

PA Pool Project – Requirements Document

EQUIPHILLO

Related Documents

Below is a list of documents related to this project. All documents can be found in the [repository](#).

- System Requirements PA01_01 SRD - STM32_BTKbd.pdf
- System High Level Requirements PA01_01 SHLRD - STM32_BTKbd.pdf
- Project Configuration Report BLE_BT_Kybd.pdf

CUBEMX and CUBEIDE Environment Setup

Step-by-step guide for setting up the environment using STM32CubeIDE with the specified configurations for the STM32F446RET6 and BLUERG-M2SP BLE Shield:

1. Create a New CubeMX Project:

- a. Open STM32CubeMX and create a new project (see fig 1).
- b. Select the STM32F446RET6 microcontroller. (see fig 2)
- c. Configure the pins as follows:
 - i. PA14, PA13 for Debug (SWD) communication.
 - ii. PC14, PC15, PH0, PH1 for Clock configuration.
 - iii. PA6 as MISO, PA7 as MOSI, PB3 as SCK for SPI1.
 - iv. PA0 as GPIO_EXTI0, PA1 as GPIO Output, PA5 as onboard LED Output, PA8 as GPIO Output, PC13 as blue button GPIO_EXTI13.
 - v. Configure NVIC for EXTI line 0 and EXTI line [15:10].

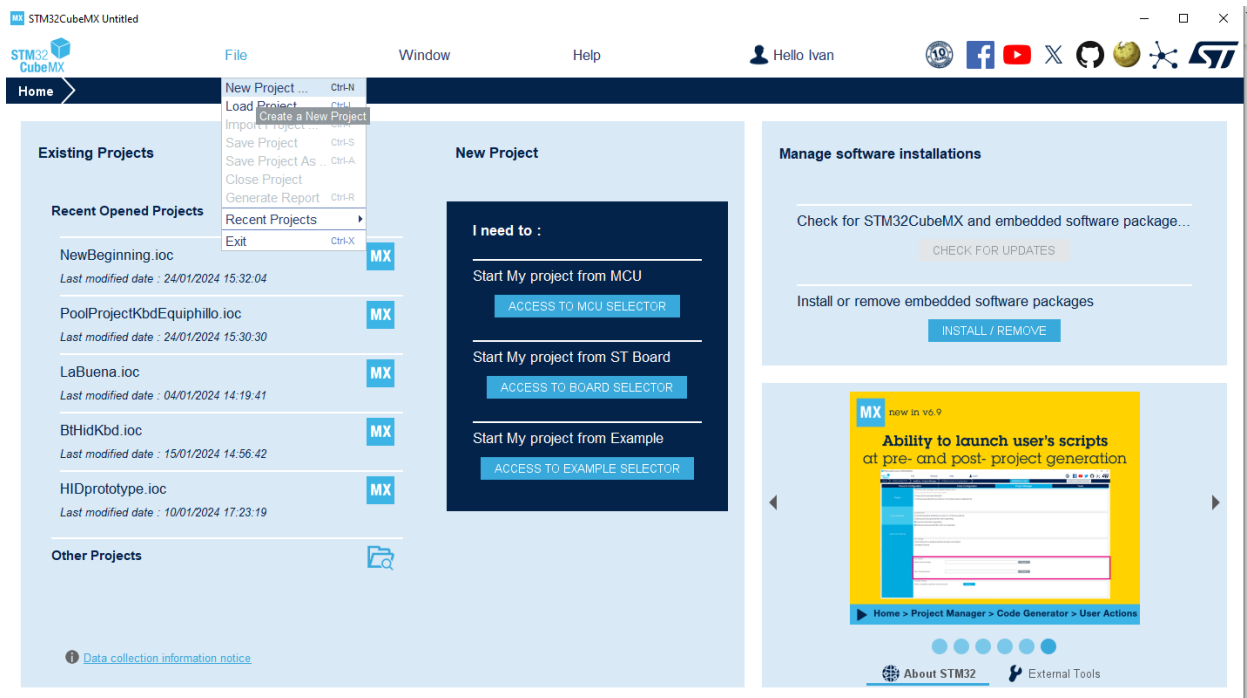


Figure 1. STM32CubeMX new project creation.

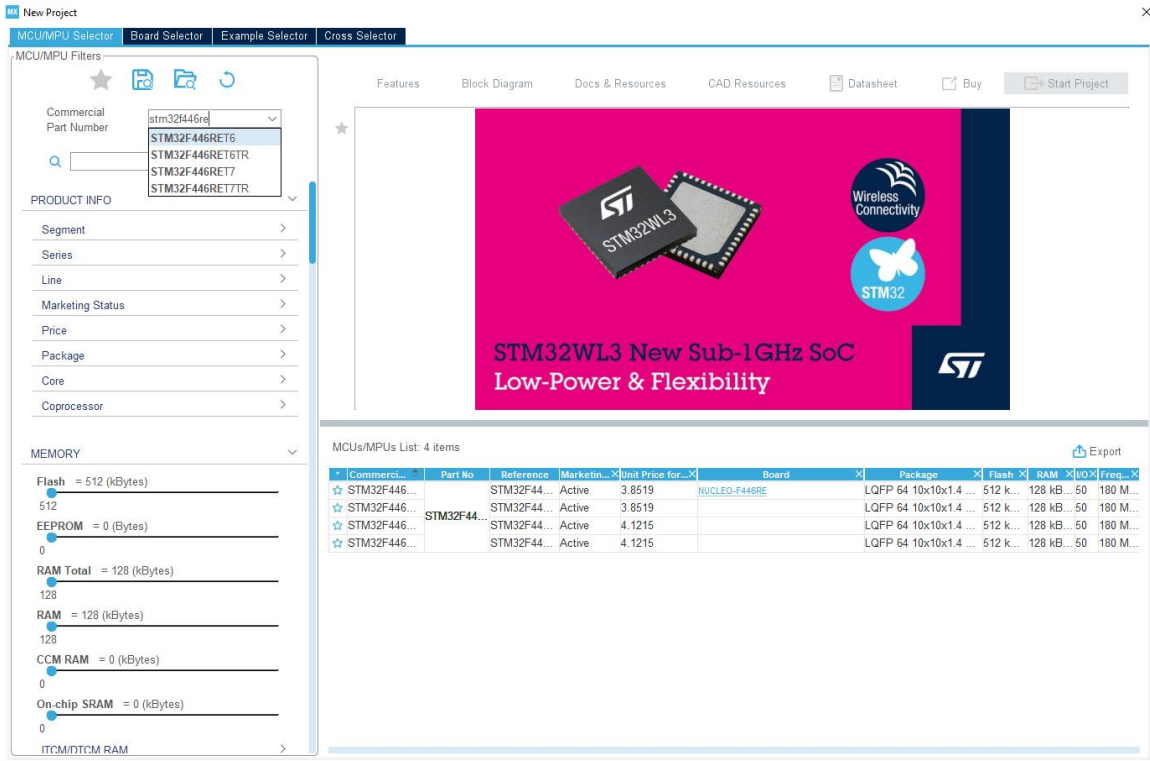


Figure 2. STM32F446RET6 Microcontroller selection.

2. SYS Tab:

- Enable Debug using Serial Wire (SWD) with PA14 and PA13.

3. CLOCK:

- Enable High-Speed Clock (HSE) with Bypass Clock Source.
- Enable Low-Speed Clock (LSE) with Crystal/Ceramic Resonator.
- Set 8MHz input clock, and configure a 64MHz HCLK (after AHB Prescaler).
- Configure PC14, PC15, PH0, PH1 for clock.

4. SPI1 Configuration:

- Configure SPI1 with PA6 (MISO), PA7 (MOSI), PB3 (SCK).
- Set it up as Full-Duplex Master.
- Set Clock Prescaler to 64 (baud rate of 1000KBits/sec).
- Set clock phase as 2nd edge.

5. GPIOs:

- Configure PA0 as GPIO_EXTI0.
- Configure PA1, PA5, PA8 as GPIO Output.
- Configure PC13 as blue button GPIO_EXTI13.
- Enable NVIC EXTI line 0 and EXTI line [15:10].

6. UART2 Configuration:

- Configure UART2 for debugging via serial prints on a terminal.

- b. Configure PA2 (TX) and PA3 (RX) at 115200 bauds as asynchronous 8N1.

7. Software Pack Component:

- a. Install and add the STMicroelectronics.X-CUBE-BLE pack (fig 3).
- b. Configure the BlueNRG-2 controller.
 - i. Set HCI_TL as basic.
 - ii. Set HCI_TL_INTERFACE as UserBoard.
- c. Check the Utils selection.
- d. Install and add the FreeRTOS pack (fig 3).

8. Middleware and Software Packs (fig 4):

- a. Add X-CUBE-BLE2 pack and check Wireless BlueNRG-2.
- b. Configure EXTI Line as PA0-WakeUp.
- c. Configure BUS IO Driver as SPI1.
- d. Set CS Line and Reset line as needed.

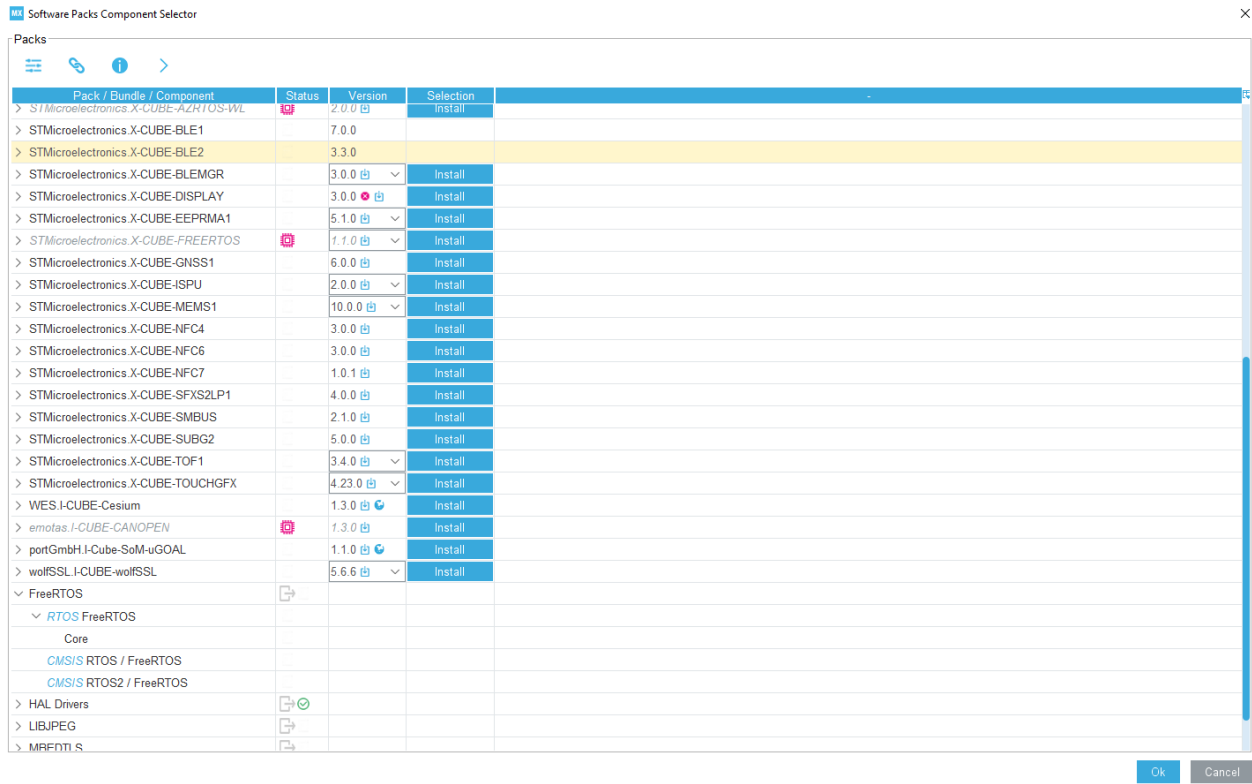


Figure 3. BLE2 and FreeRTOS Library Installation.

▼ STMicronics.X-CUBE-BLE2	✓	3.3.0	
▼ <i>Exposed APIs</i>	✓		
<i>Wireless</i> BlueNRG-2	✓	3.3.0	
▼ <i>Wireless</i> BlueNRG-2	✓	3.3.0	
▼ BlueNRG-2	✓		
Controller	✓	3.3.0	<input checked="" type="checkbox"/>
HCI_TL	✓	3.3.0	Basic ▼
HCI_TL_INTERFACE	✓	3.3.0	UserBoard ▼
Utils	✓	3.3.0	<input checked="" type="checkbox"/>
▼ <i>Device</i> BLE2_Applications		3.3.0	
Application			Not selected ▼

Figure 4. BlueNRG-2 configuration.

9. Project Generation:

- Go to the project manager and set the project name and location.
- Select the Toolchain/IDE as STM32CubeIDE.

10. Generate Code:

- Click on "Project" -> "Generate Code" in STM32CubeMX to generate the code.

11. Open in STM32CubeIDE:

- Open STM32CubeIDE and import the generated project.

12. Build and Flash:

- Build the project and flash it onto the STM32F446RET6.

Project configuration should be like the one provided in Project Configuration Report.

GIT Environment Setup

Download and install git for windows or preferred operating system (fig 5).

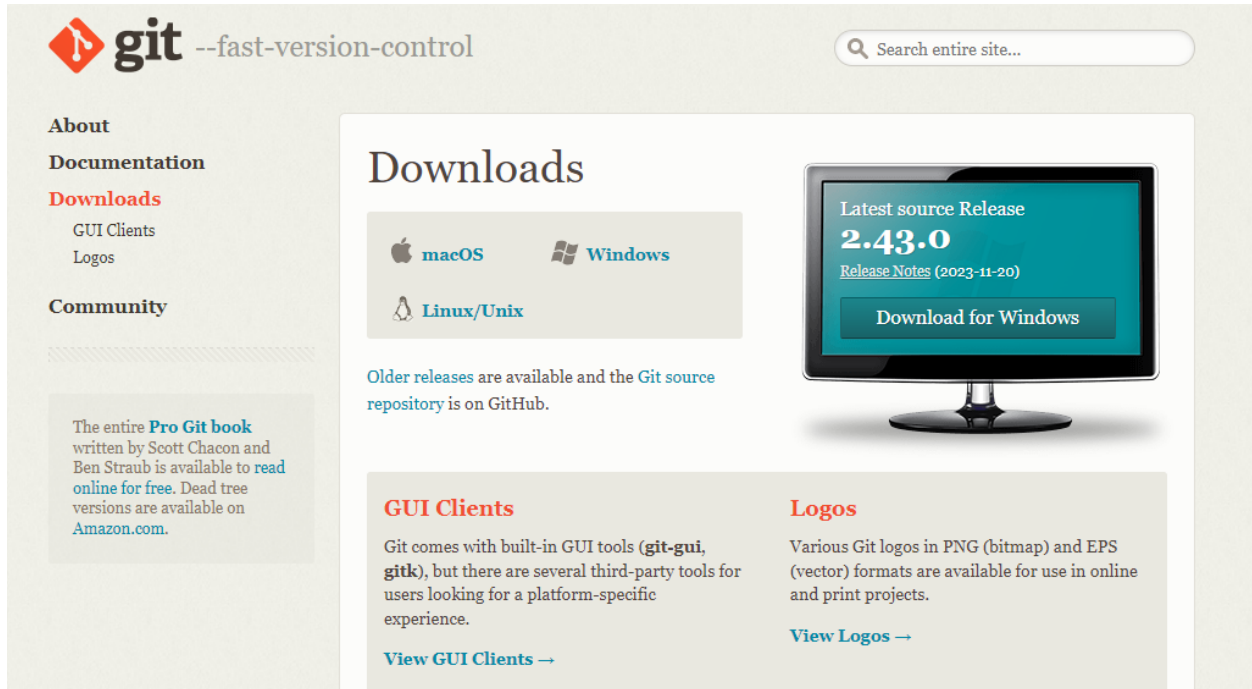


Figure 5. Git download.

In order to manage git repositories with a STM32CubeIDE project, it is recommended to add the eGit extension to the IDE. This can be done through the Eclipse Marketplace (fig 6).

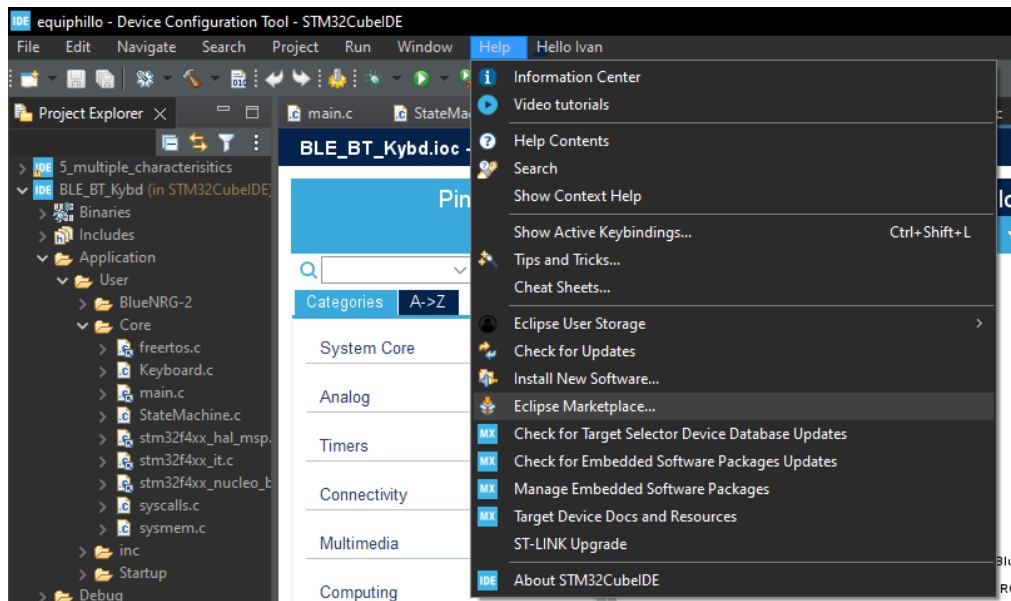


Figure 6. Menu to the eclipse marketplace.

Once installed, the EGit extension (fig 7) can provide a helpful set of git tools integrated to the IDE.

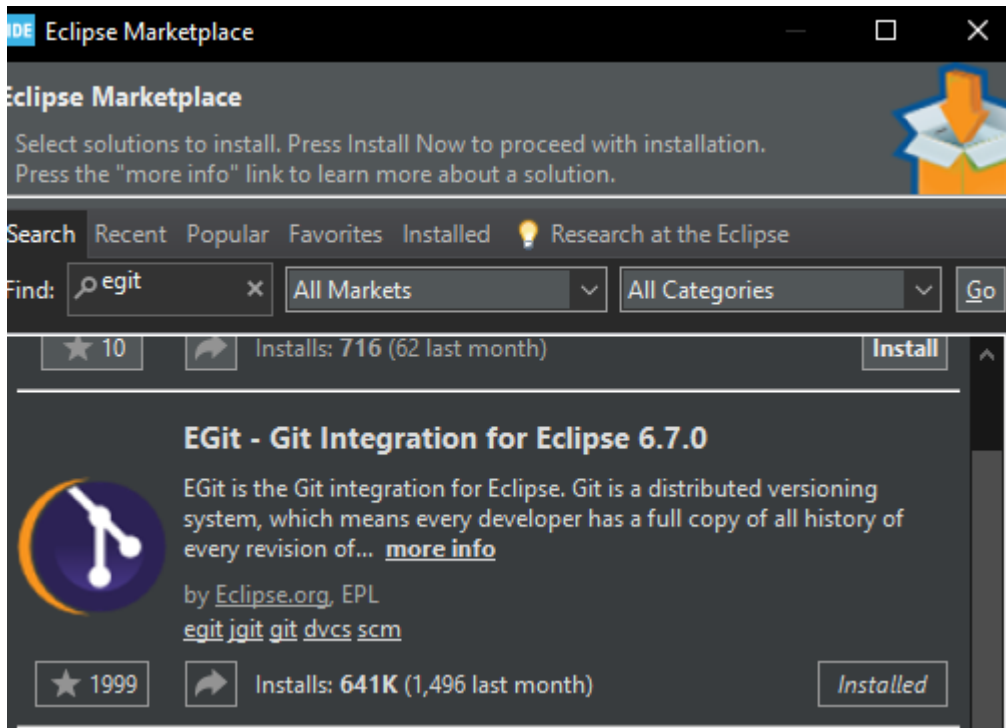


Figure 7. EGit extension.

To add or manage a new or existing git repository, follow the route Window->Show View->Other->Git->Git Repositories (fig 8 and 9).

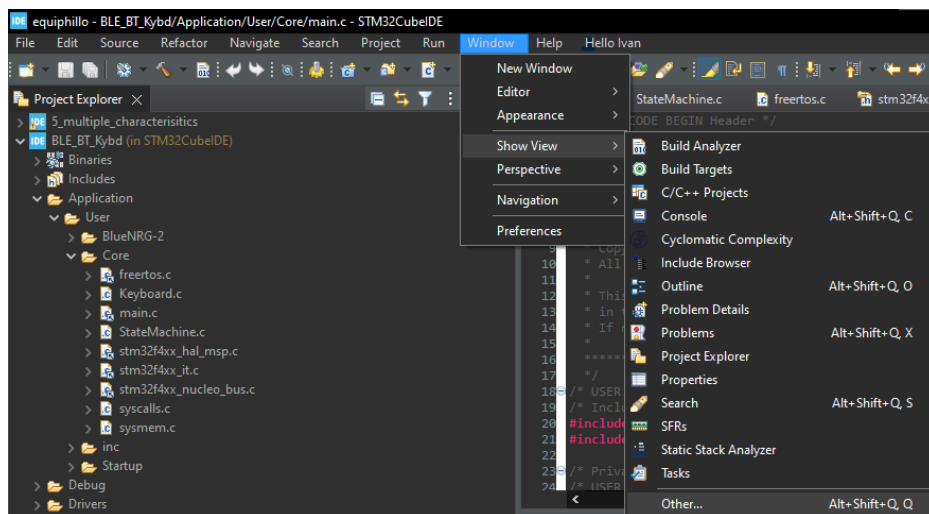


Figure 8. Route to Git menu.

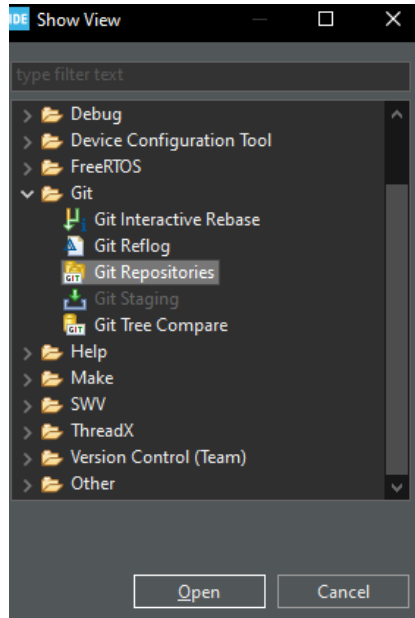


Figure 9. Git Menu.

Get the “Clone with HTTPS” URL from the desired repository and paste it on the URL text box of the Clone Git Repository window (fig 10). Enter credentials and other information as needed and click next.

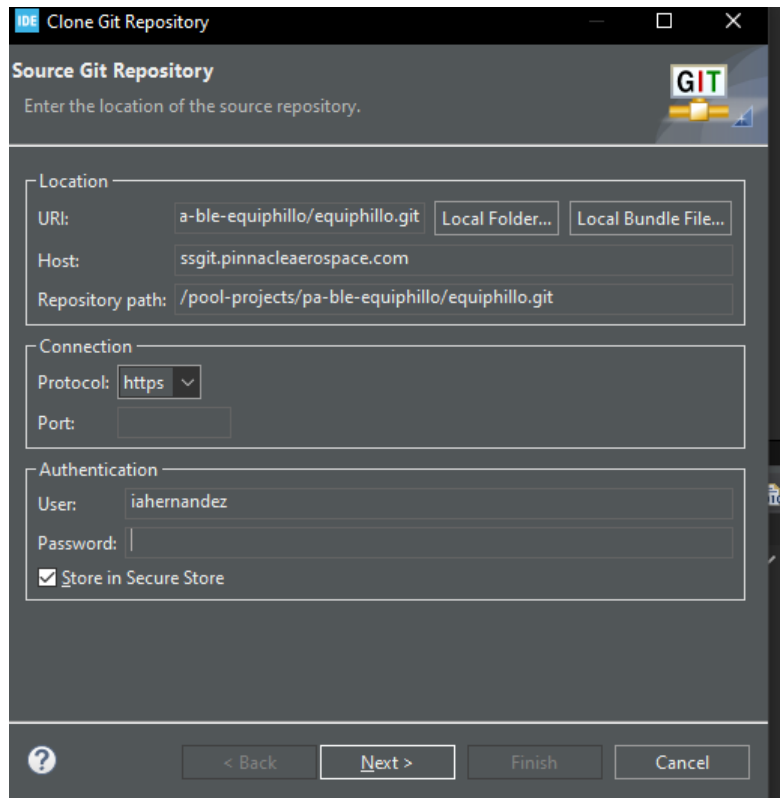


Figure 10. Clone Git window.

It is recommended to add a .gitignore file to the STM project. The following text can be used as a template for this project.

```
#settings
.settings/

#metadata
.metadata/
.vs/

#Debug
Debug/
debug/
Release/
release

# Prerequisites
*.d

# Object files
*.o
*.ko
*.obj
*.elf

# Linker output
*.ilk
*.map
*.exp

# Libraries
*.lib
*.a
*.la
*.lo

# Shared objects
*.dll
*.so
*.so.*
*.dylib

# Executables
*.exe
*.out
*.app
*.i*86
*.x86_64
*.hex
*.bin

# Debug files
*.dSYM/
*.su
*.idb
*.pdb
```