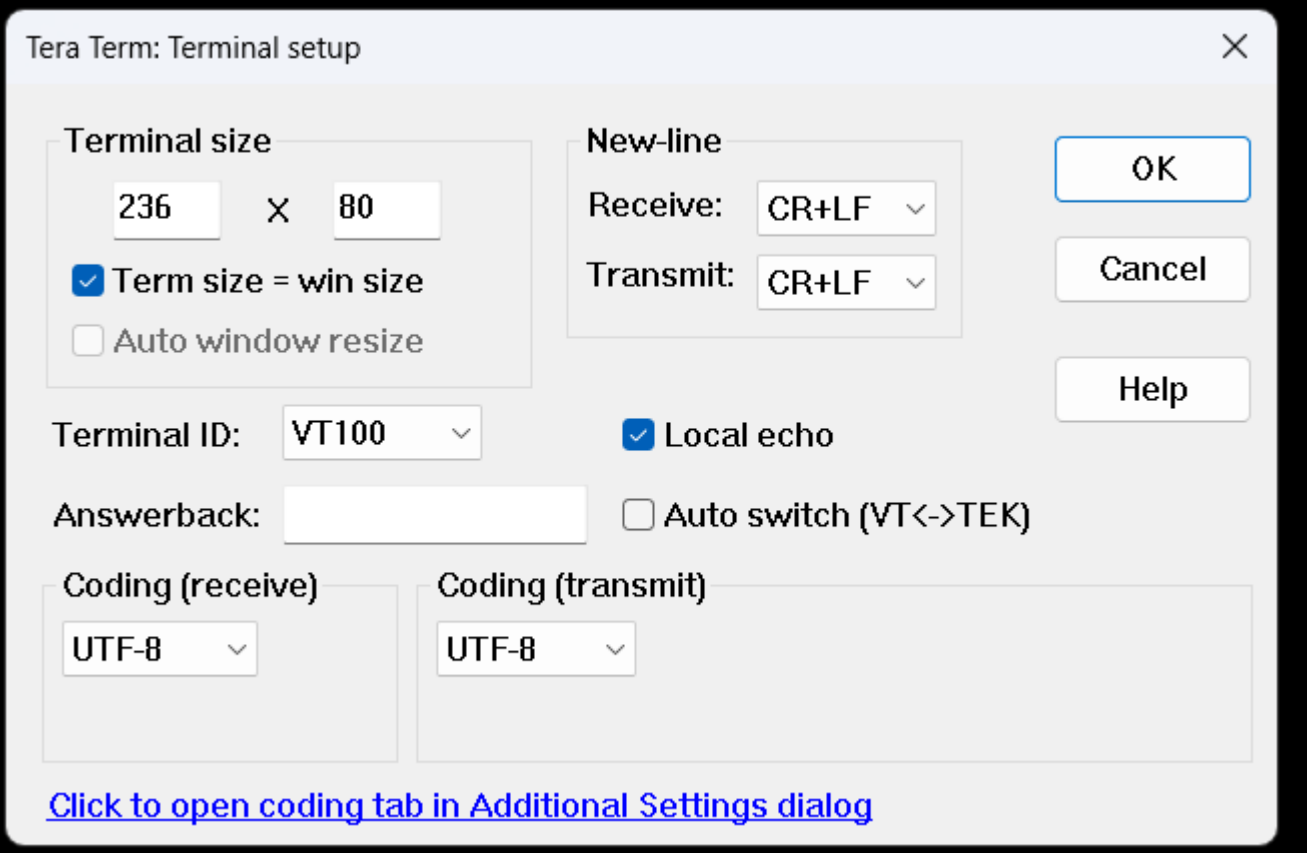
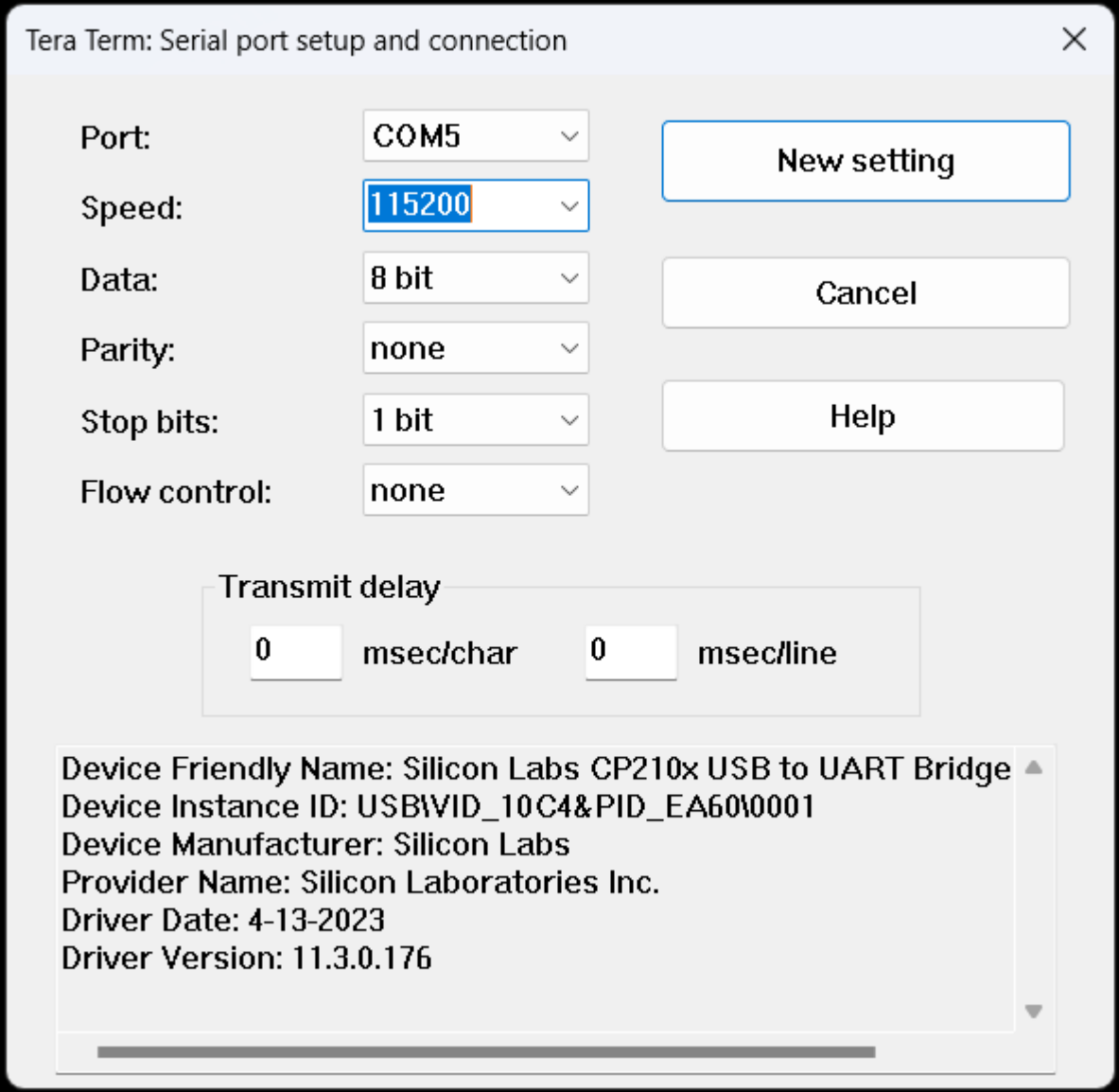

Tera Term: Terminal setup
Terminal size
236
X
80
Term size = win size
Auto window resize
New-line
Receive:
CR+LF
Transmit:
CR+LF
OK
Cancel
Help
Terminal ID:
VT100
Local echo
Answerback:
Auto switch (VT<->TEK)
Coding (receive)
UTF-8
Coding (transmit)
UTF-8
Click to open coding tab in Additional Settings dialog


Tera Term: Serial port setup and connection
Port:
COM5
Speed:
115200
Data:
8 bit
Parity:
none
Stop bits:
1 bit
Flow control:
none
New setting
Cancel
Help
Transmit delay
0
msec/char
0
msec/line
Device Friendly Name: Silicon Labs CP210x USB to UART Bridge
Device Instance ID: USB\VID_10C4&PID_EA60\0001
Device Manufacturer: Silicon Labs
Provider Name: Silicon Laboratories Inc.
Driver Date: 4-13-2023
Driver Version: 11.3.0.176

main.c | main.c | main.c | main.c | 6_DOF_Robotic_Hand_Master.ioc | main.c

```
 97
 98  /* Configure the system clock */
 99  SystemClock_Config();
100
101  /* USER CODE BEGIN SysInit */
102
103  /* USER CODE END SysInit */
104
105  /* Initialize all configured peripherals */
106  MX_GPIO_Init();
107  MX_USART1_UART_Init();
108  MX_USART2_UART_Init();
109  /* USER CODE BEGIN 2 */
110  HAL_UARTEx_ReceiveToIdle_IT(&huart1, message, 128);
111  HAL_UARTEx_ReceiveToIdle_IT(&huart2, message, 128);
112
113
114  /* USER CODE END 2 */
115
116  /* Infinite loop */
117  /* USER CODE BEGIN WHILE */
118  while (1)
119  {
120    /* USER CODE END WHILE */
121
122    /* USER CODE BEGIN 3 */
123  }
```

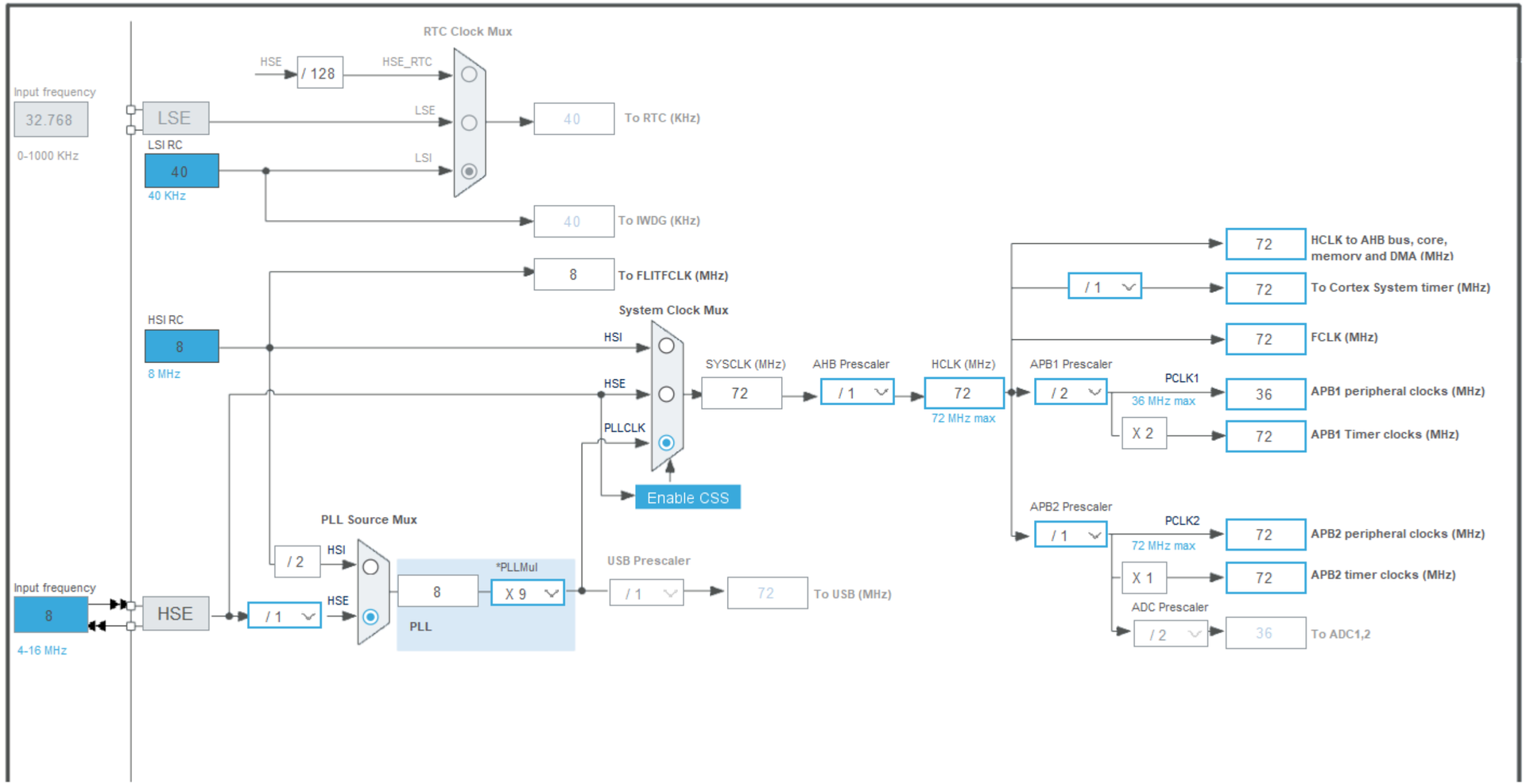
main.c | main.c | main.c | main.c | 6_DOF_Robotic_Hand_Master.ioc | main.c

```
/* USER CODE BEGIN PFP */

/* USER CODE END PFP */

/* Private user code ---------------------------------------------------------*/
/* USER CODE BEGIN 0 */
uint8_t message[128];

void HAL_UARTEx_RxEventCallback(UART_HandleTypeDef *huart, uint16_t Size)
{
  if (huart->Instance==USART1)
  {
      HAL_UART_Transmit(&huart2, message, Size, 1000);
  }
  else if (huart->Instance==USART2)
    {
      HAL_UART_Transmit(&huart1, message, Size, 1000);
    }
  HAL_UARTEx_ReceiveToIdle_IT(huart, message,128);
}

/* USER CODE END 0 */

/**
  * @brief  The application entry point.
  * @retval int
  */
int main(void)
```

6_DOF_Robotic_Hand_Master.ioc - Clock Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Resolve Clock Issues



6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

- CAN
- I2C1
- I2C2
- SPI1
- SPI2
- USART1
- USART2
- USART3
- USB

Computing

Middleware and Software P...

USART2 Mode and Configuration

Mode

Mode: Asynchronous

Hardware Flow Control (RS232): Disable

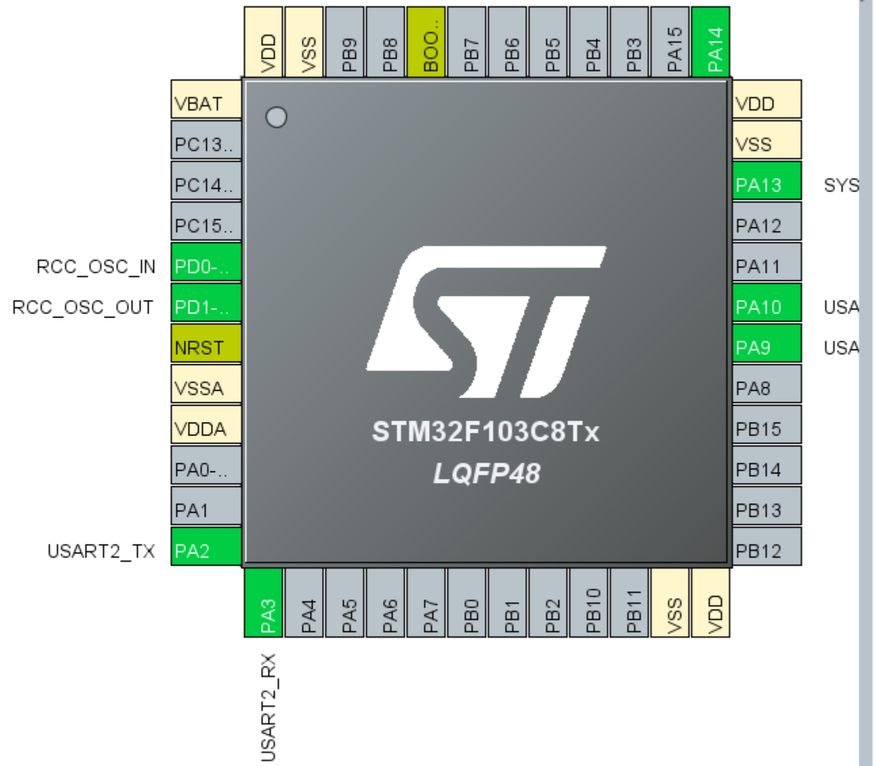
Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

NVIC Interrupt Table	Enabled	Preemption Priority	Sub Priority
USART2 global interrupt	☑	0	0

Pinout view | System view



6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

IWDG
NVIC
RCC
SYS
WWDG

Analog
Timers
Connectivity

CAN
I2C1
I2C2
SPI1
SPI2
USART1
USART2
USART3
USB

Computing
Middleware and Software P...

USART2 Mode and Configuration

Mode

Mode: Asynchronous
Hardware Flow Control (RS232): Disable

Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

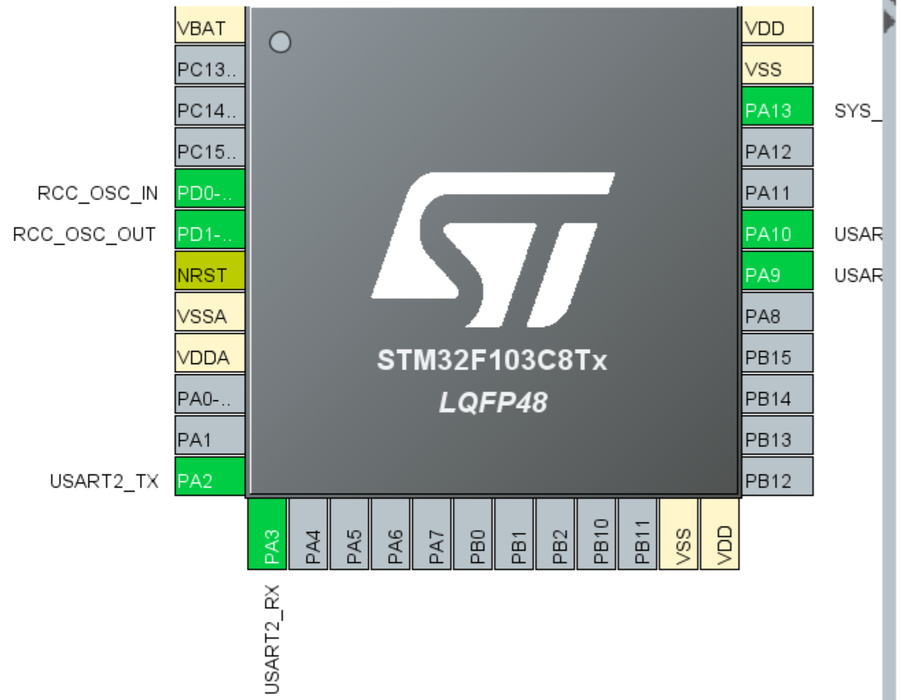
Configure the below parameters :

Search (Ctrl+F)

Basic Parameters
- Baud Rate: 115200 Bits/s
- Word Length: 8 Bits (including Parity)
- Parity: None
- Stop Bits: 1

Advanced Parameters
- Data Direction: Receive and Transmit
- Over Sampling: 16 Samples

Pinout view | System view



6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

- CAN
- I2C1
- I2C2
- SPI1
- SPI2
- USART1
- USART2
- USART3
- USB

Computing

Middleware and Software P...

USART1 Mode and Configuration

Mode

Mode: Asynchronous

Hardware Flow Control (RS232): Disable

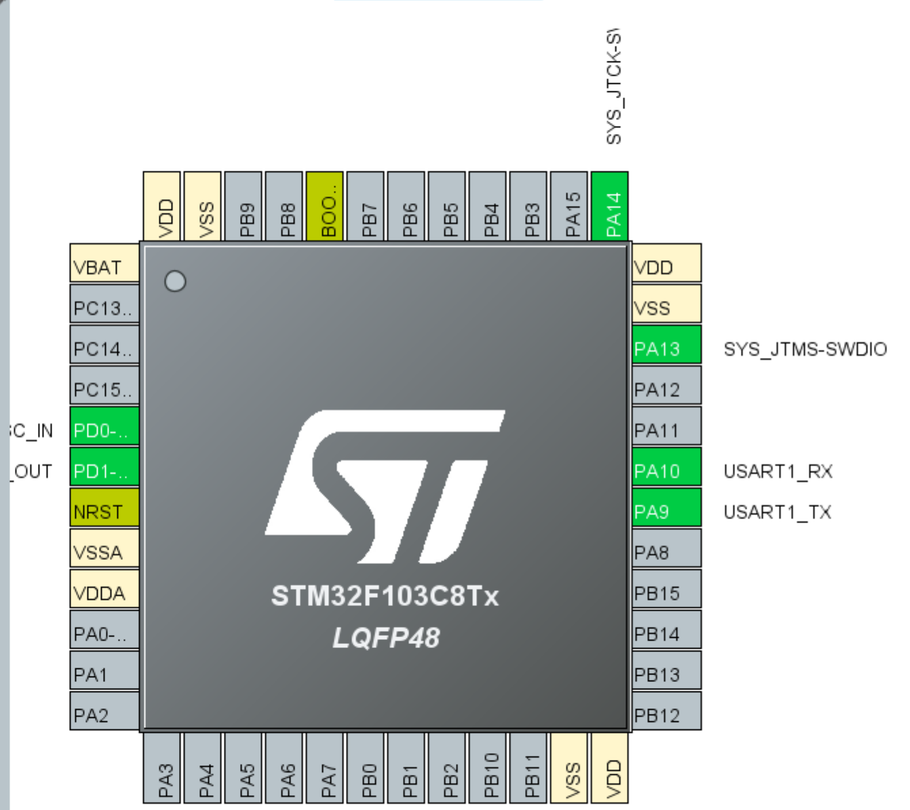
Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

NVIC Interrupt Table	Enabled	Preemption Priority	Sub Priority
USART1 global interrupt	☑	0	0

Pinout view | System view



6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

- CAN
- I2C1
- I2C2
- SPI1
- SPI2
- USART1
- USART2
- USART3
- USB

Computing

Middleware and Software P...

USART1 Mode and Configuration

Mode

Mode: Asynchronous

Hardware Flow Control (RS232): Disable

Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

Configure the below parameters :

Search (Ctrl+F)

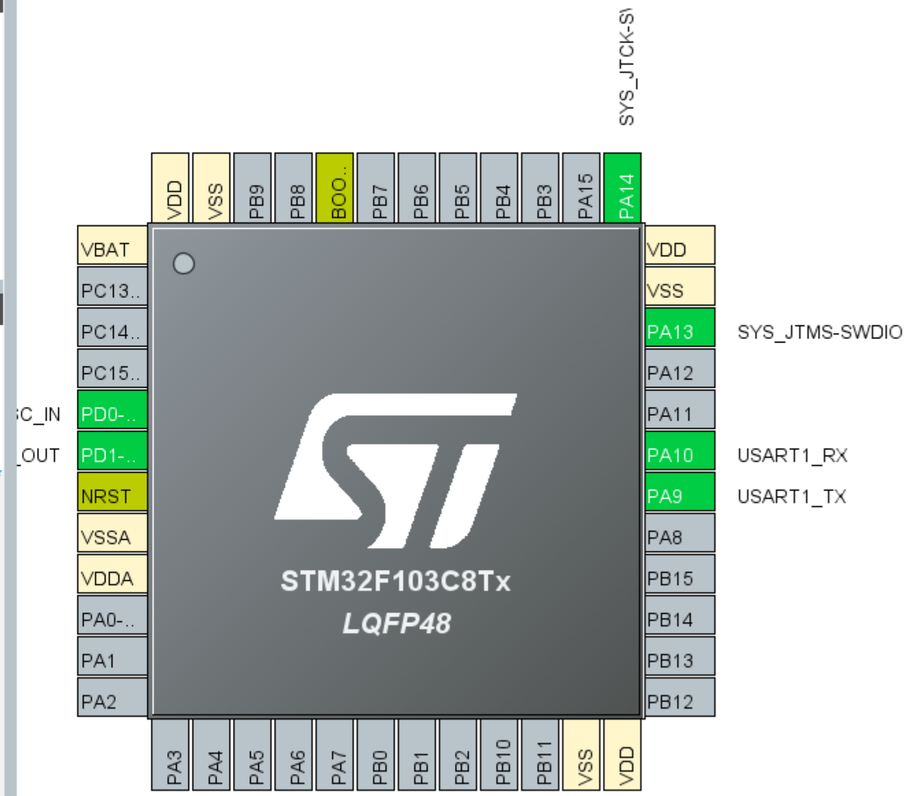
Basic Parameters

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

Advanced Parameters

Data Direction	Receive and Transmit
Over Sampling	16 Samples

Pinout view | System view



main.c main.c main.c main.c *6_DOF_Robotic_Hand_Master.ioc

6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- System Core
  - DMA
  - GPIO
  - IWDG
  - NVIC
  - RCC
  - SYS
  - WWDG
- Analog
- Timers
- Connectivity
- Computing
- Middleware and Software Pac...

SYS Mode and Configuration

Mode

Debug: Serial Wire

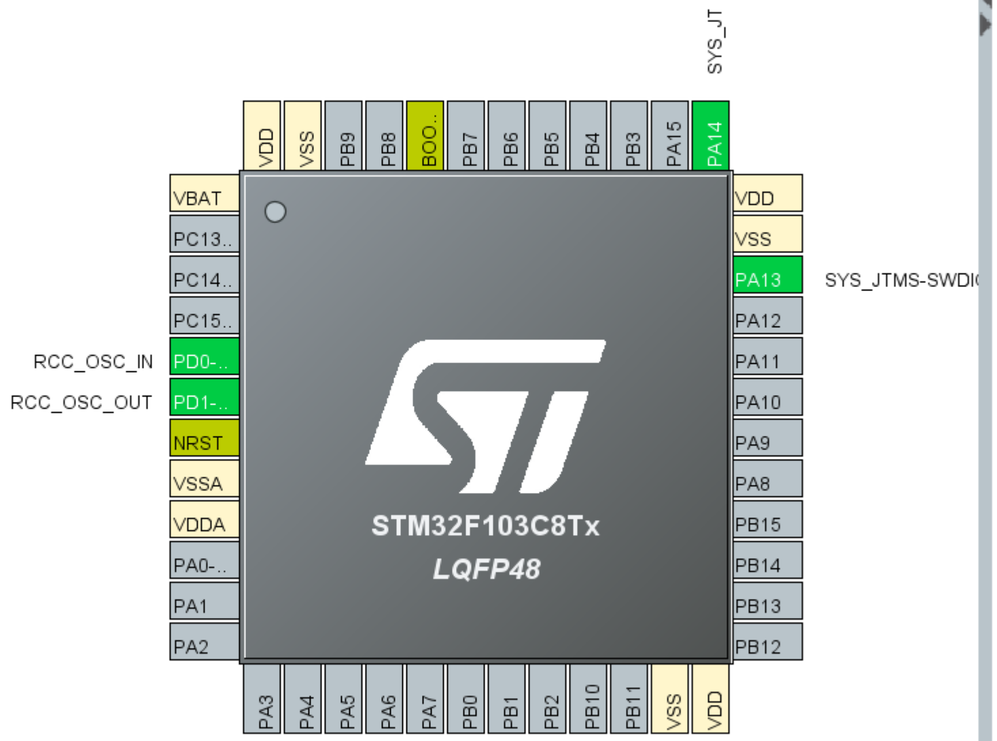
System Wake-Up

Timebase Source: SysTick

Configuration

Warning: This peripheral has no parameters to be configured.

Pinout view | System view



6_DOF_Robotic_Hand_Master.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

System Core
- DMA
- GPIO
- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

Computing

Middleware and Software Pac...

RCC Mode and Configuration

Mode

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE): Disable

Master Clock Output

Configuration

Reset Configuration

Parameter Settings | User Constants | NVIC Settings | GPIO Settings

Configure the below parameters :

Search (Ctrl+F)

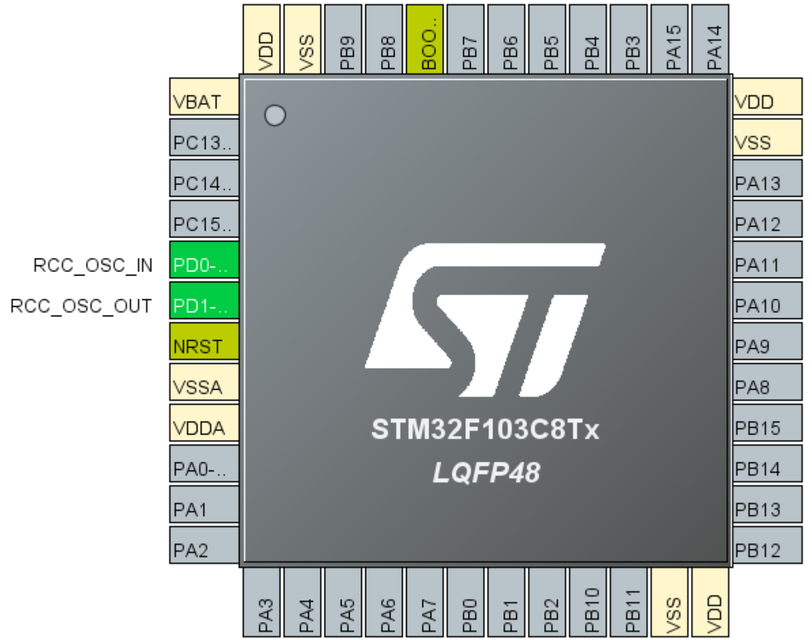
System Parameters

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

RCC Parameters

HSI Calibration Value	16
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Pinout view | System view



Setup STM32 project

IDE

Project

Project Name: 6_DOF_Robotic_Hand_Master

Use default location

Location: E:\STM32 Project Folder 2\6_DOF_Robotic_Hand_Master Browse...

Options

Targeted Language

C C++

Targeted Binary Type

Executable Static Library

Targeted Project Type

STM32Cube Empty

< Back Next > Finish Cancel

Target Selection

Select STM32 target or STM32Cube example

IDE

MCU/MPU Selector | Board Selector | Example Selector | Cross Selector

MCU/MPU Filters

Commercial Part Number: F103C8T6

PRODUCT INFO

- Segment
- Series
- Line
- Marketing Status
- Price
- Package
- Core
- Coprocessor

MEMORY

Flash = 64 (kBytes)

64

Features | Block Diagram | Docs & Resources | CAD Resources | Datasheet | Buy

STM32F1 Series

STM32F103C8T6

Mainstream Performance line, Arm Cortex-M3 MCU with 64 Kbytes of Flash memory, 72 MHz CPU, motor control, USB and CAN

ACTIVE
Product is in mass production

Unit Price for 10kU (US$) : **2.7946**

LQFP 48 7x7x1.4 mm

The STM32F103xx medium-density performance line family incorporates the high-performance Arm® Cortex®-M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and an extensive range of enhanced I/Os and peripherals connected to two APB buses. All devices offer two 12-bit ADCs, three general purpose 16-bit timers plus one PWM timer, as well as standard and

MCUs/MPUs List: 2 items

Export

*	Commercia...	Part No	Reference	Marketing St...	Unit Price fo...	Board	Package	Flash	RAM	I/O	Frequency
☆	STM32F103C...	STM32F103C8	STM32F103C...	Active	2.7946		LQFP 48 7x7x...	64 kBytes	20 kBytes	37	72 MHz
☆	STM32F103C...		STM32F103C...	Active	2.7946		LQFP 48 7x7x...	64 kBytes	20 kBytes	37	72 MHz

< Back | Next > | Finish | Cancel

6_DOF_Robotic_Hand_Slave.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- System Core
- Analog
- Timers
- Connectivity
  - CAN
  - I2C1
  - I2C2
  - SPI1
  - SPI2
  - USART1
  - USART2
  - USART3
  - USB
- Computing
- Middleware and Software Pac...

USART1 Mode and Configuration

Mode

Mode: Asynchronous

Hardware Flow Control (RS232): Disable

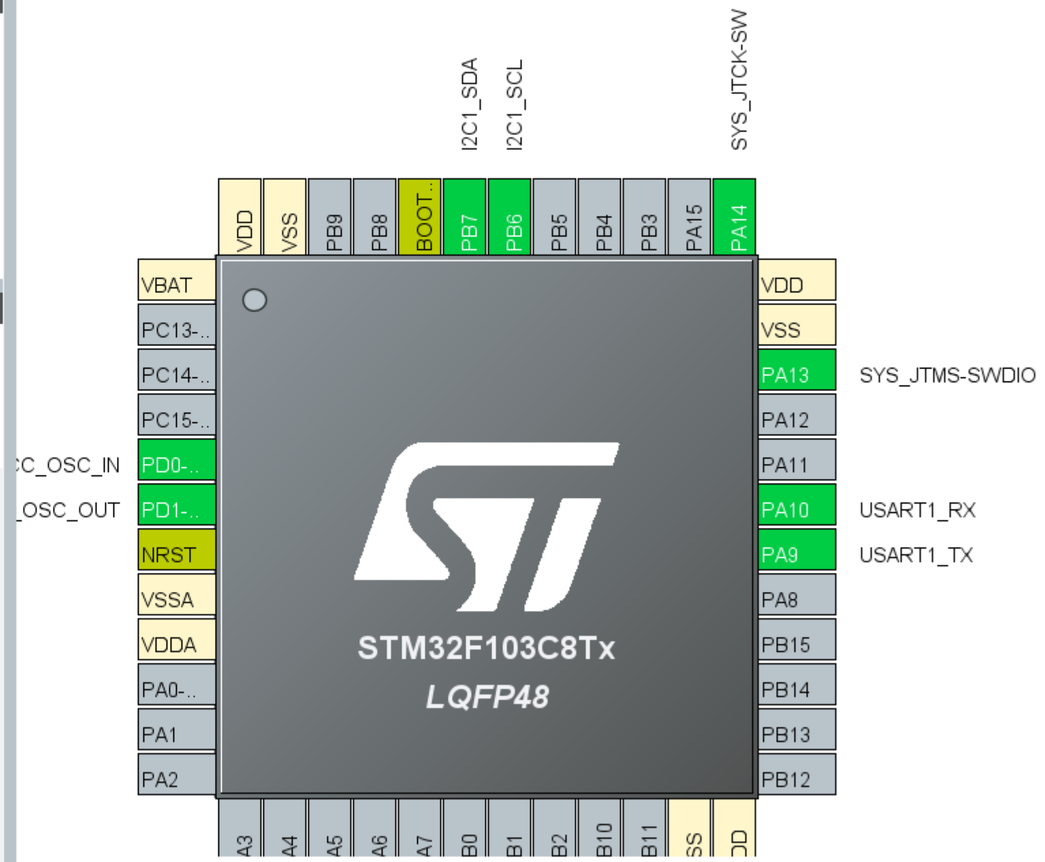
Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

NVIC Interrupt Table	Enabled	Preemption Priority	Sub Priorit
USART1 global interrupt	☑	0	0

Pinout view | System view



main.c main.c main.c main.c *6_DOF_Robotic_Hand_Slave.ioc

6_DOF_Robotic_Hand_Slave.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- System Core
- Analog
- Timers
- Connectivity
  - CAN
  - I2C1
  - I2C2
  - SPI1
  - SPI2
  - USART1
  - USART2
  - USART3
  - USB
- Computing
- Middleware and Software Pac...

USART1 Mode and Configuration

Mode

Mode: Asynchronous

Hardware Flow Control (RS232): Disable

Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

Configure the below parameters :

Search (Ctrl+F)

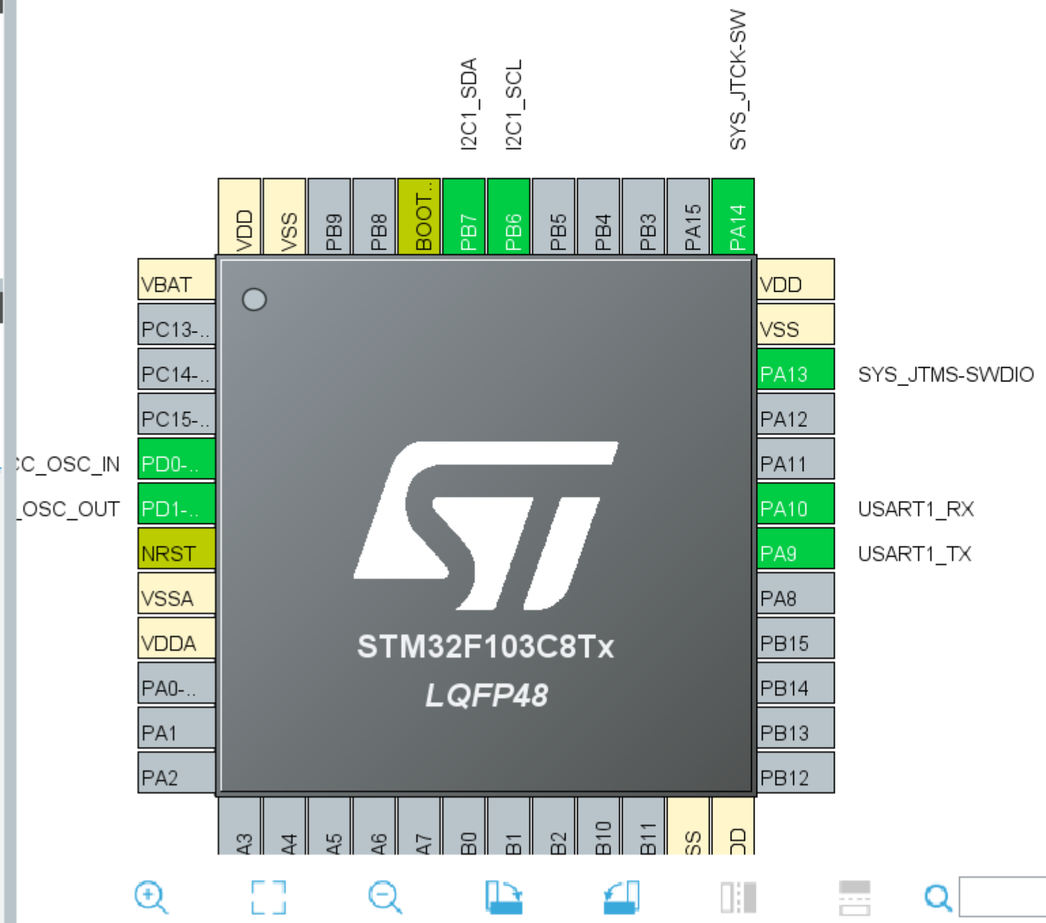
Basic Parameters

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

Advanced Parameters

Data Direction	Receive and Transmit
Over Sampling	16 Samples

Pinout view | System view



main.c main.c main.c main.c *6_DOF_Robotic_Hand_Slave.ioc

6_DOF_Robotic_Hand_Slave.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

- System Core
- Analog
- Timers
- Connectivity
  - CAN
  - I2C1
  - I2C2
  - SPI1
  - SPI2
  - USART1
  - USART2
  - USART3
  - USB
- Computing
- Middleware and Software Pac...

I2C1 Mode and Configuration

Mode

I2C: I2C

Configuration

Reset Configuration

NVIC Settings | DMA Settings | GPIO Settings | Parameter Settings | User Constants

Configure the below parameters :

Search (Ctrl+F)

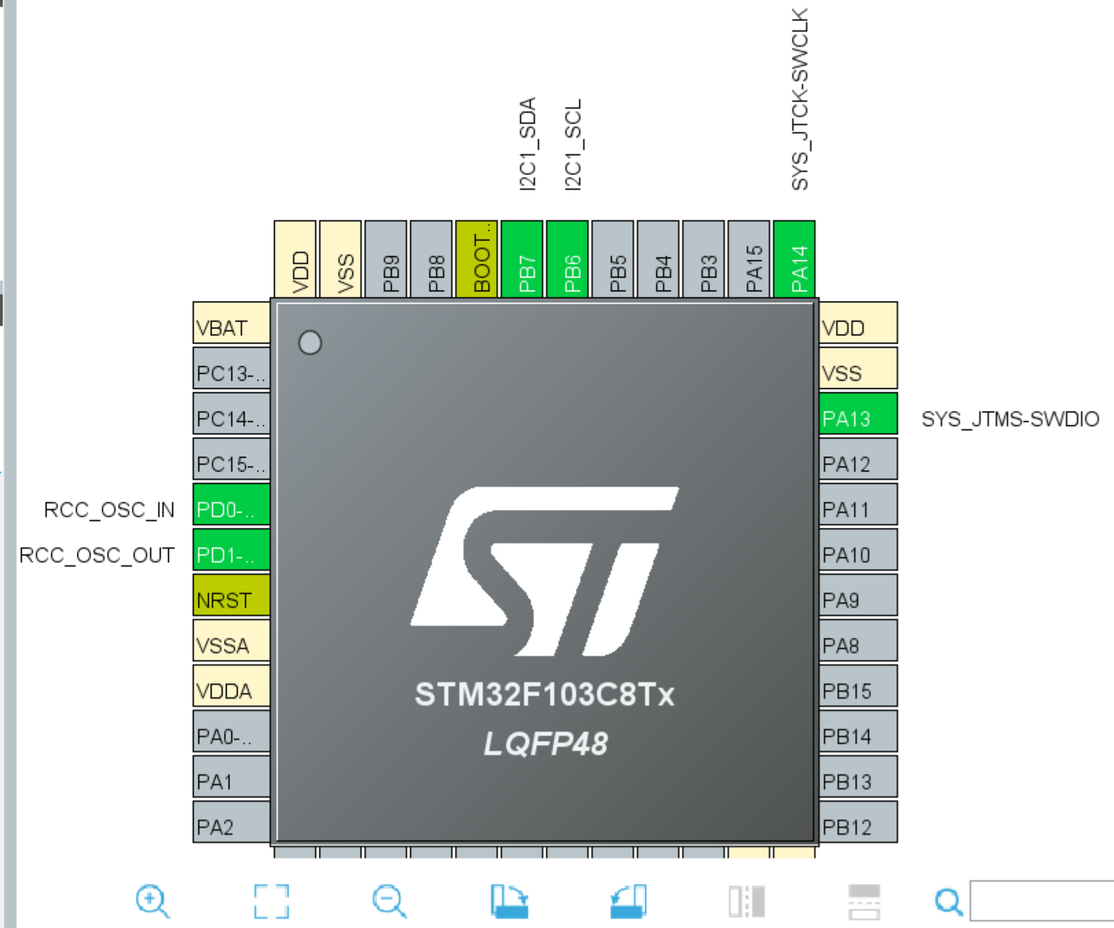
Master Features

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

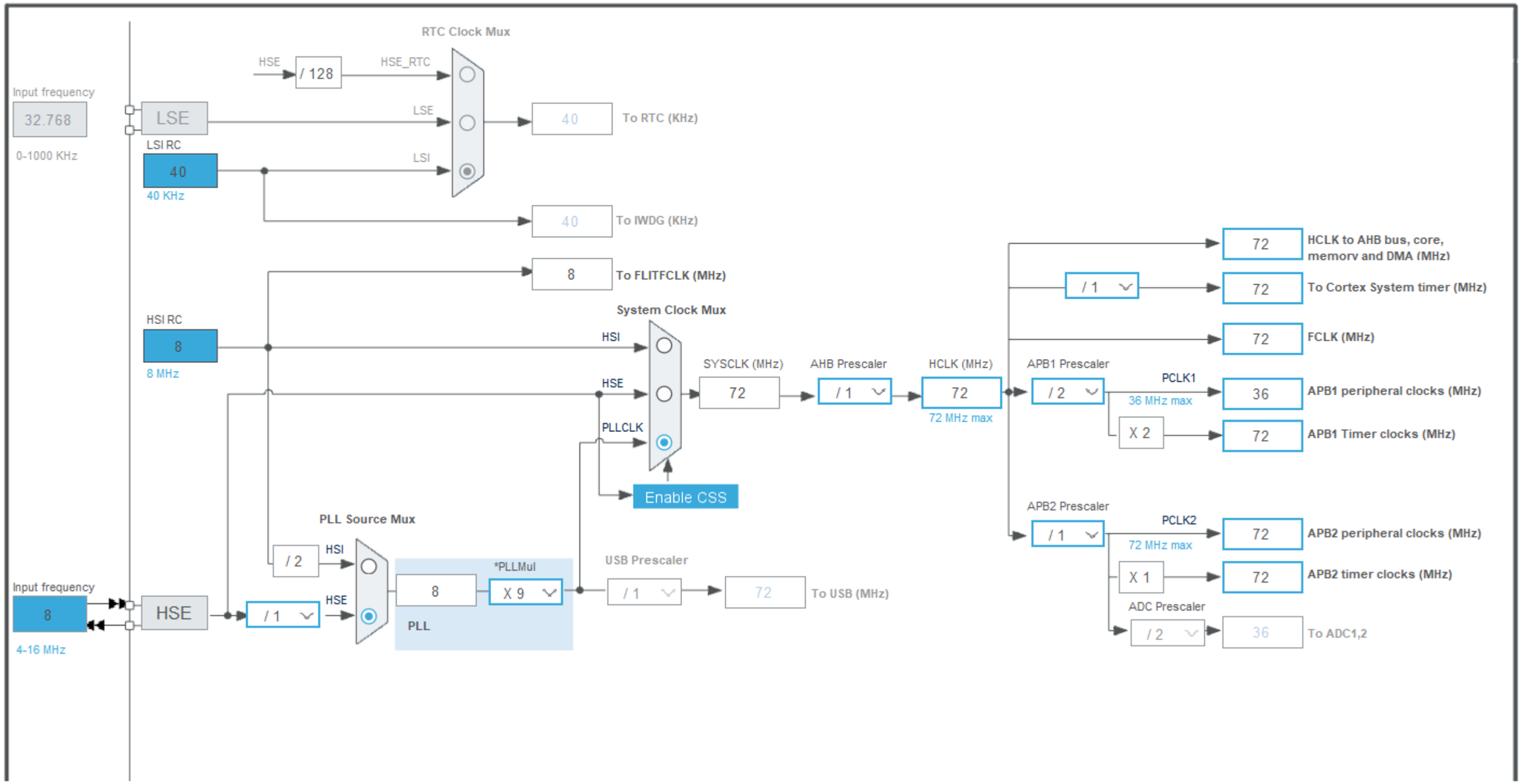
Slave Features

Clock No Stretch Mode	Disabled
Primary Address Length sele.	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detecti..	Disabled

Pinout view | System view



Resolve Clock Issues



6_DOF_Robotic_Hand_Slave.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

System Core
- DMA
- GPIO
- IWDG
- NVIC
- RCC
- SYS
- WWDG

Analog

Timers

Connectivity

Computing

Middleware and Software Pac...

SYS Mode and Configuration

Mode

Debug: Serial Wire

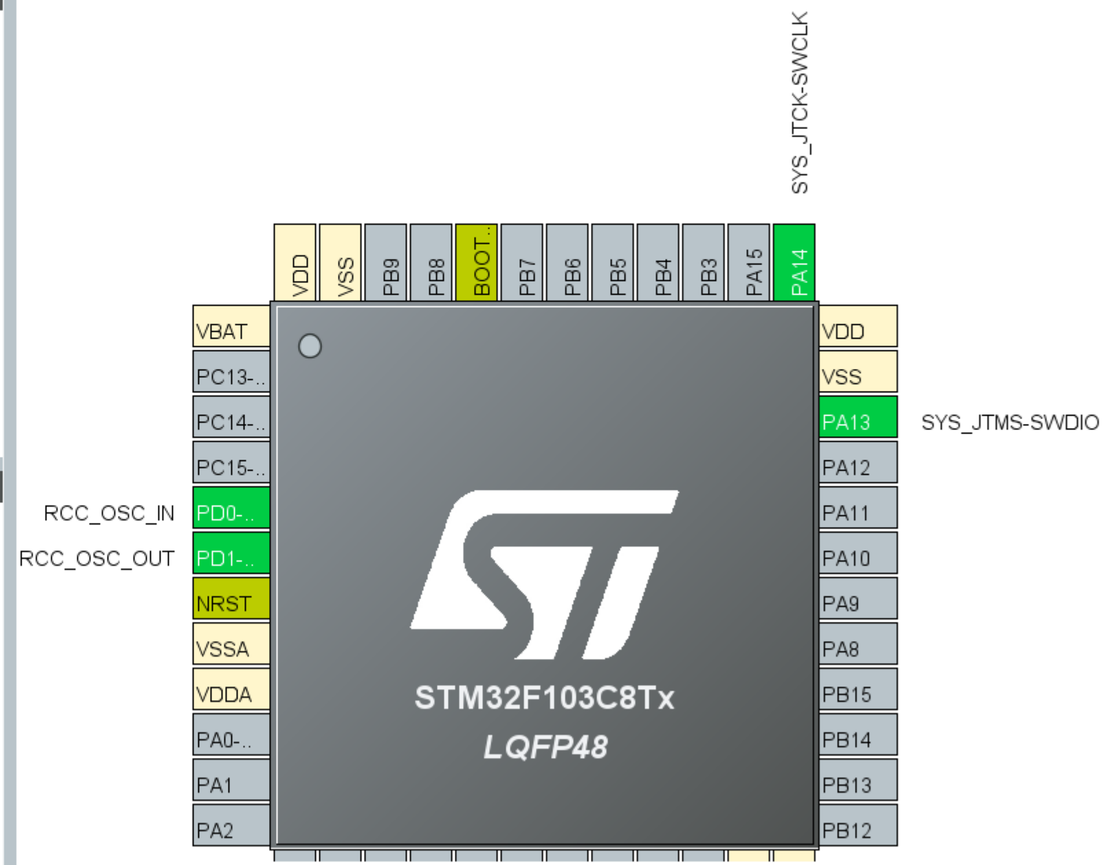
System Wake-Up

Timebase Source: SysTick

Configuration

Warning: This peripheral has no parameters to be configured.

Pinout view | System view



6_DOF_Robotic_Hand_Slave.ioc - Pinout & Configuration

Pinout & Configuration | Clock Configuration | Project Manager | Tools

Software Packs | Pinout

Categories | A->Z

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Configuration

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System Parameters

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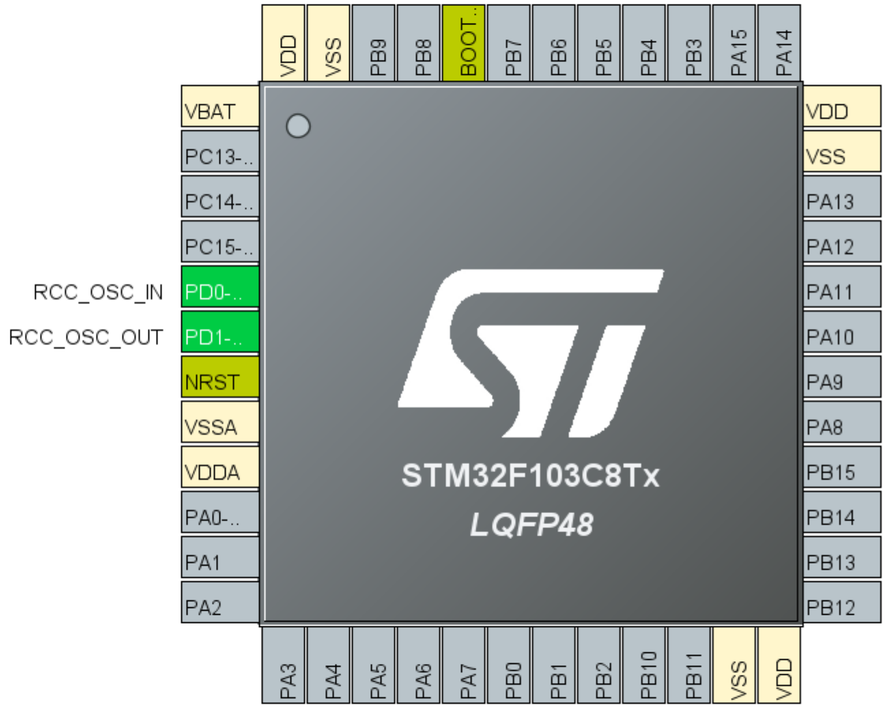
Prefetch Buffer	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

RCC Parameters

HSI Calibration Value	16

Pinout view | System view



Setup STM32 project

IDE

Project

Project Name: 6_DOF_Robotic_Hand_Slave

Use default location

Location: E:\STM32 Project Folder 2\6_DOF_Robotic_Hand_Bluetooth_Controlled_001 Browse...

Options

Targeted Language

(•) C ( ) C++

Targeted Binary Type

(•) Executable ( ) Static Library

Targeted Project Type

(•) STM32Cube ( ) Empty

< Back Next > Finish Cancel

Target Selection

Select STM32 target or STM32Cube example

IDE

MCU/MPU Selector | Board Selector | Example Selector | Cross Selector

MCU/MPU Filters

Commercial Part Number: STM32F103C8T6

PRODUCT INFO

- Segment
- Series
- Line
- Marketing Status
- Price
- Package
- Core
- Coprocessor

MEMORY

Flash = 64 (kBytes)

64

EEPROM = 0 (Bytes)

Features | Block Diagram | Docs & Resources | CAD Resources | Datasheet | Buy

STM32F1 Series

STM32F103C8T6

Mainstream Performance line, Arm Cortex-M3 MCU with 64 Kbytes of Flash memory, 72 MHz CPU, motor control, USB and CAN

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< Back | Next > | Finish | Cancel