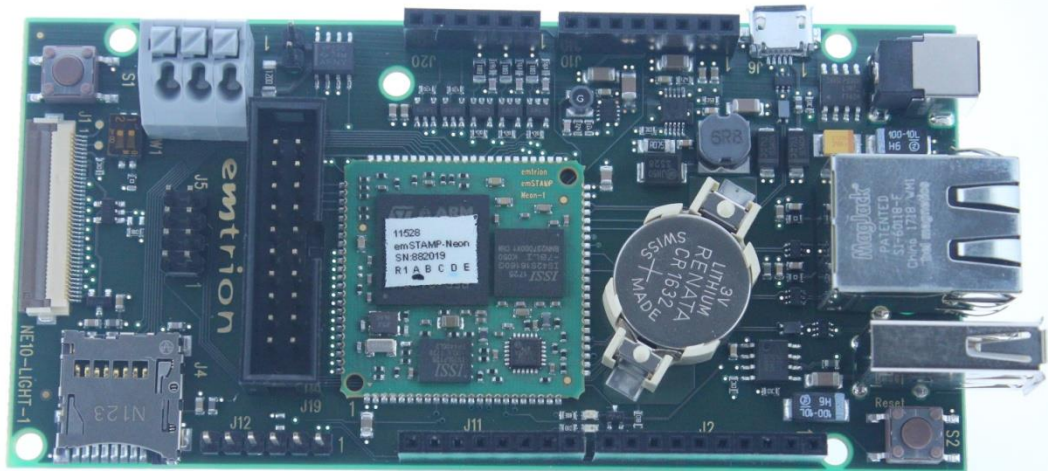


emSTAMP Neon Developer Kit

Software Manual

Rev03 / 13.05.2020



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Revision: **03 / 13.05.2020**

Rev	Date/Signature	Changes
1	01.08.2018/Ha	Initial release
2	23.03.2020/Ha	Change for CM769+ STM32CubeIDE
3	13.05.2020/Ha	Add Link for the IOC file

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2 Introduction

Welcome to emSTAMP-Neon documentation. This manual will give you a startup software guideline of our developer kit. It will describe how to use the different free software to program your developer kit.

It is assumed that users of emtrion developer kits are already familiar with software development. Programming knowledge are out of the scope of this document. emtrion will gladly assist you in acquiring this knowledge. If you are interested in training courses or getting support, please contact the emtrion sales department.

The examples in this manual are demonstrated on specific hardware but if not mentioned otherwise they all work on all supported emtrion devices.

Please refer to the "Hardware Description" of to emSTAMP-Neon available on the emtrion support website (<http://support.emtrion.de>) for more detailed info of the capability of the product.

3 Hardware requirement

3.1 JTAG debugger/programmer

In this manual, the in-circuit debugger/programmer used is the ST-LINK/V2 (<https://www.st.com/en/development-tools/st-link-v2.html>).

4 Workstation Software installation

Before starting you need to prepare your workstation. In order to build an image that runs on the target, you need to install the following set of free software available online on the ST microelectronics, the microcontroller manufacturer (www.st.com).

4.1 STM32CubeMX initialization code generator

STM32CubeMX is a graphical tool that allows a very easy configuration of STM32 microcontrollers and the generation of the corresponding initialization C code through a step-by-step process. (<https://www.st.com/en/development-tools/stm32cubemx.html>)

Note: STM32CubeMX is a stand alone application but it is also part of the STM32CubeIDE (see below)

4.2 STM32 ST-LINK utility

STM32 ST-LINK Utility is a full-featured software interface for programming STM32 microcontrollers (<https://www.st.com/en/development-tools/stsw-link004.html>)

The tool offers a wide range of features to program STM32 internal memories (Flash, RAM, OTP and others), external memories, to verify the programming content (checksum, verify during and after programming, compare with file) and to automate STM32 programming. STM32 ST-LINK Utility is delivered as a graphical user interface (GUI) with a command line interface (CLI).

4.3 STM32CubeIDE for development

STM32CubeIDE is an advanced C/C++ development platform with peripheral configuration, code generation, code compilation, and debug features for STM32 microcontrollers and microprocessors. It is based on the ECLIPSE™/CDT framework and GCC toolchain for the development, and GDB for the debugging. (<https://www.st.com/en/development-tools/stm32cubeide.html>)

4.4 The IOC File

emtrion is providing a ioc file that is compliant with the developer kit and let you generate the MCU peripheral (GPIO, USART, Pin MUX ...) and the middleware (USB, TCP/IP, FreeRTOS...). The output will be a bundle of initialization file in C code and all project files that allow you to create your main project.

The Link to download the IOC file:

<https://cloud.emtrion.de/index.php/s/nuA1rFRjFY9JaCu/download>

5 Testing your in-circuit Debugger/programmer on your emStamp-Neon

It is strongly advice to test the communication between your workstation and your target using the ST-LINK utility tool before starting any debugging and/or programming with SW4STM32.

The output of a good communication should look like this:

The screenshot displays the STM32 ST-LINK Utility application window. The interface includes a menu bar (File, Edit, View, Target, ST-LINK, External Loader, Help) and a toolbar with various icons. The 'Memory display' section shows the address 0x90000000, size 0x2000, and data width 16 bits. The device information table is as follows:

Device	STM32F469x/F479x
Device ID	0x434
Revision ID	Rev A
Flash size	2MBytes

The 'Target memory' section shows a table of memory addresses and their values:

Address	0	2	4	6	8	A	C	E	ASCII
0x90000000	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000010	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000020	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000030	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000040	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000050	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000060	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000070	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000080	0000	0000	0000	0000	0000	0000	0000	0000	.....
0x90000090	0000	0000	0000	0000	0000	0000	0000	0000	.....

The status window at the bottom shows the following log output:

```

16:38:37 : ST-LINK SN : 31FF6F064D4E353849390943
16:38:37 : ST-LINK Firmware version : V2J29S7
16:38:37 : Connected via JTAG.
16:38:37 : JTAG Frequency = 9 MHz.
16:38:37 : Connection mode : Connect Under Reset.
16:38:37 : Debug in Low Power mode enabled.
16:38:38 : Device ID:0x434
16:38:38 : Device flash Size : 2MBytes
16:38:38 : Device family :STM32F469x/F479x
  
```

At the bottom of the window, there are three status indicators: 'Debug in Low Power mode enabled.', 'Device ID:0x434', and 'Core State : Live Update Disabled'.

6 Working with STM32CubeIDE to develop your application

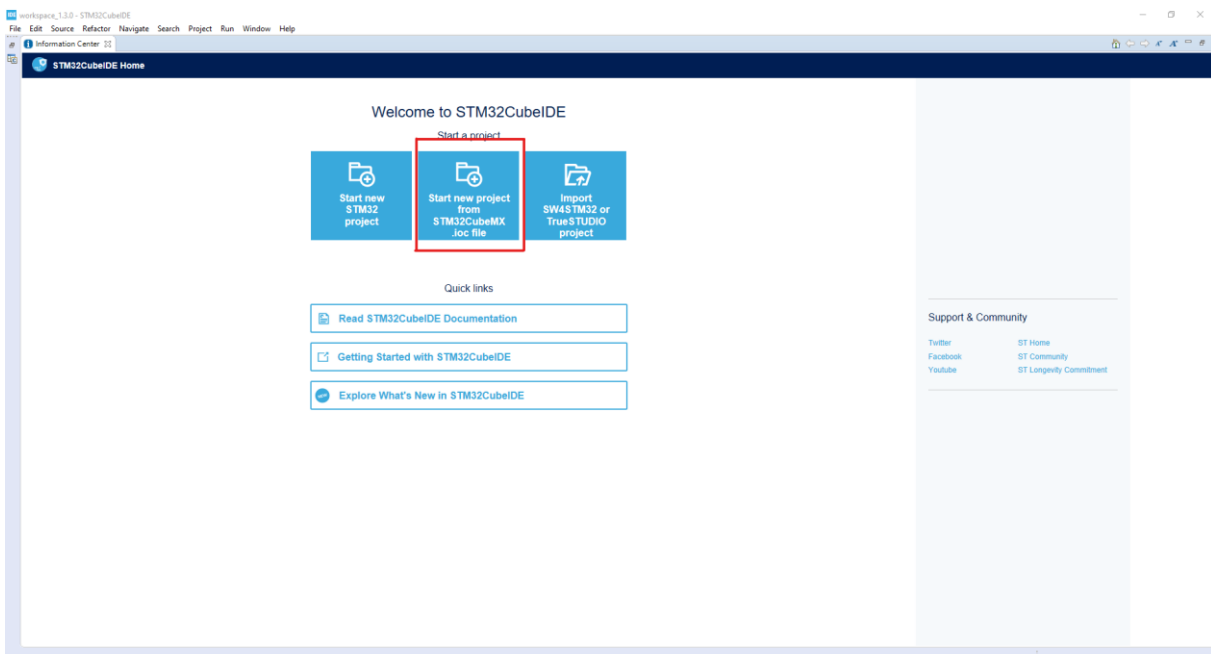
Emtrion is providing the configuration file that gives you the possibility to load the entire pin muxing, clock configuration and middleware of the MCU STM32F769NIHx used in the emStamp-Neon. To proceed to the generation, load the project file called *emSBC-Neon-2-CM769-Pinmux-V01-Release-emSTAMP-Neon-edi6511-v01en.ioc*

NOTE: This tutorial is written for the CM479 version. Apply the same but with "769" instead of "479"

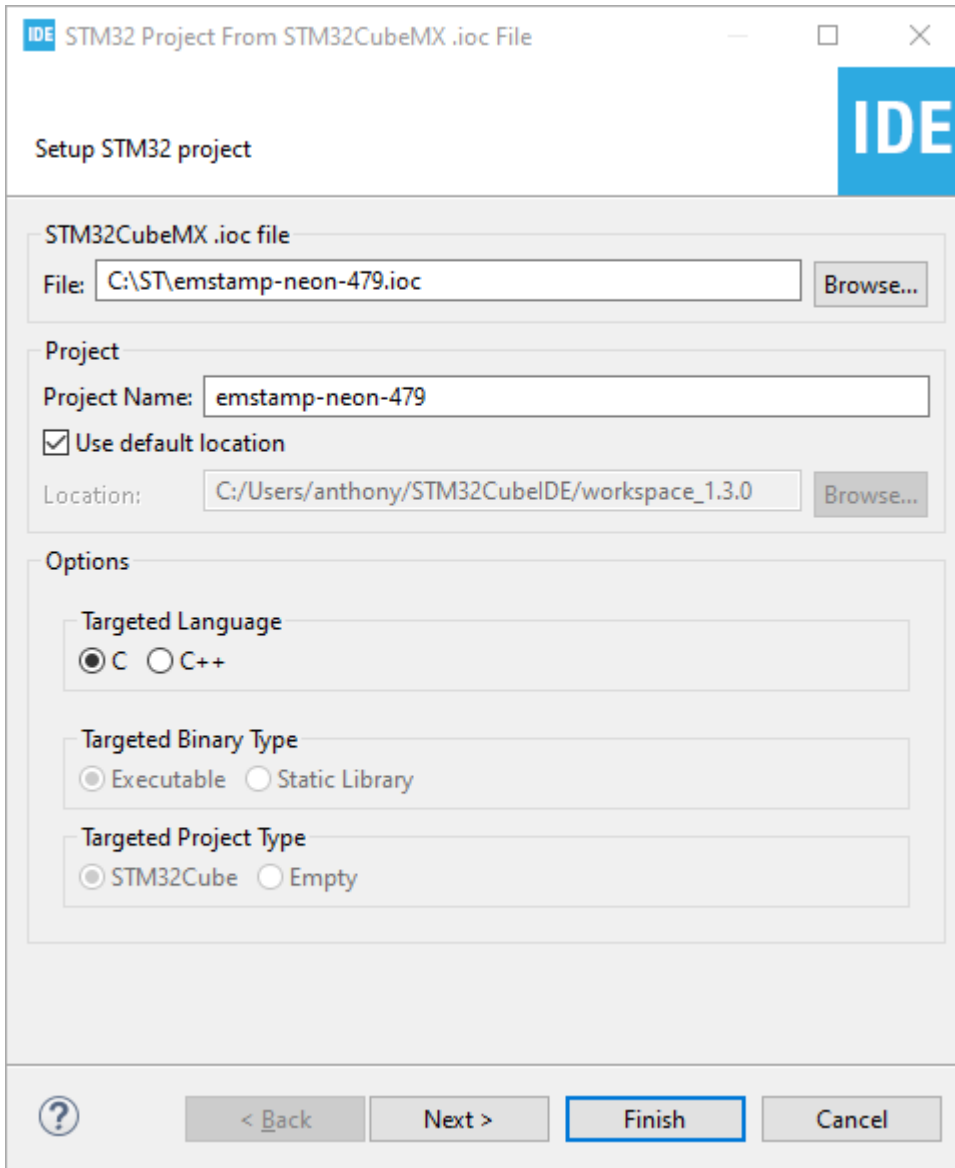
To import a project, open STM32CubeIDE:



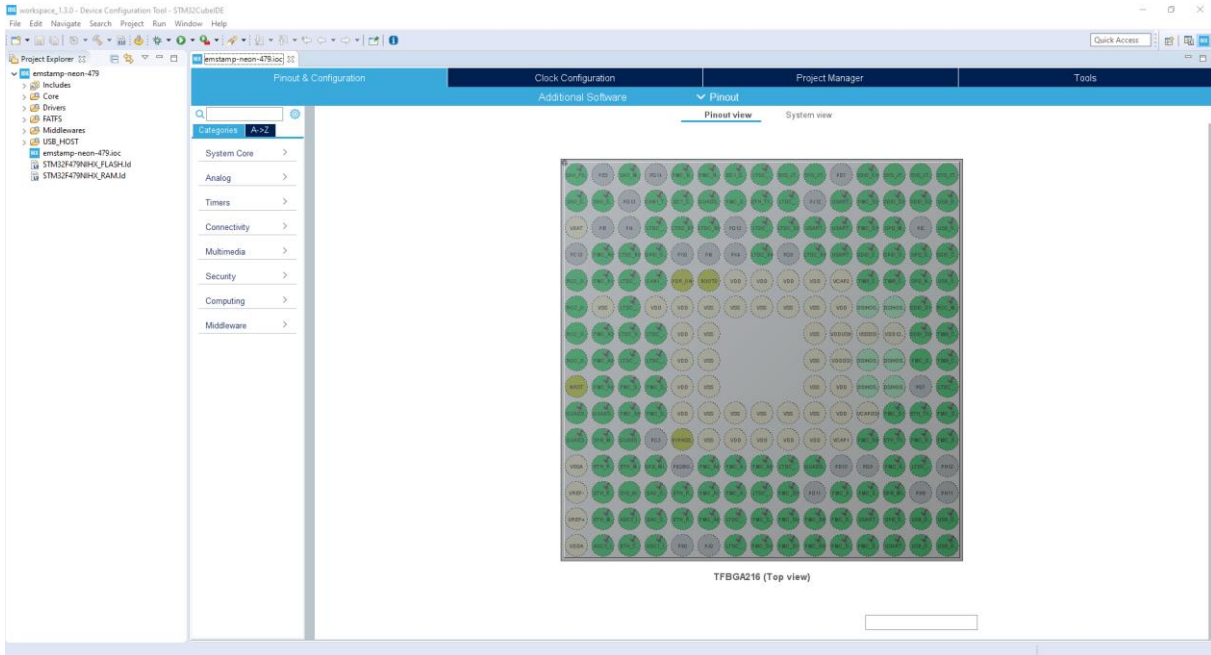
Then click on the following icon:



And select the provided ioc file. Then click on finish and wait for the files generations to finish.

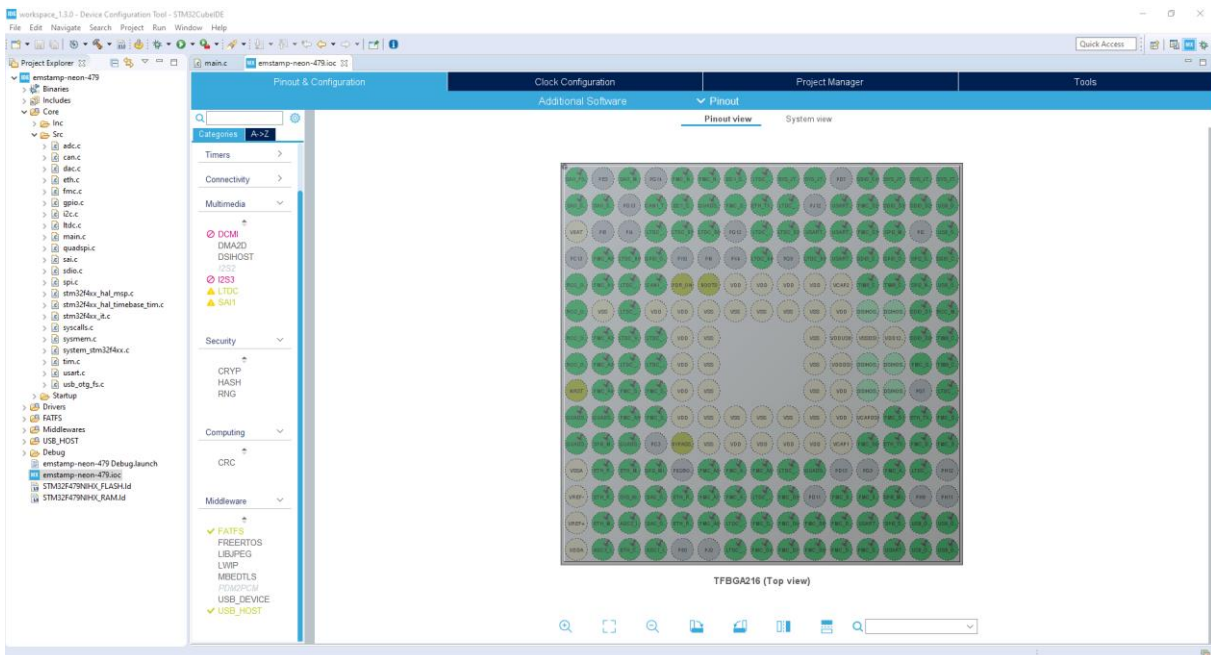


Once imported you should see the IDE like this:

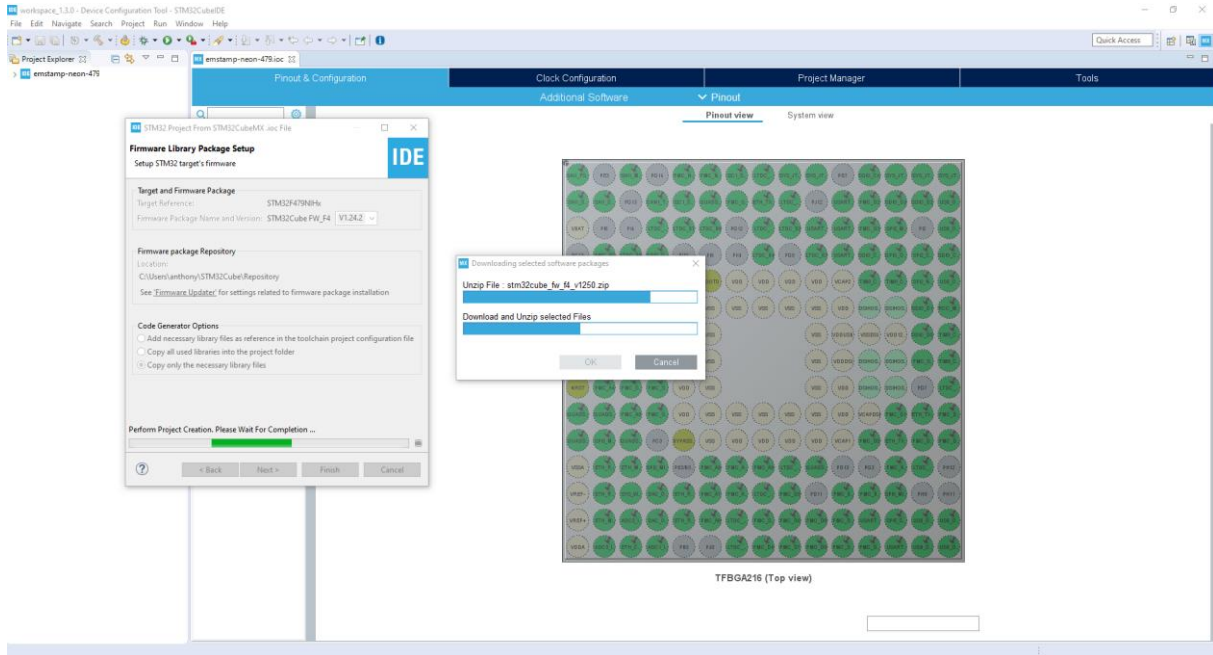


From here you can modify the source code and/or the configuration of the microcontroller. Using the integrated STM32CubeMX, you can modify and regenerate the configuration like this:

Double click on the ioc file:

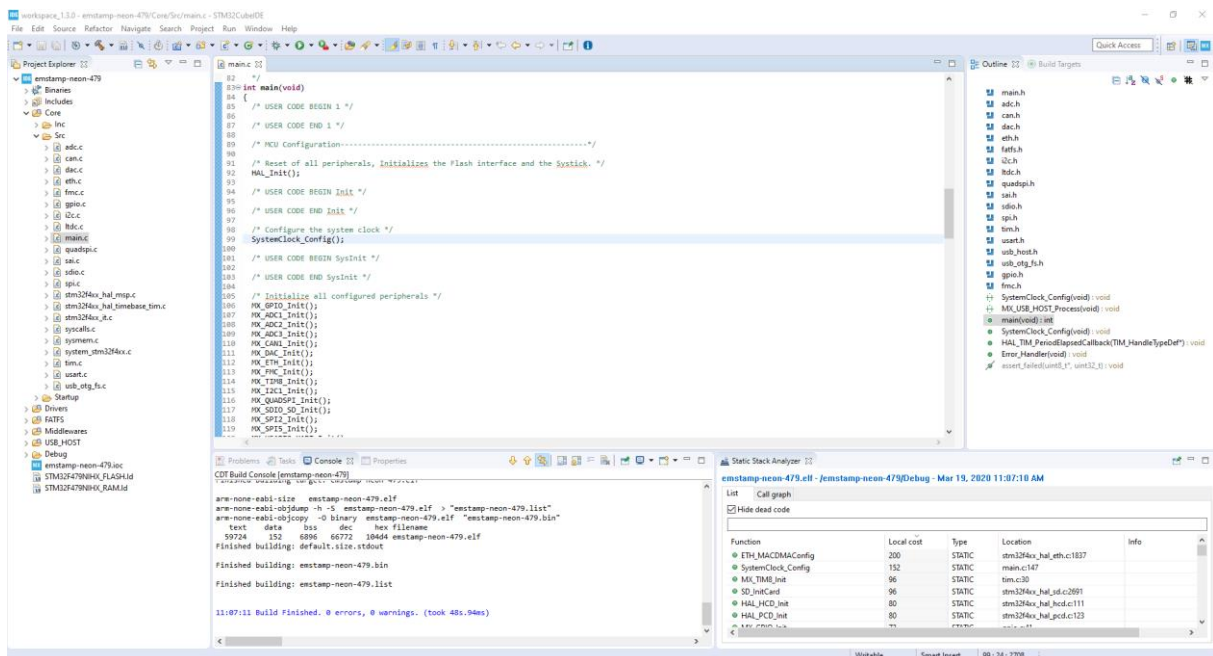


Then modify and regenerate:



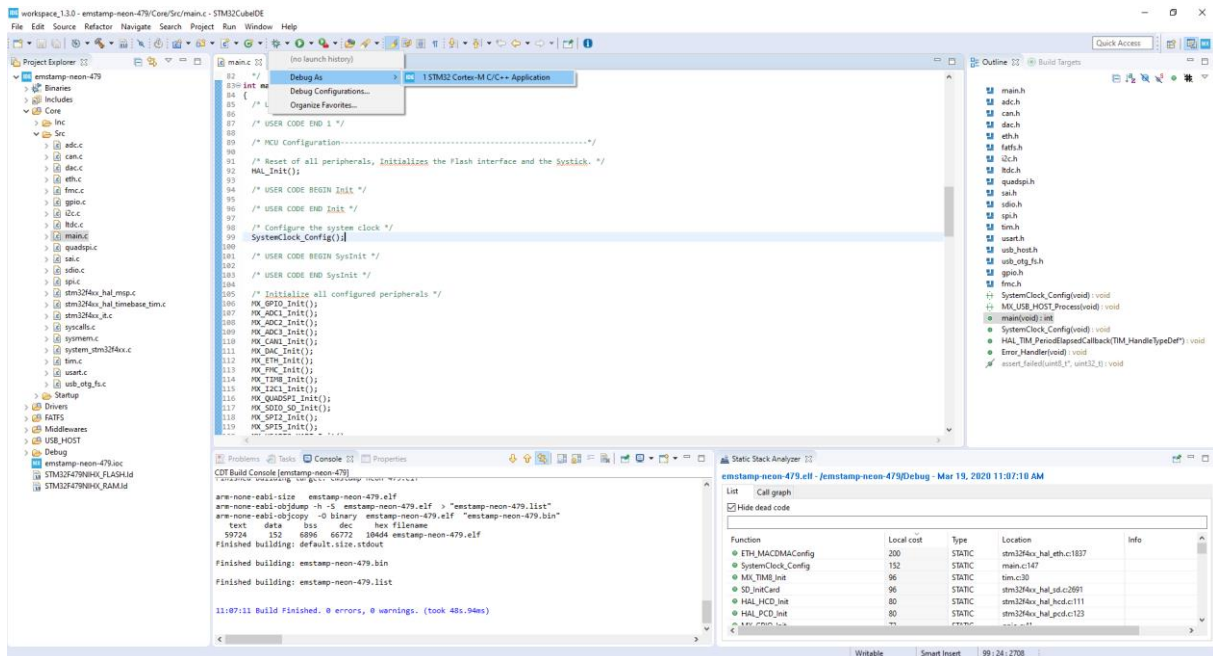
Note: This might take a long time if you haven't already downloaded the firmware package. The IDE do it itself.

Let's compile the project by click on the hammer icon, select Debug:

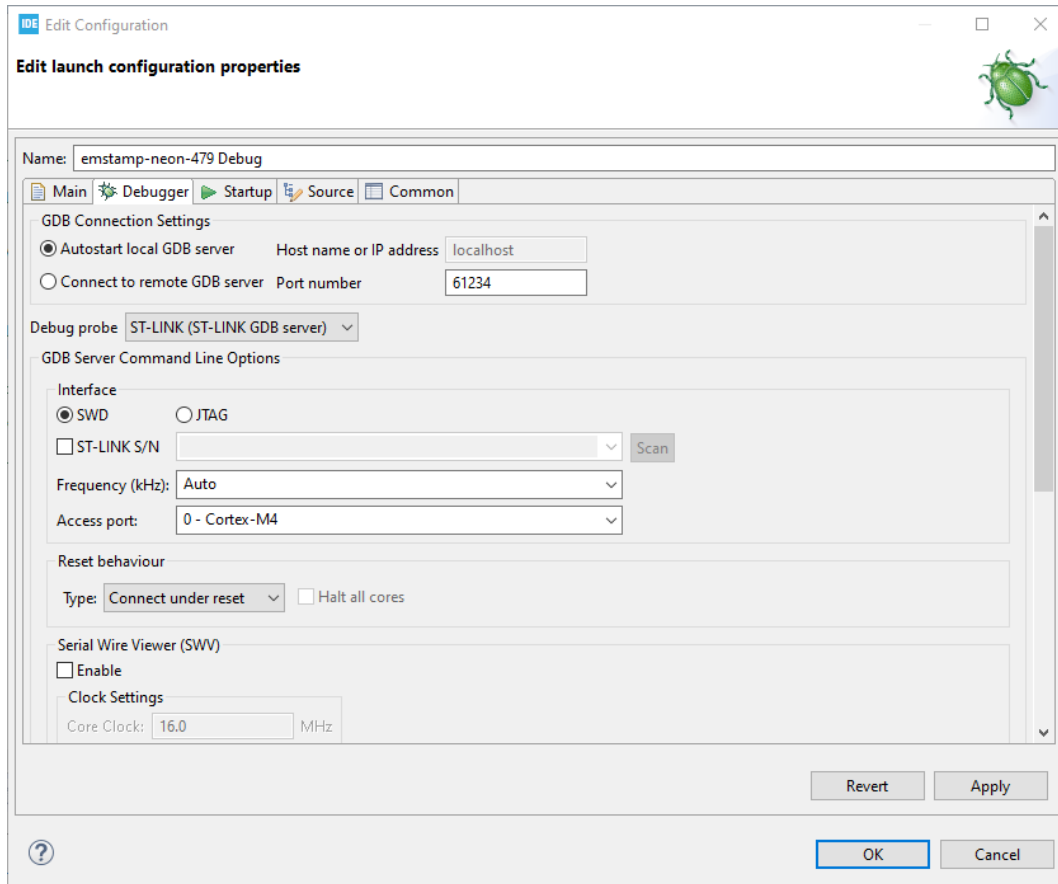


You are now ready to debug your application.

Make sure your target is power up and that the ST-LINK is connected properly and hit the bug icon to debug your project.



Choose the following configuration:



Once done you should get the IDE ready to debug the code on the target like this:

