSB First

Clock Parameters:

Prescaler (for Baud Rate) 2

Baud Rate 25.0 MBits/s *

Clock Polarity (CPOL) Low
Clock Phase (CPHA) 1 Edge

Advanced Parameters:

CRC Calculation Disabled

NSSP Mode Enabled

NSS Signal Type Software

5.8. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.9. TIM1

Clock Source: Internal Clock 5.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value) 0

Counter Mode Up

Counter Period (AutoReload Register - 16 bits value) 0

Internal Clock Division (CKD) No Division

Repetition Counter (RCR - 16 bits value) 0

auto-reload preload Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit) Disable (Trigger input effect not delayed)

Trigger Event Selection TRGO Reset (UG bit from TIMx_EGR)

Trigger Event Selection TRGO2 Reset (UG bit from TIMx_EGR)

5.10. TIM2

Clock Source : Internal Clock 5.10.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value) 0

Counter Mode Up

Counter Period (AutoReload Register - 32 bits value) 0

Internal Clock Division (CKD)

No Division

auto-reload preload

Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit) Disable (Trigger input effect not delayed)

Trigger Event Selection TRGO Reset (UG bit from TIMx_EGR)

5.11. TIM3

Clock Source : Internal Clock 5.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)

Counter Mode

Counter Period (AutoReload Register - 16 bits value)

Internal Clock Division (CKD)

auto-reload preload

page *

No Division

Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit) Disable (Trigger input effect not delayed)

Trigger Event Selection TRGO Reset (UG bit from TIMx_EGR)

5.12. TIM4

Clock Source: Internal Clock 5.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)

Counter Mode

Counter Period (AutoReload Register - 16 bits value)

Internal Clock Division (CKD)

auto-reload preload

pagg *

No Division

Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)

Disable (Trigger input effect not delayed)

Trigger Event Selection TRGO Reset (UG bit from TIMx_EGR)

5.13. UART4

Mode: Asynchronous

5.13.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable TX Pin Active Level Inversion Disable **RX Pin Active Level Inversion** Disable Data Inversion Disable TX and RX Pins Swapping Disable Overrun Enable DMA on RX Error Enable MSB First Disable

5.14. UART5

Mode: Asynchronous

5.14.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable

TX Pin Active Level Inversion

RX Pin Active Level Inversion

Disable

Data Inversion

Disable

TX and RX Pins Swapping

Overrun

Enable

DMA on RX Error

Enable

MSB First

Disable

5.15. UART7

Mode: Asynchronous

5.15.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable TX Pin Active Level Inversion Disable **RX Pin Active Level Inversion** Disable Disable **Data Inversion** TX and RX Pins Swapping Disable Overrun Enable DMA on RX Error Enable MSB First Disable

5.16. UART8

Mode: Asynchronous

5.16.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable TX Pin Active Level Inversion Disable **RX Pin Active Level Inversion** Disable **Data Inversion** Disable TX and RX Pins Swapping Disable Enable Overrun DMA on RX Error Enable MSB First Disable

5.17. USART2

Mode: Asynchronous

5.17.1. 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
Single Sample Disable

Advanced Features:

Disable Auto Baudrate TX Pin Active Level Inversion Disable **RX Pin Active Level Inversion** Disable **Data Inversion** Disable Disable TX and RX Pins Swapping Overrun Enable DMA on RX Error Enable MSB First Disable

5.18. USART3

Mode: Asynchronous

5.18.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable

TX Pin Active Level Inversion Disable

RX Pin Active Level Inversion Disable

Data Inversion Disable

TX and RX Pins Swapping Disable

Overrun Enable

DMA on RX Error Enable

MSB First Disable

5.19. USART6

Mode: Asynchronous

5.19.1. 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
Single Sample Disable

Advanced Features:

Auto Baudrate Disable TX Pin Active Level Inversion Disable RX Pin Active Level Inversion Disable Data Inversion Disable Disable TX and RX Pins Swapping Overrun Enable DMA on RX Error Enable MSB First Disable

^{*} 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	Very High	I2C1_X_SCL
	PB9	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very High *	I2C1_X_SDA
I2C2	PF0	I2C2_SDA	Alternate Function Open Drain	Pull-up	Very High	
	PF1	I2C2_SCL	Alternate Function Open Drain	Pull-up	Very High	
RCC	PC14/OSC3 2_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15/OSC3 2_OUT	RCC_OSC32_O UT	n/a	n/a	n/a	
	PH0/OSC_I	RCC_OSC_IN	n/a	n/a	n/a	MCO [STM32F103CBT6_PA8]
	PH1/OSC_O UT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SPI2	PC2	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC3	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
SYS	PA13	SYS_JTMS- SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_JTCK- SWCLK	n/a	n/a	n/a	TCK
UART4	PD0	UART4_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	UART4_WIFI_RX
	PD1	UART4_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	UART4_WIFI_TX

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
UART5	PB12	UART5_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC12	UART5_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
UART7	PF6	UART7_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PF7	UART7_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
UART8	PE0	UART8_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE1	UART8_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
USART2	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD5	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
USART3	PD8	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	STLK_RX [STM32F103CBT6_PA3]
	PD9	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	STLK_TX [STM32F103CBT6_PA2]
USART6	PC6	USART6_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC7	USART6_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
Single Mapped	PC1	ETH_MDC	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_MDC [LAN8742A- CZ-TR_MDC]
Signals	PA1	ETH_REF_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_REF_CLK [LAN8742A-CZ- TR_REFCLK0]
	PA2	ETH_MDIO	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_MDIO [LAN8742A- CZ-TR_MDIO]
	PA7	ETH_CRS_DV	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_CRS_DV [LAN8742A-CZ- TR_CRS_DV]
	PC4	ETH_RXD0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_RXD0 [LAN8742A- CZ-TR_RXD0]
	PC5	ETH_RXD1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_RXD1 [LAN8742A-

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
					*	CZ-TR_RXD1]
	PB13	ETH_TXD1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_TXD1 [LAN8742A- CZ-TR_TXD1]
	PA8	USB_OTG_FS_ SOF	Alternate Function Push Pull	No pull-up and no pull-down	Very High	USB_SOF [TP1]
	PA9	USB_OTG_FS_ VBUS	Input mode	No pull-up and no pull-down	n/a	USB_VBUS
	PA10	USB_OTG_FS_I D	Alternate Function Push Pull	No pull-up and no pull-down	Very High	USB_ID
	PA11	USB_OTG_FS_ DM	Alternate Function Push Pull	No pull-up and no pull-down	Very High	USB_DM
	PA12	USB_OTG_FS_ DP	Alternate Function Push Pull	No pull-up and no pull-down	Very High	USB_DP
	PG11	ETH_TX_EN	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_TX_EN [LAN8742A- CZ-TR_TXEN]
	PG13	ETH_TXD0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	RMII_TXD0 [LAN8742A- CZ-TR_TXD0]
	PB3	SYS_JTDO- SWO	n/a	n/a	n/a	SWO
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	USER_Btn [B1]
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD3 [Red]
	PG6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USB_PowerSwitchOn [STMPS2151STR_EN]
	PG7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USB_OverCurrent [STMPS2151STR_FAULT]
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2 [Blue]

6.2. DMA configuration

DMA request	Stream	Direction	Priority
UART4_RX	DMA1_Stream2	Peripheral To Memory	Low
UART4_TX	DMA1_Stream4	Memory To Peripheral	Low

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:

UART4_TX: DMA1_Stream4 DMA request Settings:

Byte

Mode: Normal
Use fifo: Disable
Peripheral Increment: Disable
Memory Increment: Enable *

Registeral Data Width: Bute

Peripheral Data Width: Byte
Memory Data Width: Byte

6.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority	
Non maskable interrupt	true	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	
DMA1 stream2 global interrupt	true	0	0	
DMA1 stream4 global interrupt	true	0	0	
USART3 global interrupt	true	0	0	
UART4 global interrupt	true	0	0	
PVD interrupt through EXTI line 16		unused		
Flash global interrupt		unused		
RCC global interrupt		unused		
TIM1 break interrupt and TIM9 global interrupt		unused		
TIM1 update interrupt and TIM10 global interrupt	unused			
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused			
TIM1 capture compare interrupt	unused			
TIM2 global interrupt	unused			
TIM3 global interrupt		unused		
TIM4 global interrupt		unused		
I2C1 event interrupt		unused		
I2C1 error interrupt		unused		
I2C2 event interrupt		unused		
I2C2 error interrupt		unused		
SPI1 global interrupt		unused		
SPI2 global interrupt	unused			
USART2 global interrupt	unused			
EXTI line[15:10] interrupts	unused			
UART5 global interrupt	unused			
USART6 global interrupt	unused			
FPU global interrupt	unused			
UART7 global interrupt		unused		
UART8 global interrupt	unused			

RobotSTCOM Project
Configuration Report

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F7
Line	STM32F7x7
мси	STM32F767ZITx
Datasheet	029041_Rev4

7.2. Parameter Selection

Temperature	25
Vdd	3.6

8. Software Project

8.1. Project Settings

Name	Value
Project Name	RobotSTCOM
Project Folder	C:\Users\tapio\Projects\Electronics\Projects\RobotSTCOM
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_F7 V1.12.0

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	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	No
consumption)	

