



# SR5x StellarStudio Pinmap Configurator

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## SR5x StellarStudio Pinmap Configurator User Guide

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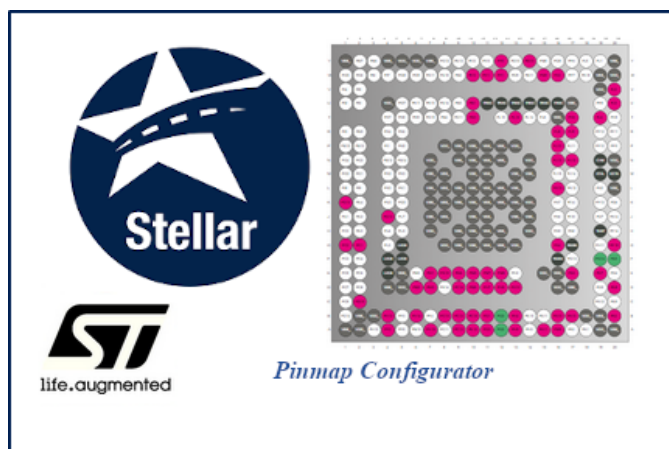
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# 1 Introduction

Figure 1: StellarStudio Pinmap configurator - Copyright STMicroelectronics (c) 2021-2025



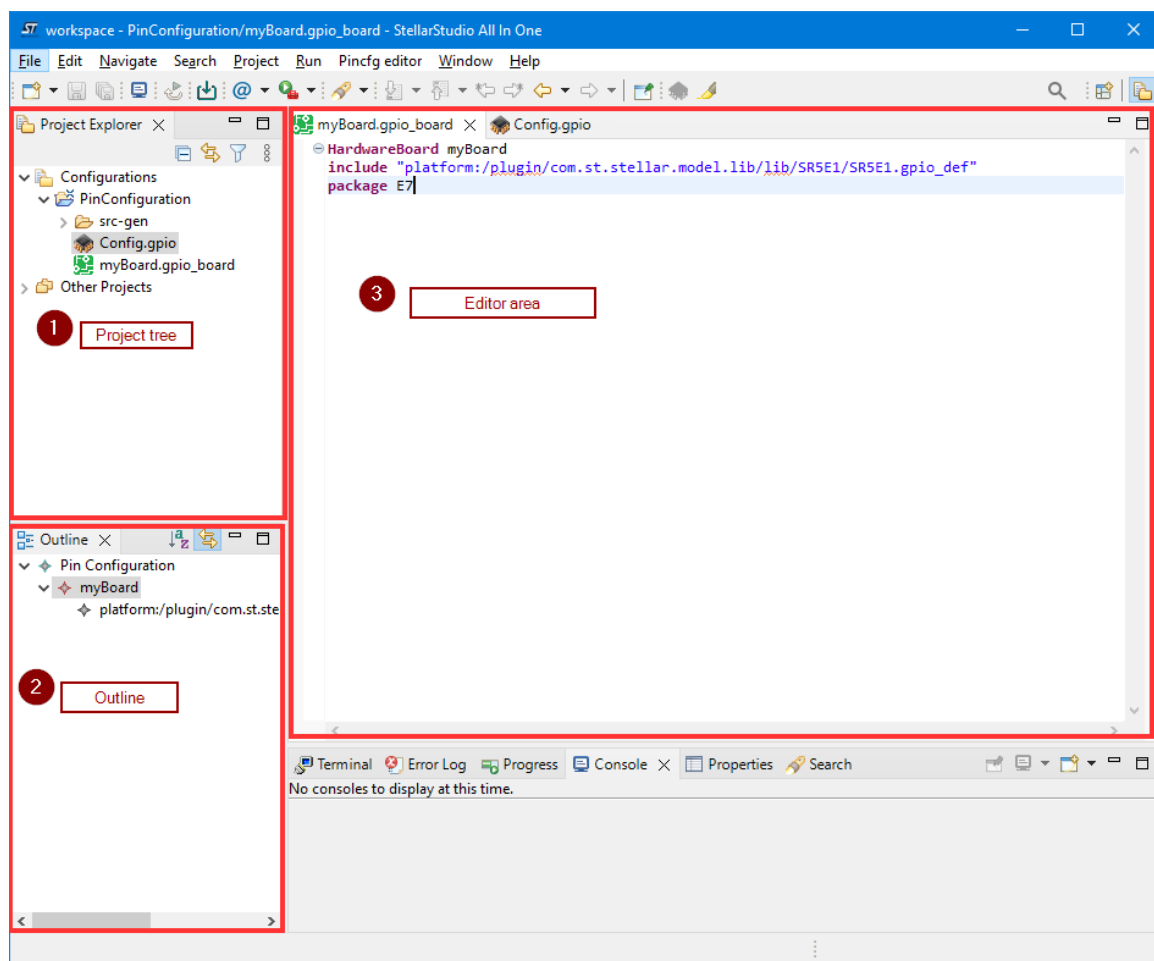
The Pinmap configurator is an intuitive end user graphical assistant dedicated to configure the pinmap of Stellar products.

The configuration is done using a textual edition of the peripherals. For each peripheral, you need to set the associated registers.

An application's pins configuration is based on a board on which the application is supposed to be executed. There is a need to describe the pinmap configuration for this board before being able to add pin configurations dedicated to the application itself.

There are some predefined boards (included inside StellarStudio) that you can start from. Whenever a predefined board needs some modifications, you can import this board into your project's workspace. You can even start from scratch, creating a new board predefined pin configuration from a blank board.

Figure 2: Pinmap configuration tool



When a configuration is created, the tool looks like in the above picture, where three main areas are present.

1. Project tree: contains the various projects of the workspace and their corresponding files.
2. The outline will show the hierarchical structure of the *gpio* file shown in the editor area.
3. Editor area: contains the editing part of the tool, where configurations are manipulated, and where generated C, xls and html files can be seen.

## 2 Creation of pins configuration

As described earlier there are two types of pin configuration : board configuration (identified with the extension *.gpio\_board*) and application configuration (identified with the extension *.gpio*).

Both configurations need to be hosted inside an Eclipse project.

Board definitions are created using a dedicated wizard page, accessible using the File/New menu.

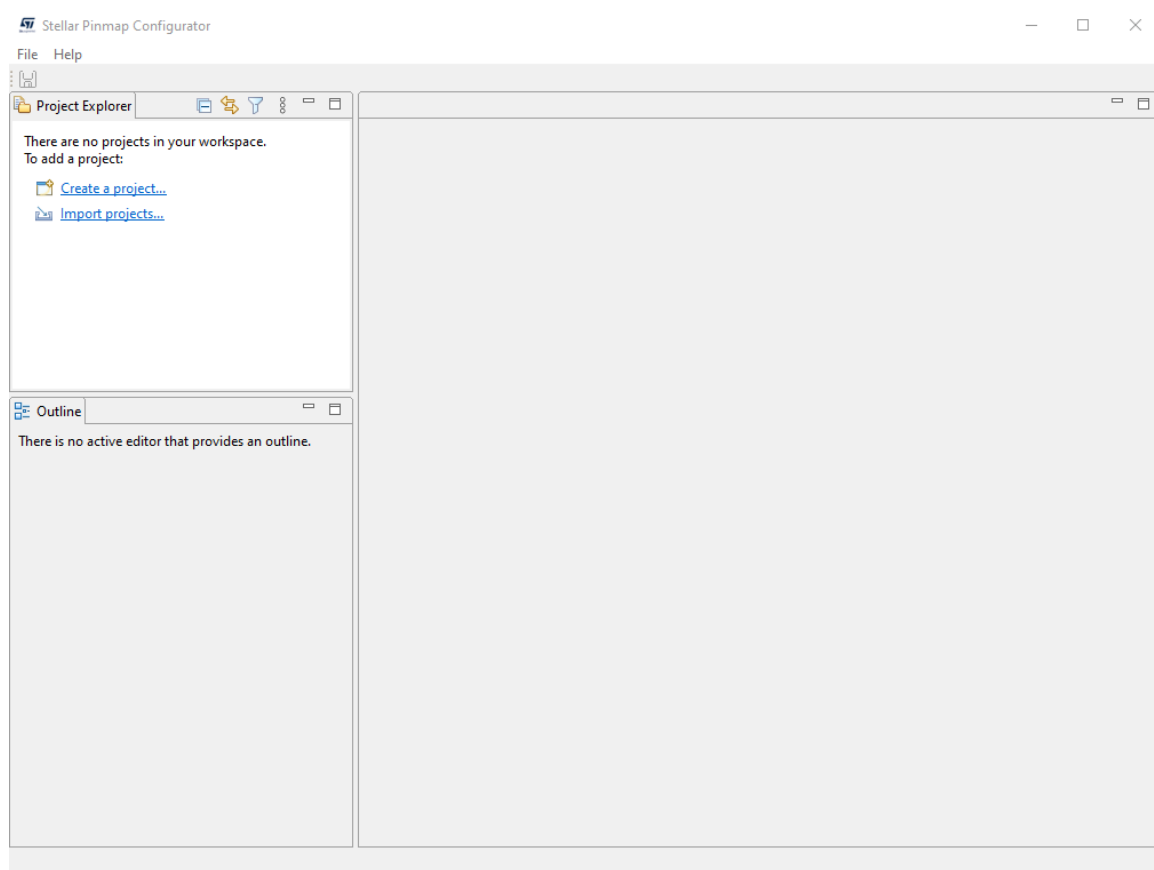
Application configurations are also created using another dedicated wizard page, accessible using the File/New menu as well.

The following sections describe how to create a project and how to create a configuration (either board or application configuration).

### 2.1 Create a project if needed

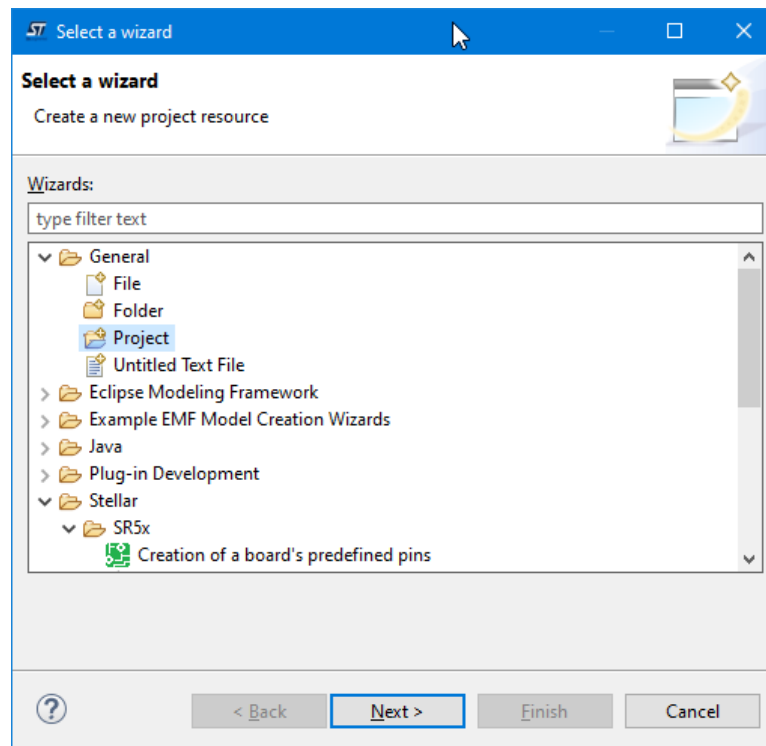
The pin configuration is hosted in a file, that needs a project as container.

**Figure 3: Create a project from an empty project**



If you do not have yet a project, you might use the project creation wizard, using the <CTRL>+N shortcut.

Figure 4: Select Project creation wizard



Then click "Next" and then enter the name you want to give to your project, then click "Finish":



Figure 5: Name the project

**Project**  
Create a new project resource.

Project name:

☒ Use default location

Location:

**Working sets**

☐ Add project to working sets

Working sets:

## 2.2 Create board configuration

A configuration is based on a board, which contains predefined pins. You can decide to start using a predefined board, or create your own board.

As soon as you have a project you can create a configuration inside.

This is done using the same key combination: <CTRL>+N, then select the pinmap configurator creation wizard.

You'll have to choose the wizard named "Creation of a board's predefined pins" in order to create your own board pins definitions. You will be asked to enter a file name (with extension set to `.gpio_board`), then you'll need to choose a MCU pinmap model and a package.

Figure 6: Launch pinmap board configurator wizard

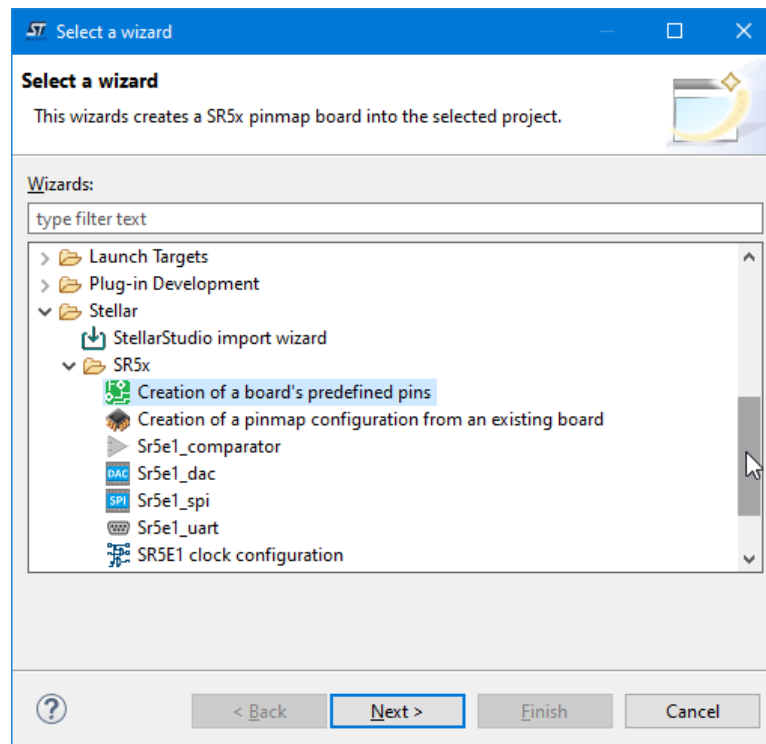
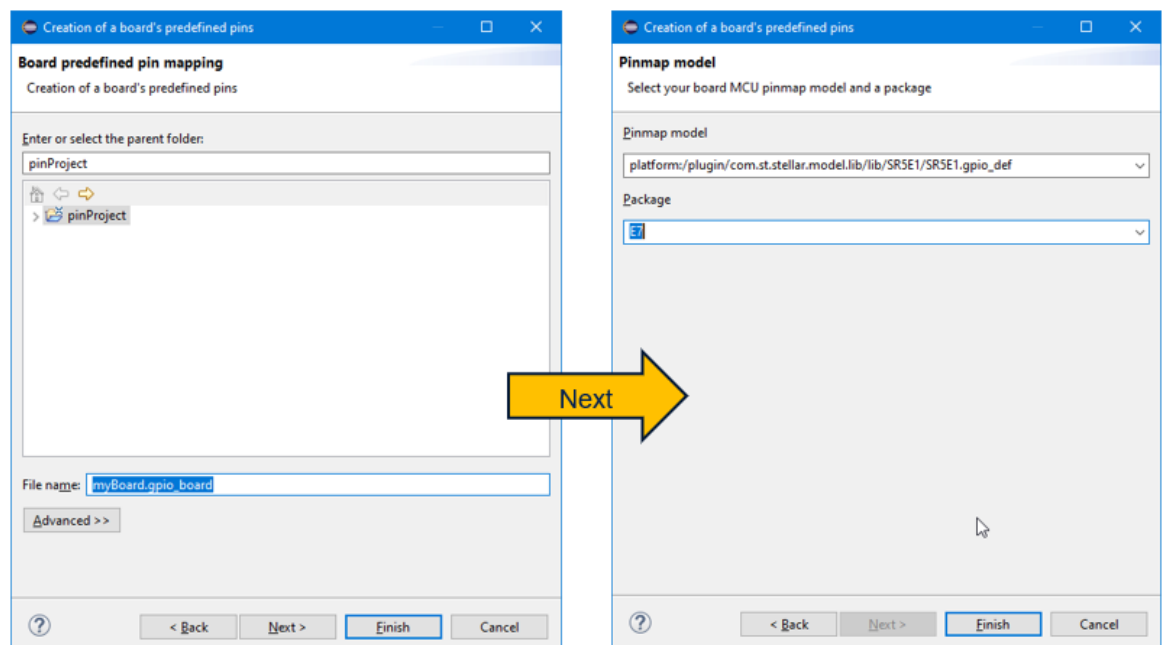
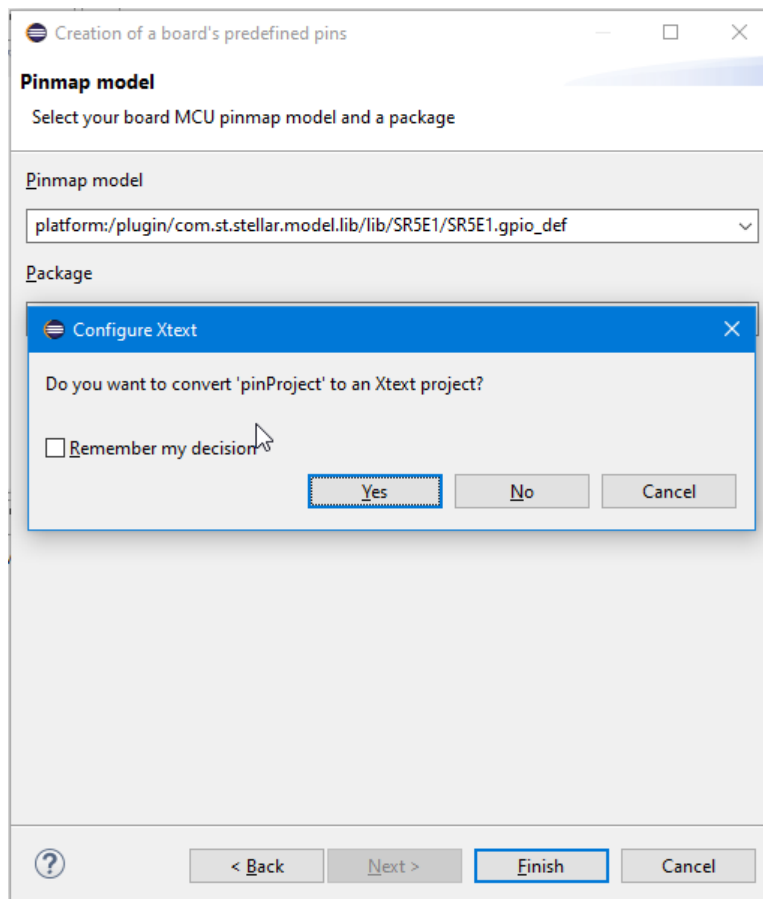


Figure 7: Choose predefined board



Give it a name, then click on "Next".

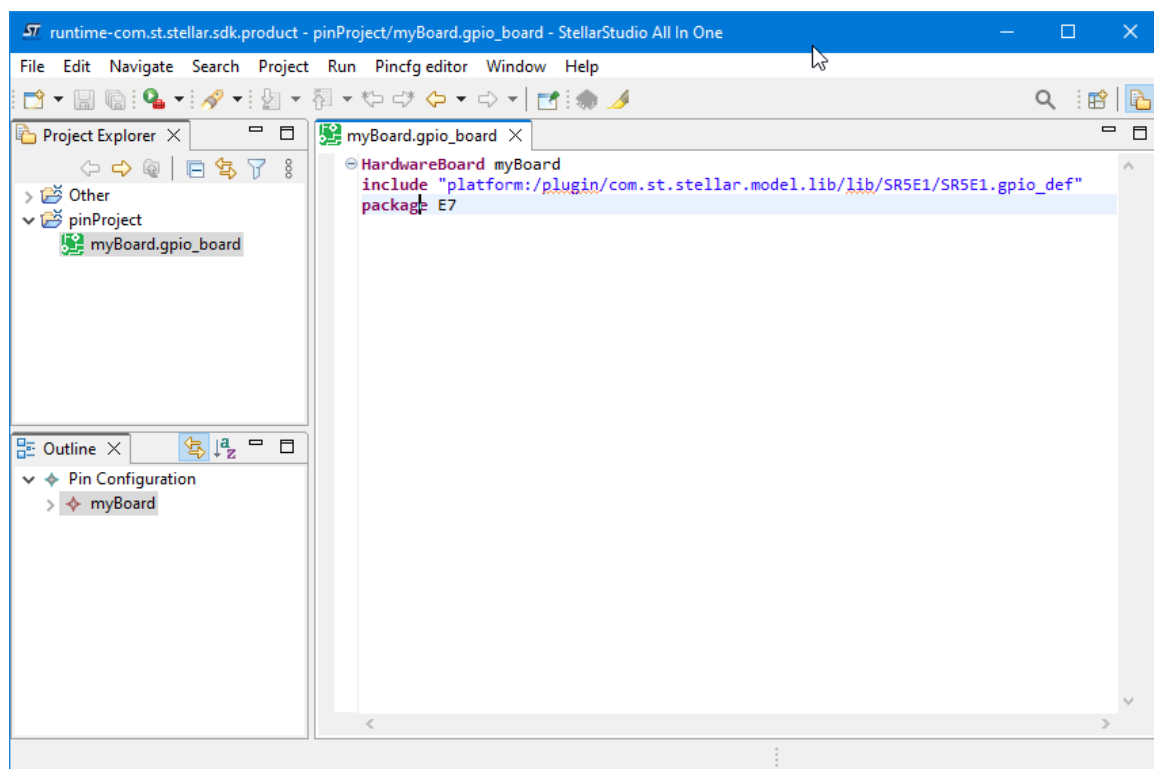
Then choose the pinmap model and the package. The pinmap model is provided by the StellarStudio team and contains the needed pinmap definitions that will be used for a particular Stellar platform. This model contains some package definitions. You must choose one of them to start your configuration.



Now click on "Finish", one dialog window should appear, asking you to convert your project into a Xtext project. Select Yes.

This step is mandatory, as the configuration is based on the Xtext technology, declaring the project as an Xtext project. It allows for launching the appropriate editor when double-clicking on the configuration.

Now your project is ready and open in the editor area.



Please note that the file name must have the extension ".gpio\_board". This file would be part of the available boards you can choose from when creating your pinmap configuration.

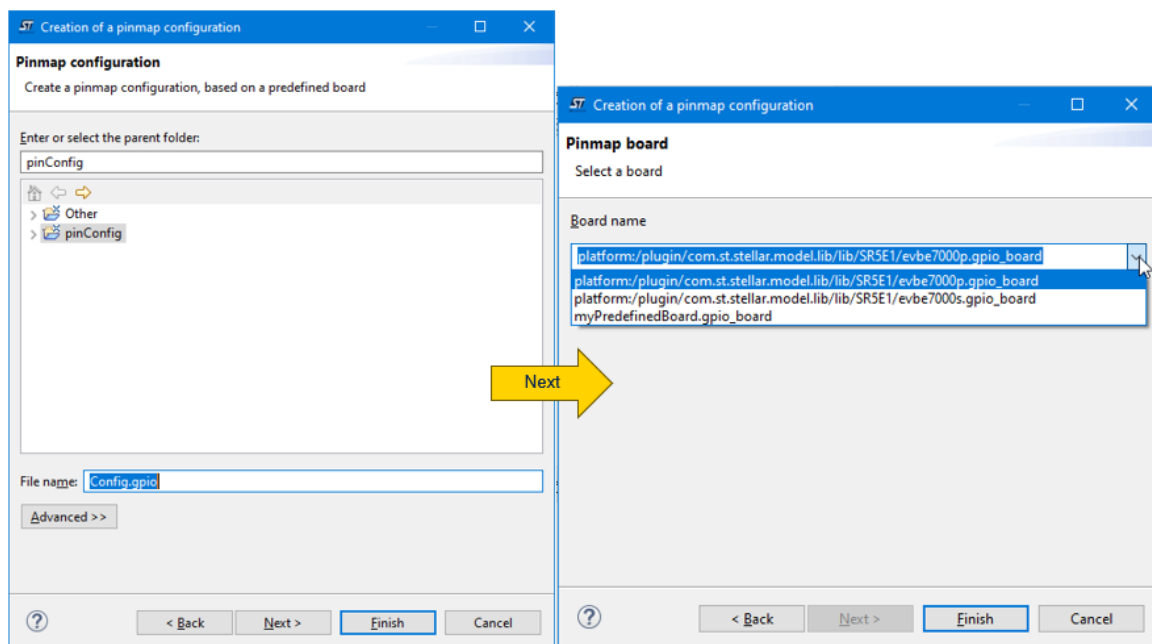
Now you can start adding pin configurations to your board.

## 2.3 Create application configuration

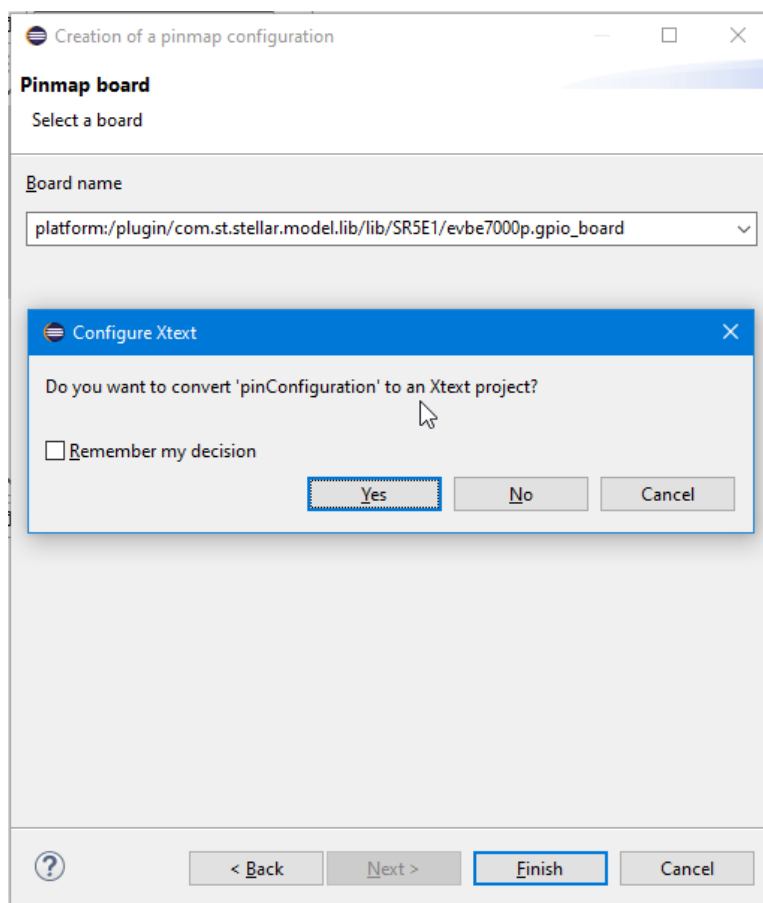
Application pin configuration are based on the pins already predefined inside a board configuration.

Using the <CTRL>+N, or the File/New menu option, you'll be able to access the "Creation of a pinmap configuration from an existing board" wizard. You will be asked to enter a file name (with extension set to .gpio), then choose the board you want to use, from the list of predefined boards.

Figure 8: Start a configuration from a board

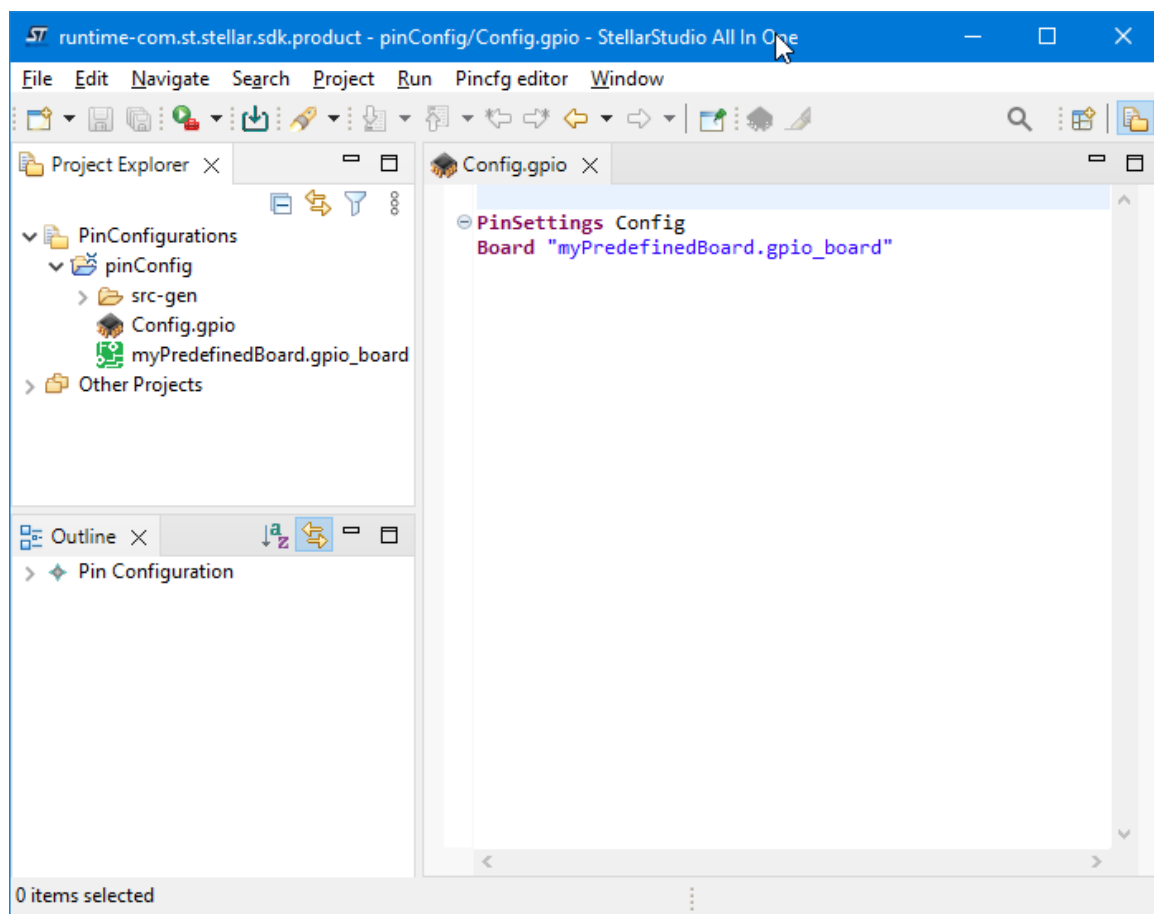


Choose the board to start from. Again if the project has not yet been converted to Xtext you must do it. This step is mandatory, as the configuration is based on the Xtext technology, declaring the project as an Xtext project. It allows for launching the appropriate editor when double-clicking on the configuration.



Now your project is ready and open in the editor area of the tool.

Here is the content of the pin configuration, whenever you've chosen the *myPredefinedBoard.gpio\_board* file in list of available boards in the previous step.



Now you can start adding pin configurations to your application.

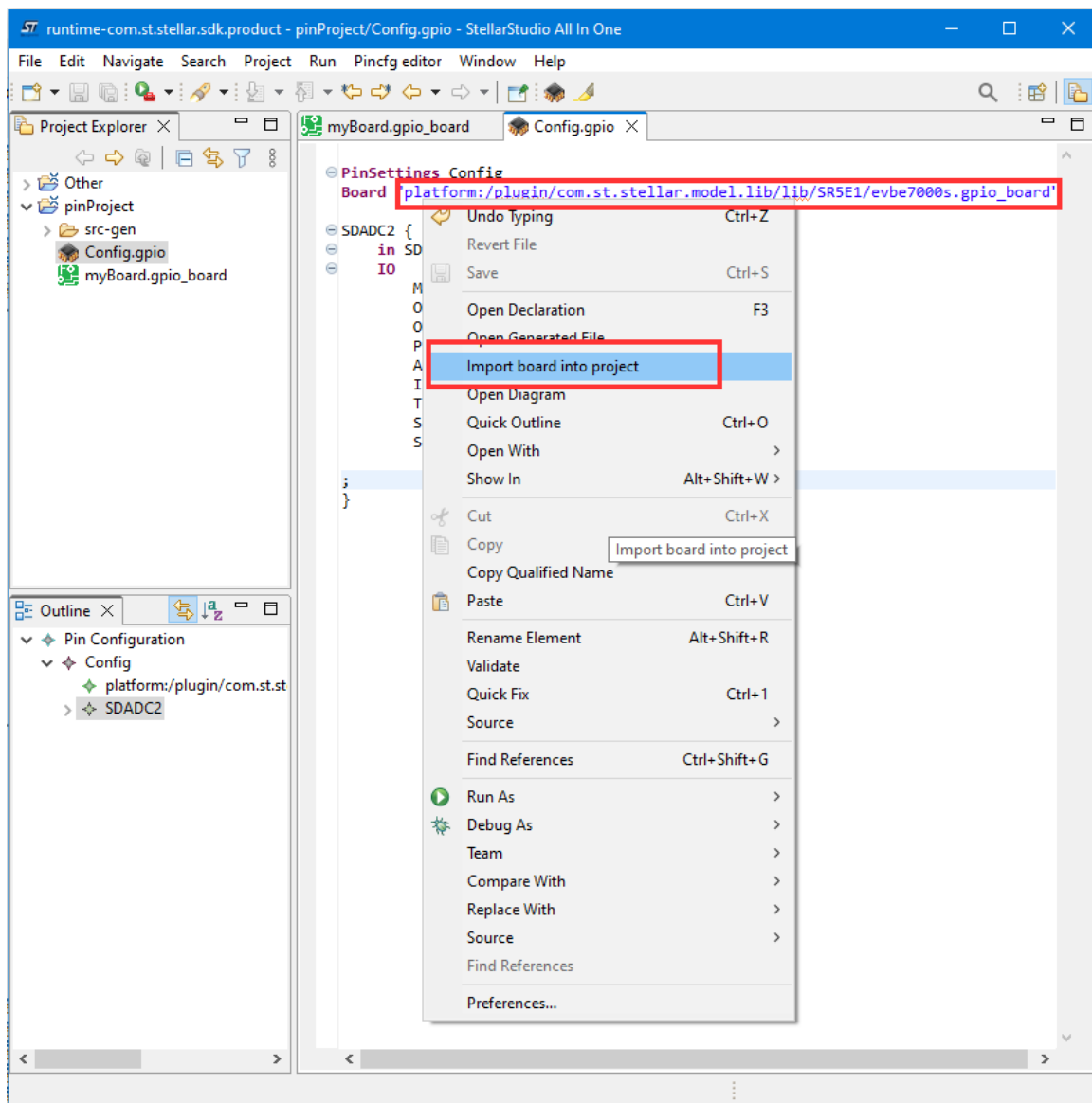
## 2.4 Modifying a board's predefined pins

The previous section allows you to start a pin configuration from a predefined board. A predefined board, as provided to you by the StellarStudio team, allows to use predefined pins, but contains pin configurations that you cannot modify. Whenever you need to modify or adapt a pin already configured you need to change the predefined definition.

This section describes you how to copy a board definition to your current project.

From an open configuration, you can right click on the editor text and choose the "Import board into project" menu option.

Figure 9: Copy to current project

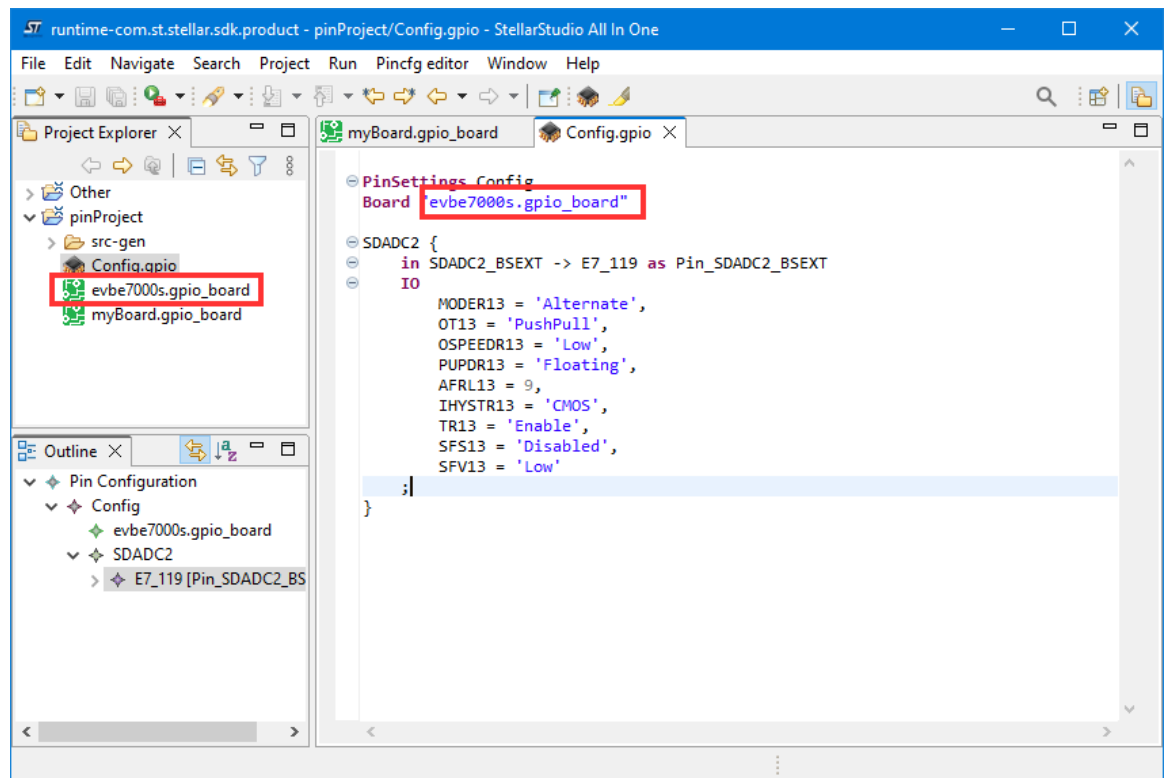


Please note that this option would be disabled (grayed out) if the included board is already included into your project.

The tool will propose you to copy the file locally to your project (with a dedicated file dialog) and will modify the configuration to import the board from the new chosen location, as in the below example (please note the change in the board imported board path).



Figure 10: Changed imported board path



## 3 Manipulation of a pinmap configuration

The following section describes how to manipulate a pinmap configuration.

### 3.1 Magic key

As pinmap configuration manipulation is done using a textual file, the tool provides a so called "*magic key*" used to provide contextual help to the user, depending on the context (i.e. the location of the textual cursor inside the editor).

There are two key combinations available, which offer the same content assist function.

- <CTRL><Space bar>
- <CTRL><TAB>

In the following sections, the



Will be used to remind you to use the *magic key* combination

### 3.2 Manipulation of the configuration

The pin settings needs a name, a pinmap model and an associated package.

The "PinSettings" keyword precedes the name to be given to the configuration.

The "include" keyword introduces the URI to the pinmap model... This file is provided by the "StellarStudio" team.

Now you can edit the file, add the peripherals and their corresponding configurations.



**Hint: remember that at any time you can use the *magic key* combination so that the editor will help you with a contextual content assist helper menu.**

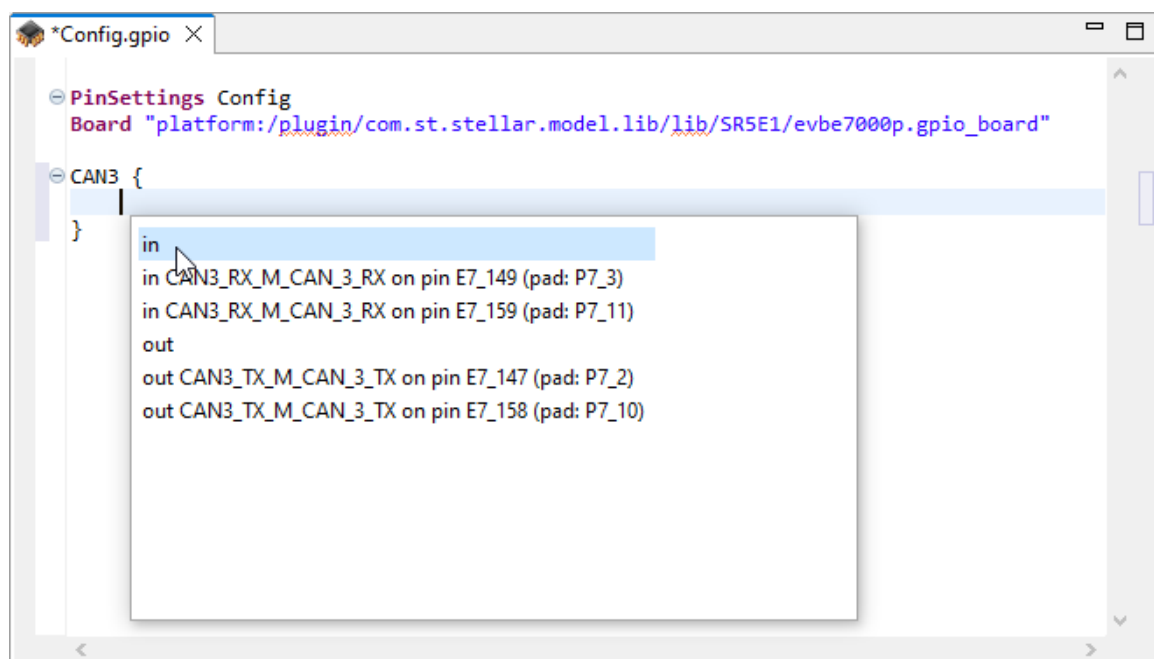
Figure 11: Choose a peripheral



add an opening bracket,

Now choose a pin to configure,

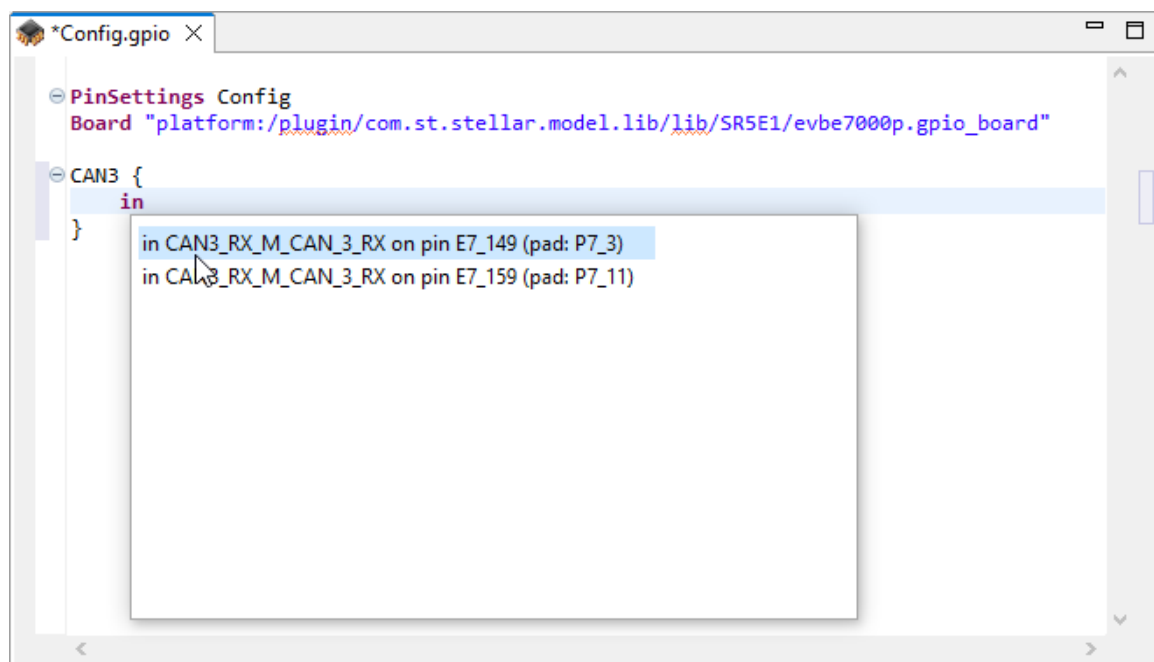
Figure 12: Choose a direction, ...





*magic key* again

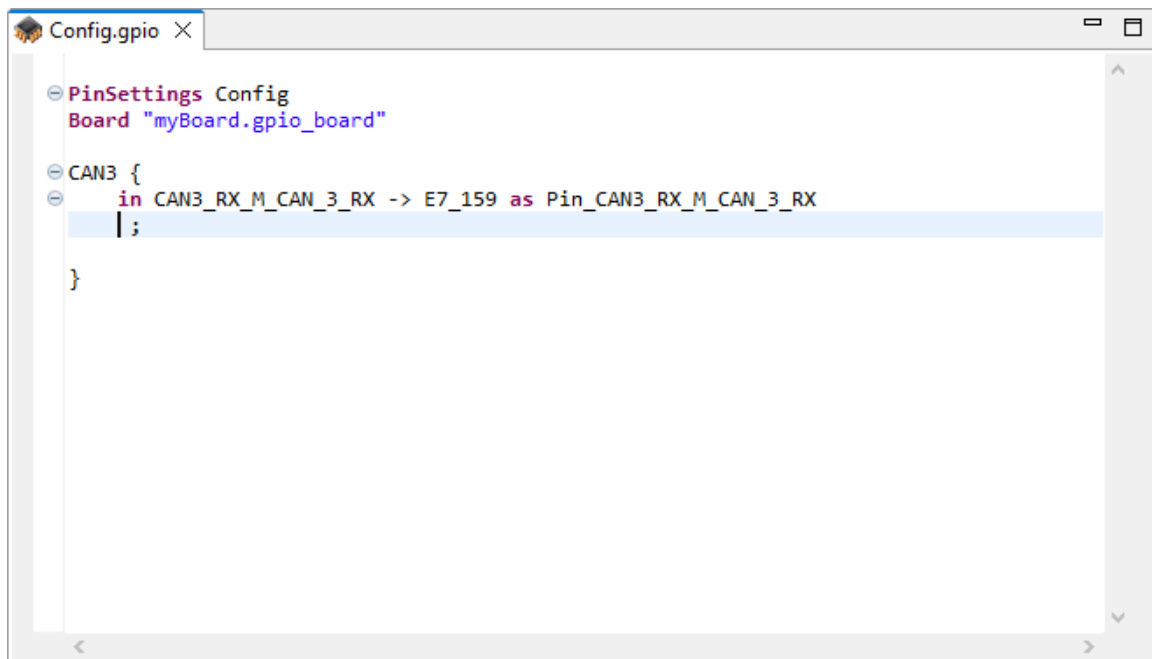
Figure 13: ... then a function associated to a pin



The pin is assigned a default name, that the user can change (the keyword introducing the pin name is 'as'. By default the pin name is named after the associated function, with the 'Pin\_' prefix.

The syntax here says that the input function *CAN3\_RX\_M\_CAN\_3\_RX* is assigned to the pin *E7\_159* and is named *Pin\_CAN3\_RX\_M\_CAN\_3\_RX*.

Figure 14: Pin is chosen

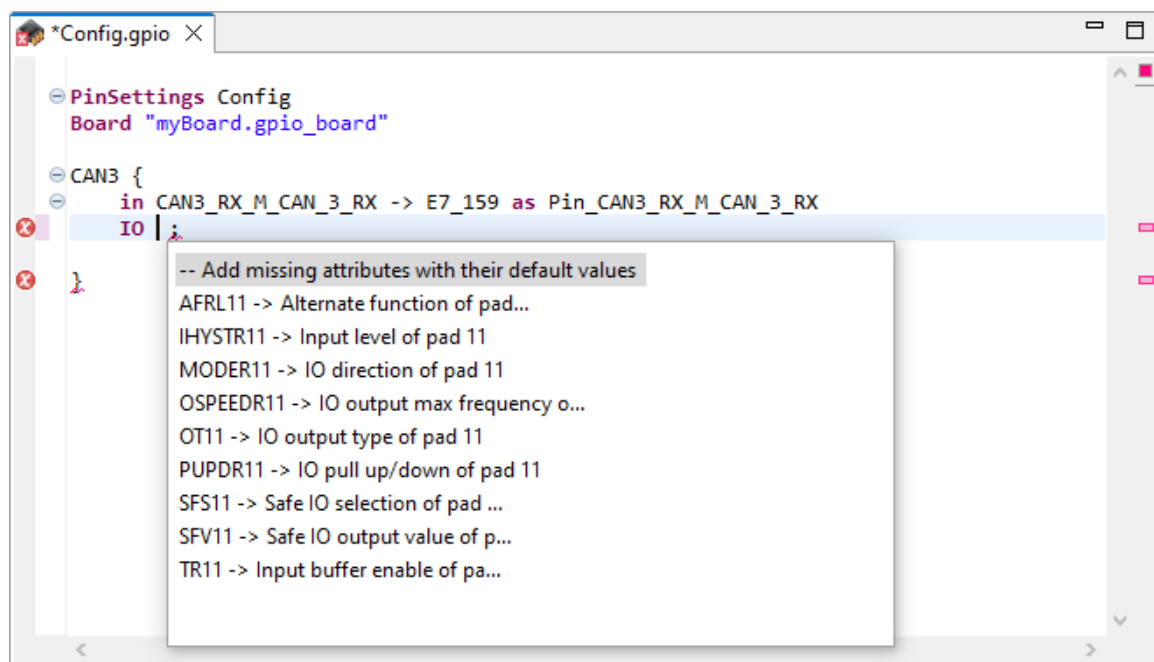


Now you must add IO settings (registers configuration for the created pin). You need to add the 'IO' keyword, then use <CTRL><Space bar> again to add registers values for your pin configuration.



*magic key* again

Figure 15: Add registers bitfields

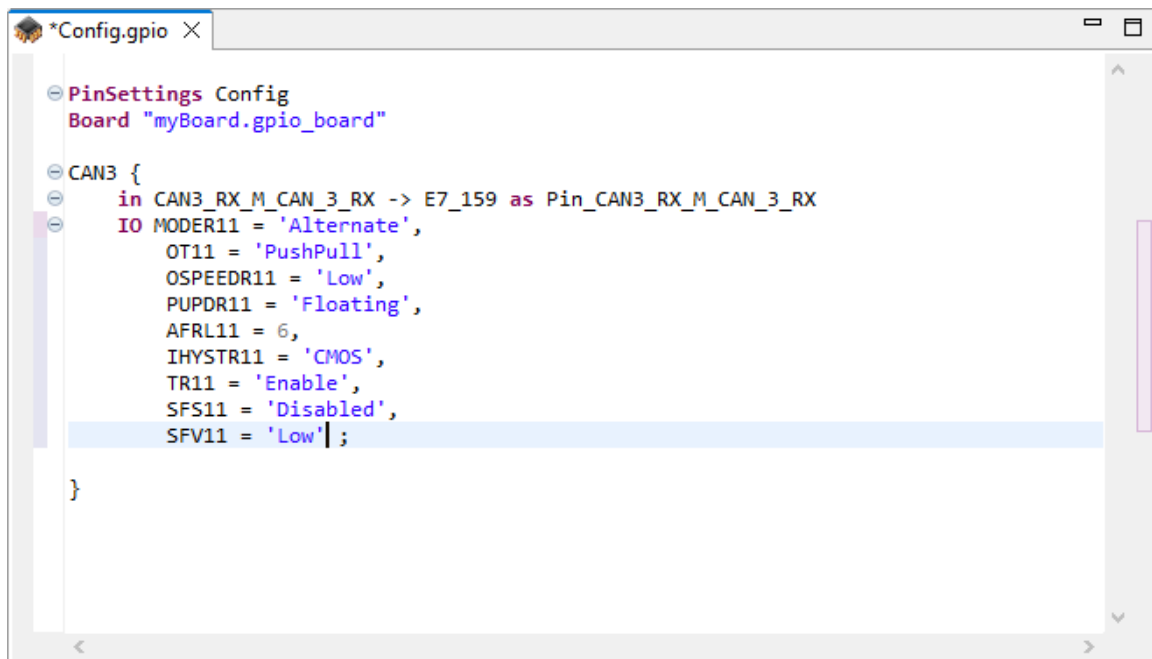


You can assign either all default bit fields, choosing the first option in the menu *add missing attributes with their default values* or add individual bit fields at a time.

Please refer to the appropriate MCU reference manual whenever you need some details on the bit fields possible configurations.

For the chosen register, you need to assign a value. There are some bit fields for which an enumerated value is provided. In such a case, the content assist helps you once more, providing you with the different available values.

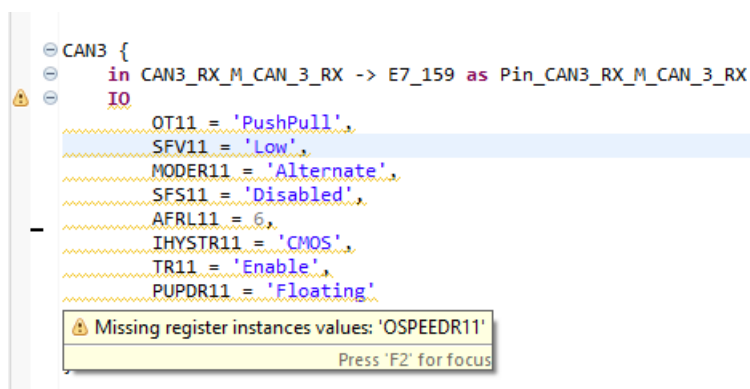
Figure 16: Resulting configuration



**Please note that** even if the configuration has been completed with default values, you can choose to change attributes' values, or remove some of them, nevertheless, missing values will be considered as warnings.

--> as long as the pin configuration does not contain the whole set of register attributes, the configuration will appear with a warning.

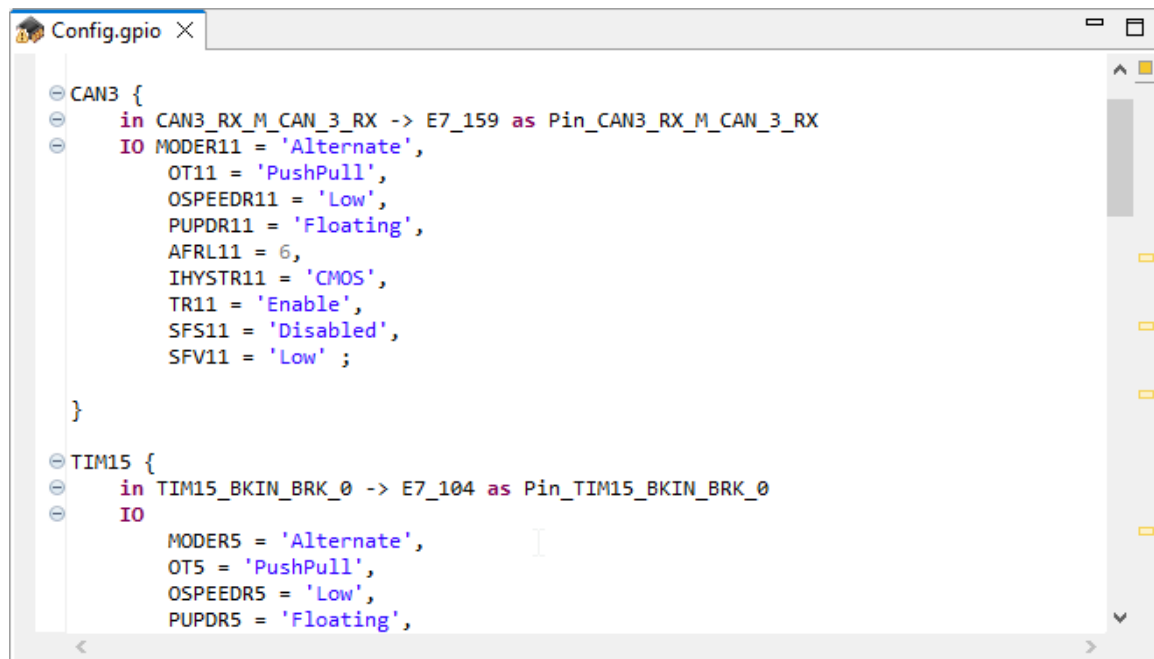
Figure 17: Warnings on incomplete pin configurations



Now, you can add some additional pins inside the peripheral by using <CTRL><Space bar>.

You can notice that functions already used by a previous configuration are not displayed in the contextual menu.

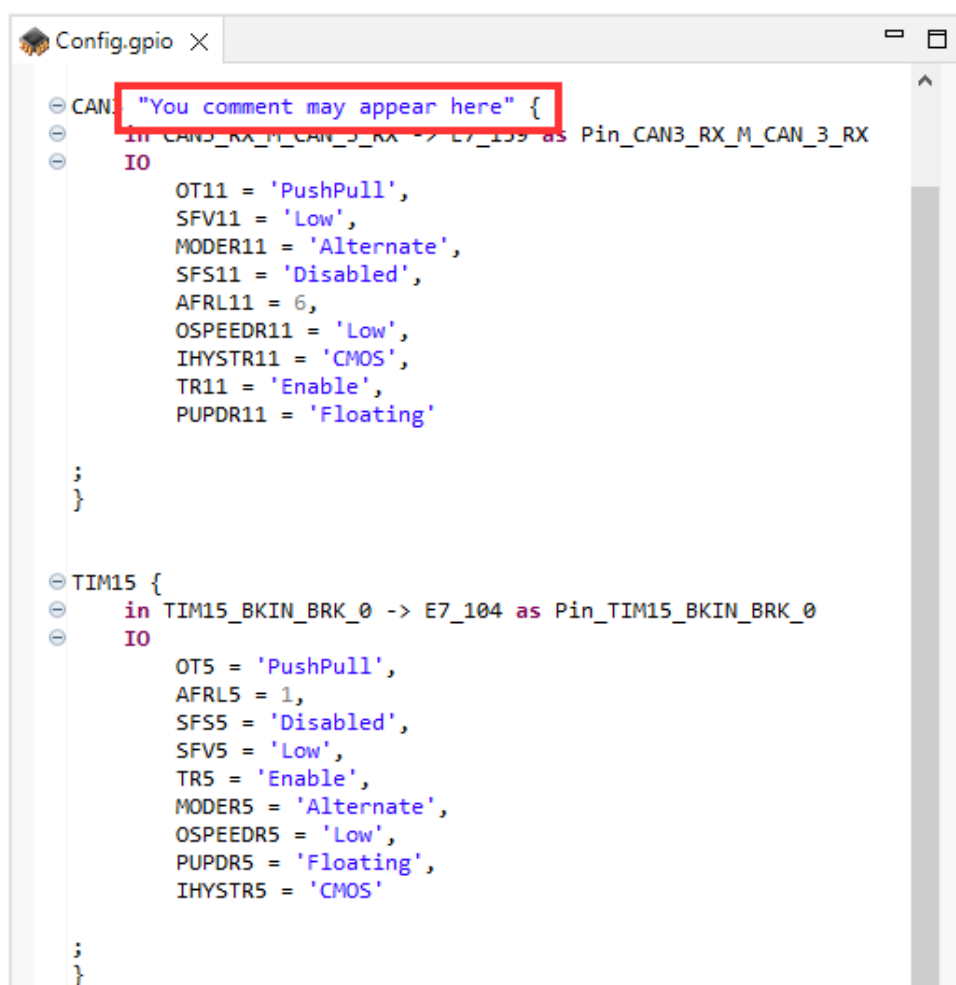
Figure 18: Add some additional pins



You can add a comment with your peripheral. You must add this comment after the peripheral name, and before the { character.



Figure 19: Add some comments



Inside the generated file, the comment will appear as below:

Figure 20: Comments are added to the generated code

```

/*=====
/* Module constants.
/*=====

#define EVBE7000P 1

/*
 * You comment may appear here
 */

#define PIN_CAN3_RX_M_CAN_3_RX gpio_iopack(GPIO_PORT_H, GPIO_PIN_11) /*
#define PIN_CAN3_RX_M_CAN_3_RX_CFG \
(GPIO_MODE_OTYPER_PUSH_PULL | \
 GPIO_MODE_SAFEVALR_LOW | \
 GPIO_MODE_MODER_ALTERNATE | \
 GPIO_MODE_SAFESELR_DISABLED | \
 GPIO_MODE_AFR(6U) | \
 GPIO_MODE_OSPEEDR_LOW | \
 GPIO_MODE_IHYSTR_CMOS | \
 GPIO_MODE_TRIGENR_IN_ENABLED | \
 GPIO_MODE_PUPDR_FLOATING)

/*----- TTM15 pins definitions -----*/

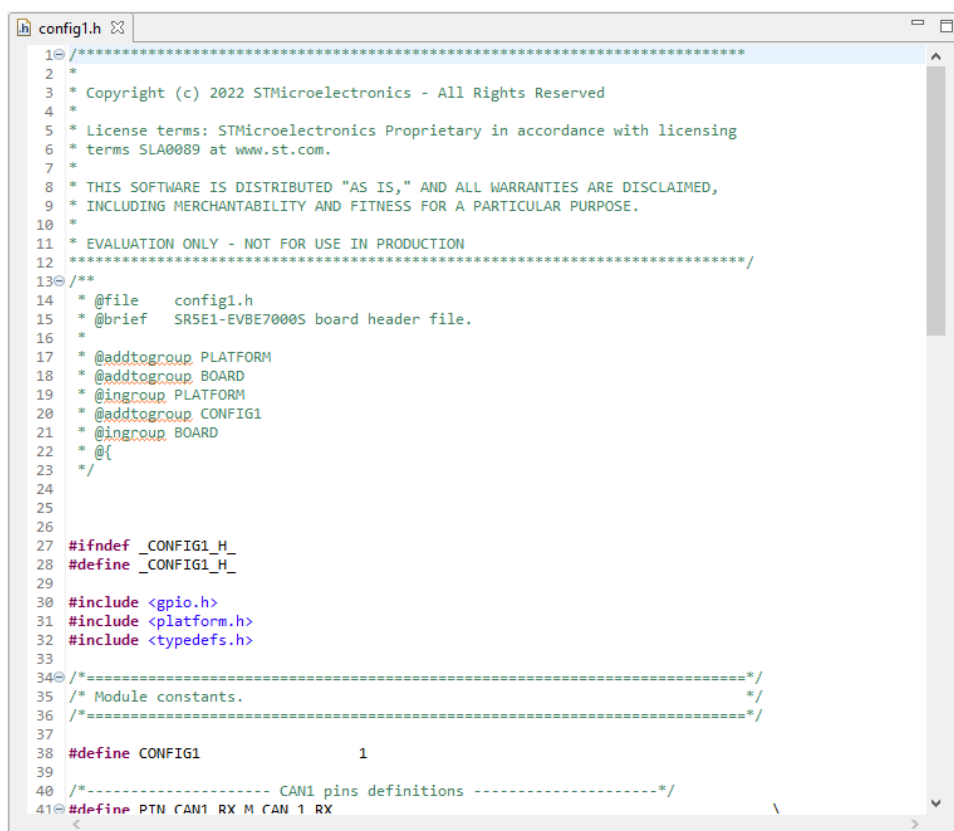
```

### 3.3 Code generation

As soon as you have a configuration without any error (i.e. without any red markers), the tool will generate the C code corresponding to the current configuration in the folder "src-gen".

This code generation is automatic, and is done each time the configuration is saved.

Figure 21: Code generated from the configuration



```

1  /*****
2  *
3  * Copyright (c) 2022 STMicroelectronics - All Rights Reserved
4  *
5  * License terms: STMicroelectronics Proprietary in accordance with licensing
6  * terms SLA0089 at www.st.com.
7  *
8  * THIS SOFTWARE IS DISTRIBUTED "AS IS," AND ALL WARRANTIES ARE DISCLAIMED,
9  * INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
10 *
11 * EVALUATION ONLY - NOT FOR USE IN PRODUCTION
12 *****/
13 /**
14  * @file    config1.h
15  * @brief    SR5E1-EVBE7000S board header file.
16  *
17  * @addtogroup PLATFORM
18  * @addtogroup BOARD
19  * @ingroup  PLATFORM
20  * @addtogroup CONFIG1
21  * @ingroup  BOARD
22  * @{
23  */
24
25
26
27 #ifndef _CONFIG1_H_
28 #define _CONFIG1_H_
29
30 #include <gpio.h>
31 #include <platform.h>
32 #include <typedefs.h>
33
34 /*=====*/
35 /* Module constants. */
36 /*=====*/
37
38 #define CONFIG1                1
39
40 /*----- CAN1 pins definitions -----*/
41 #define PTN CAN1 RX M CAN 1 RX

```

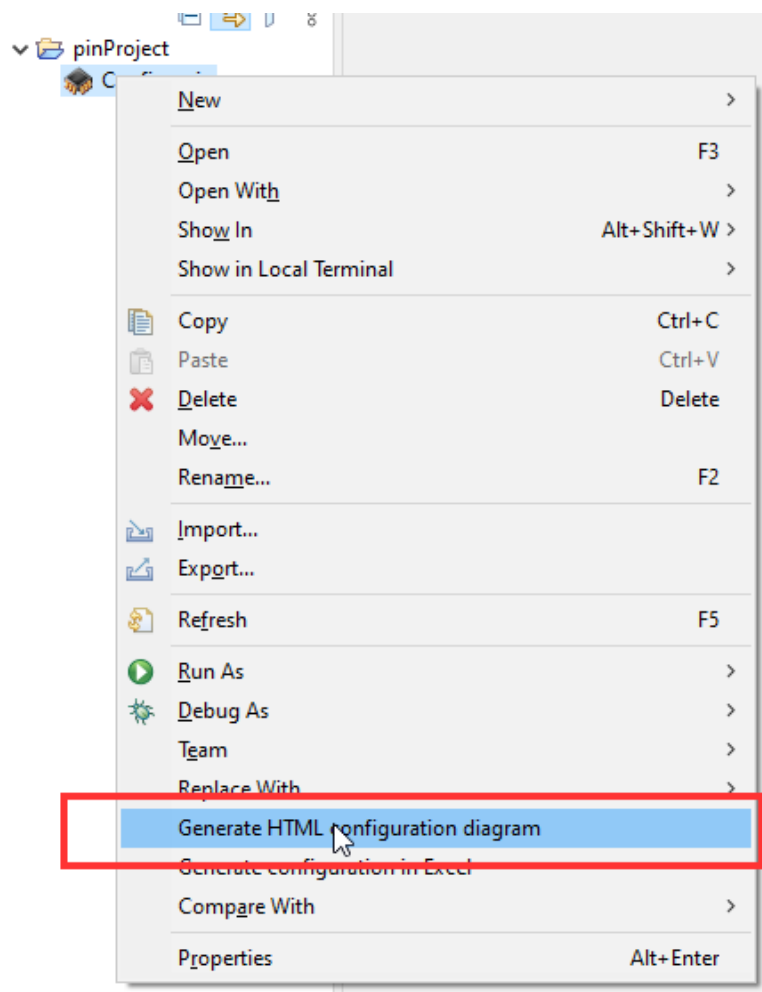
The pin settings are generated with a comment indicating an explanation of the corresponding values, instead of just the hexadecimal values.

### 3.4 HTML generation

The HTML generation is **not** automatic, but must be done from the project explorer, right clicking on the .gpio file, asking for HTML generation.

The generated file will be located inside the project's 'src-gen' folder.

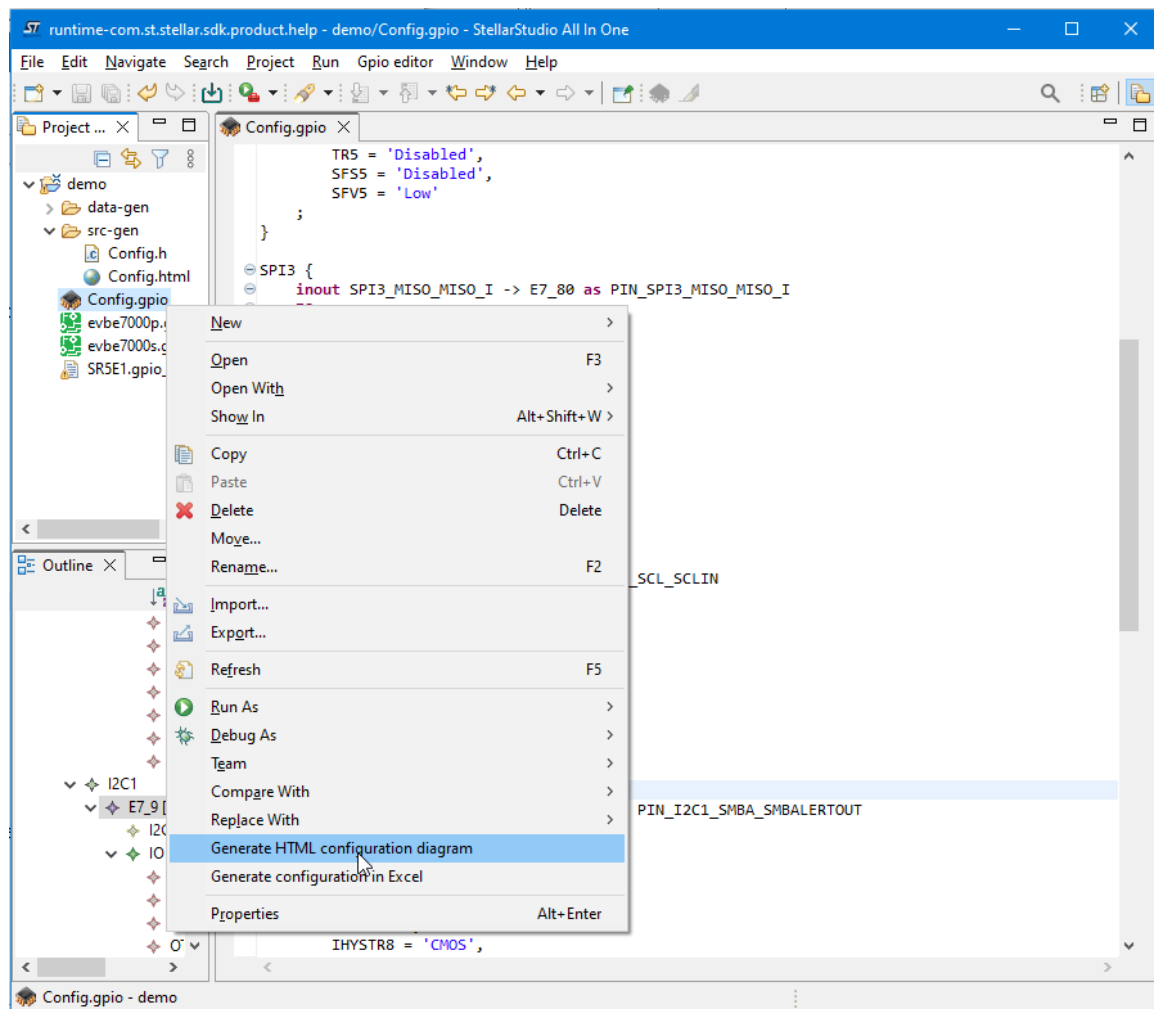
Figure 22: Generate the HTML file



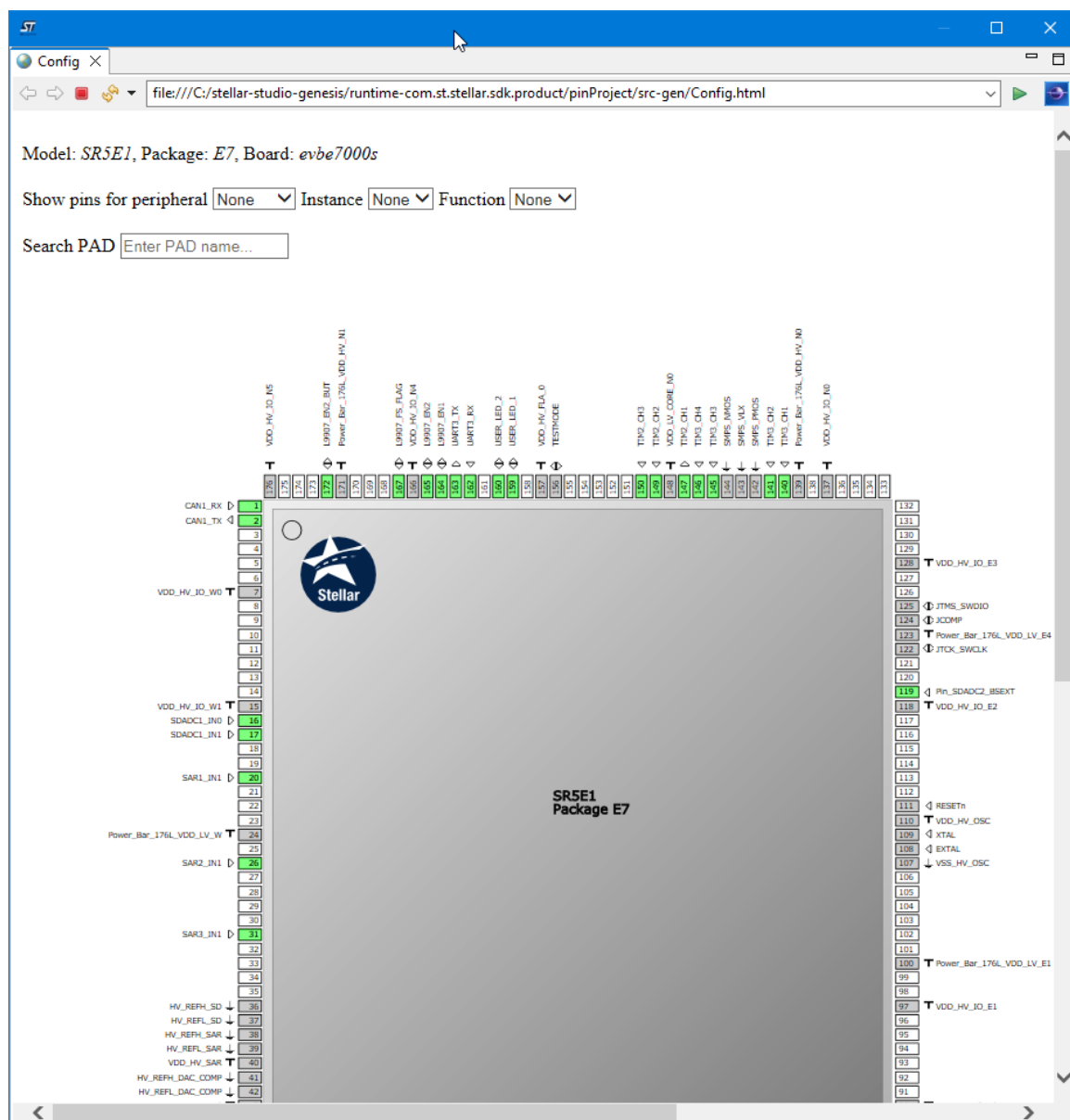
The developer can open the *.html* file by the contextual menu on *.gpio* file editor area.

Remember to regenerate the html file each time a modification is made into the gpio, as it will not be re-generated by default.

Figure 23: Open an HTML file



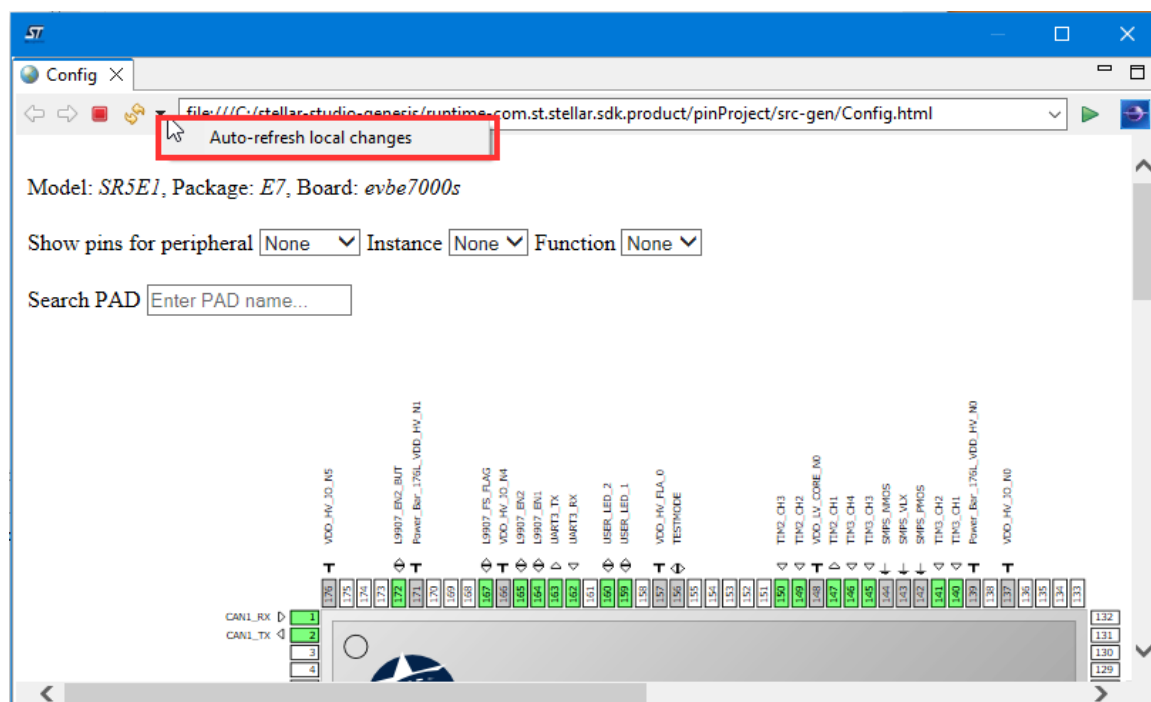
**Figure 24: HTML generated from the configuration**



It is possible to filter and display by peripheral and subpart of the peripheral.

The dynamic list and the tooltip comment are very useful to know your current configuration.

Figure 25: Auto-refresh local changes



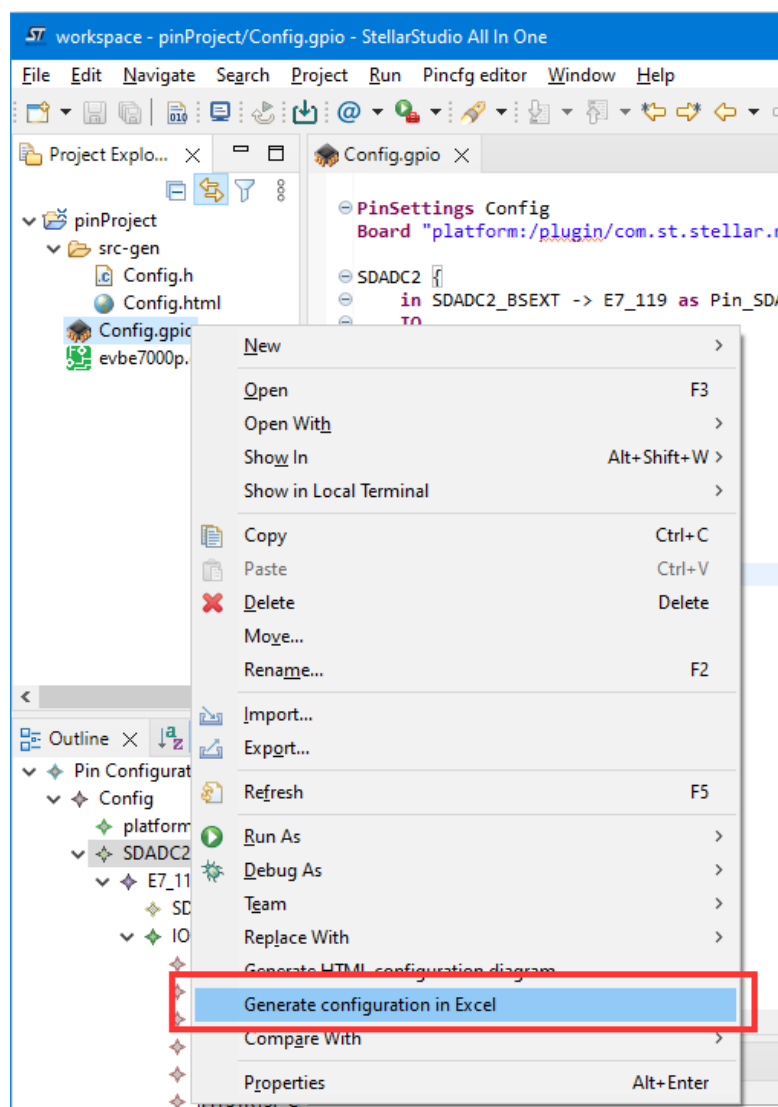
in order to have the HTML file synchronized with your current pin configuration, the developer can enable *Auto-refresh local changes*

### 3.5 XLS generation

The XLS generation is **not** automatic, but must be done from the project explorer, right clicking on the .gpio file, asking for Excel generation.

The generated file will be located inside the project's 'src-gen' folder.

Figure 26: Generate the Excel file



The developer can then open the XLS file by Microsoft Excel® in the *src-gen* folder, using right-click + open With.../System Editor menu option.

*WARNING : double-clicking is not supported because no OLE editor is supported*



Figure 27: Open an XLS file

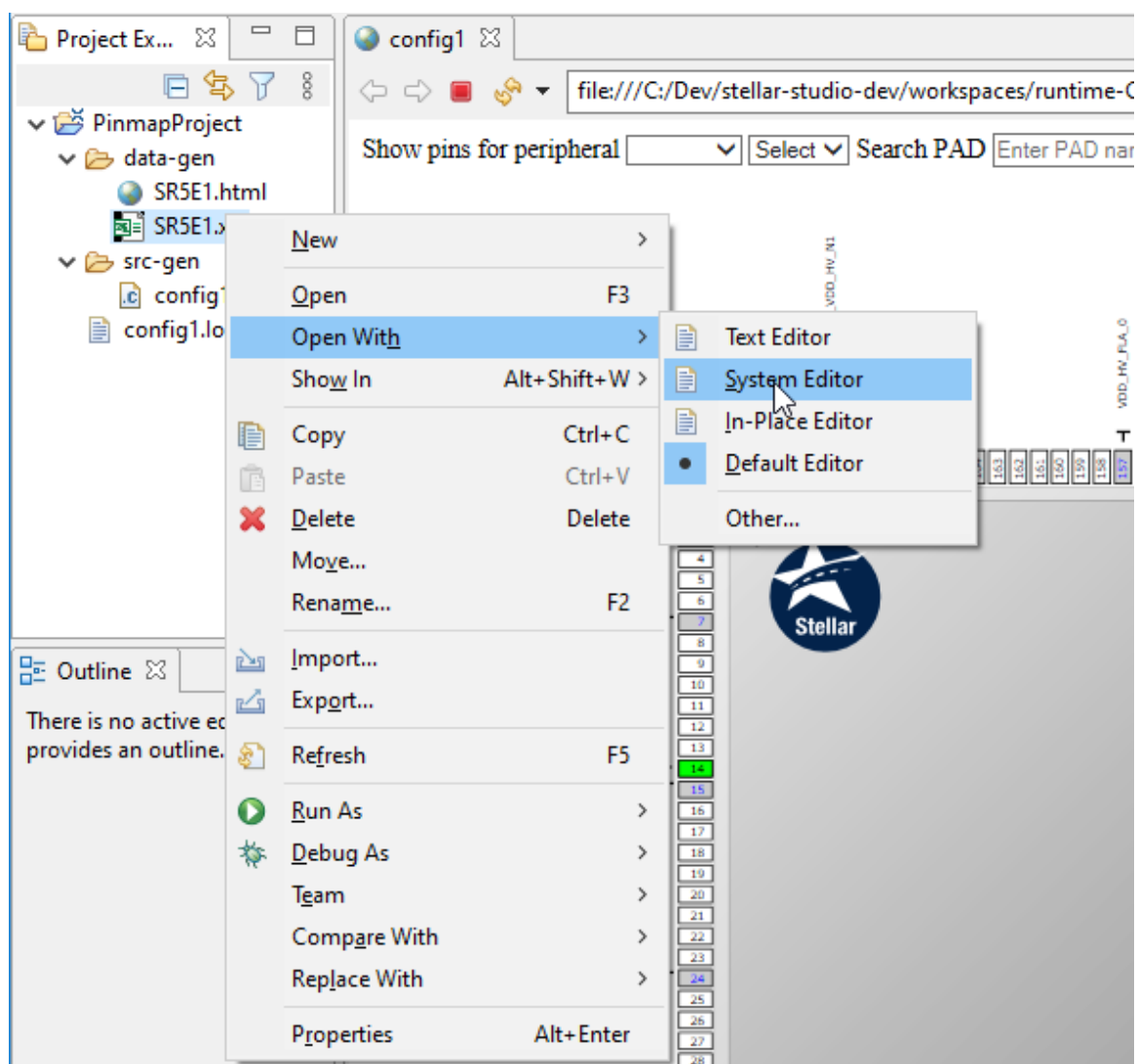
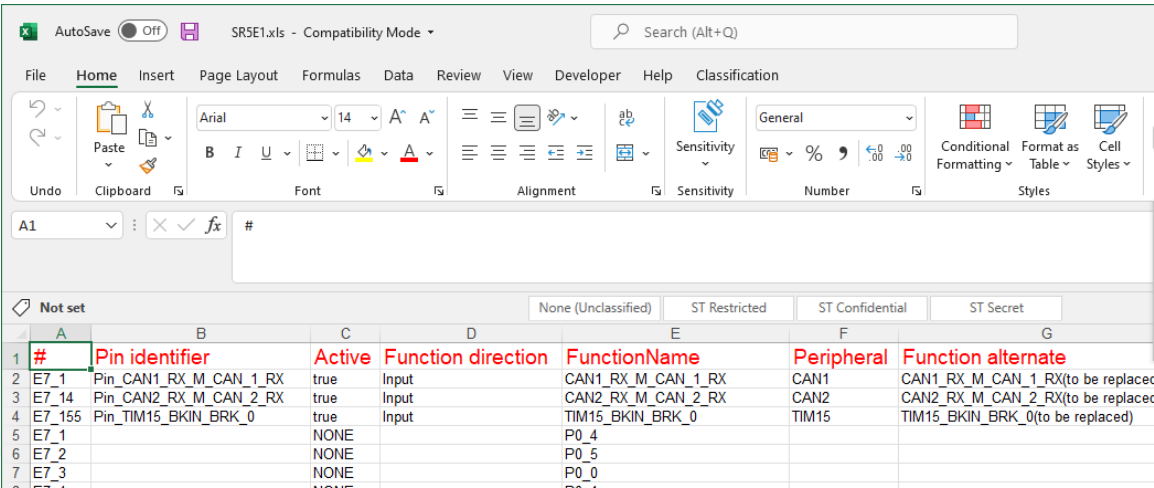


Figure 28: Example of XLS generated from the configuration



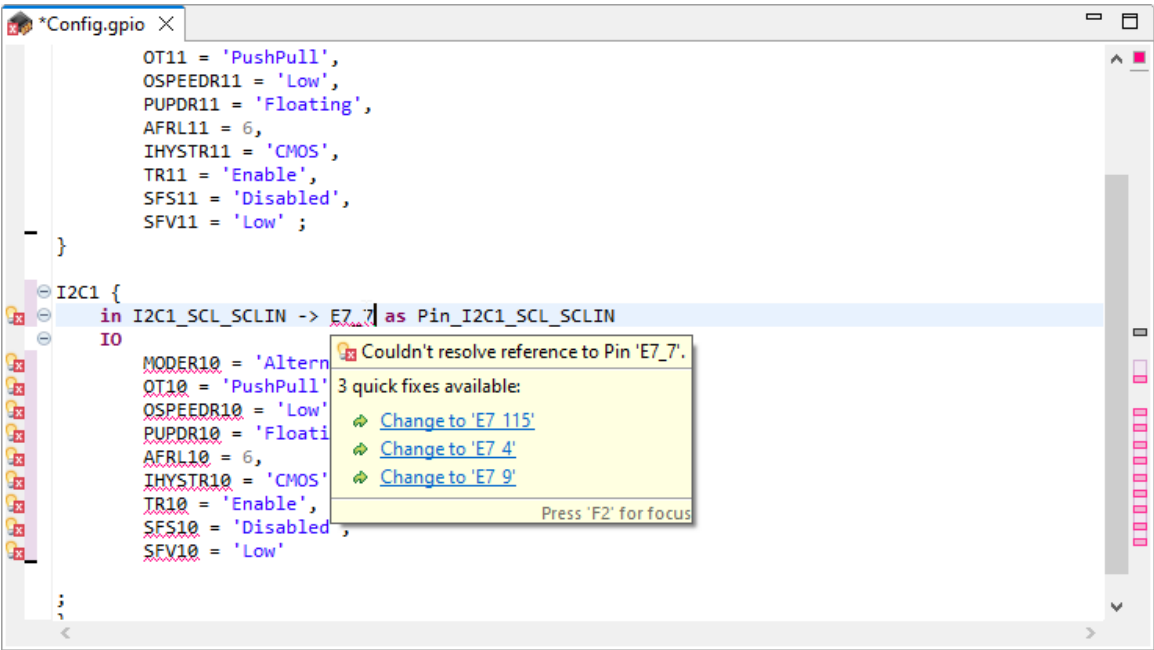
The screenshot shows an Excel spreadsheet titled 'SR5E1.xls - Compatibility Mode'. The spreadsheet contains a table with the following data:

#	Pin identifier	Active	Function direction	FunctionName	Peripheral	Function alternate
E7_1	Pin_CAN1_RX_M_CAN_1_RX	true	Input	CAN1_RX_M_CAN_1_RX	CAN1	CAN1_RX_M_CAN_1_RX(to be replaced)
E7_14	Pin_CAN2_RX_M_CAN_2_RX	true	Input	CAN2_RX_M_CAN_2_RX	CAN2	CAN2_RX_M_CAN_2_RX(to be replaced)
E7_155	Pin_TIM15_BKIN_BRK_0	true	Input	TIM15_BKIN_BRK_0	TIM15	TIM15_BKIN_BRK_0(to be replaced)
E7_1		NONE		P0_4		
E7_2		NONE		P0_5		
E7_3		NONE		P0_0		

3.6 Configuration errors

Errors in naming peripherals, pin configuration, as well as syntax errors in the expected keywords, are identified with some markers in the configuration editor.

Figure 29: Syntax Errors



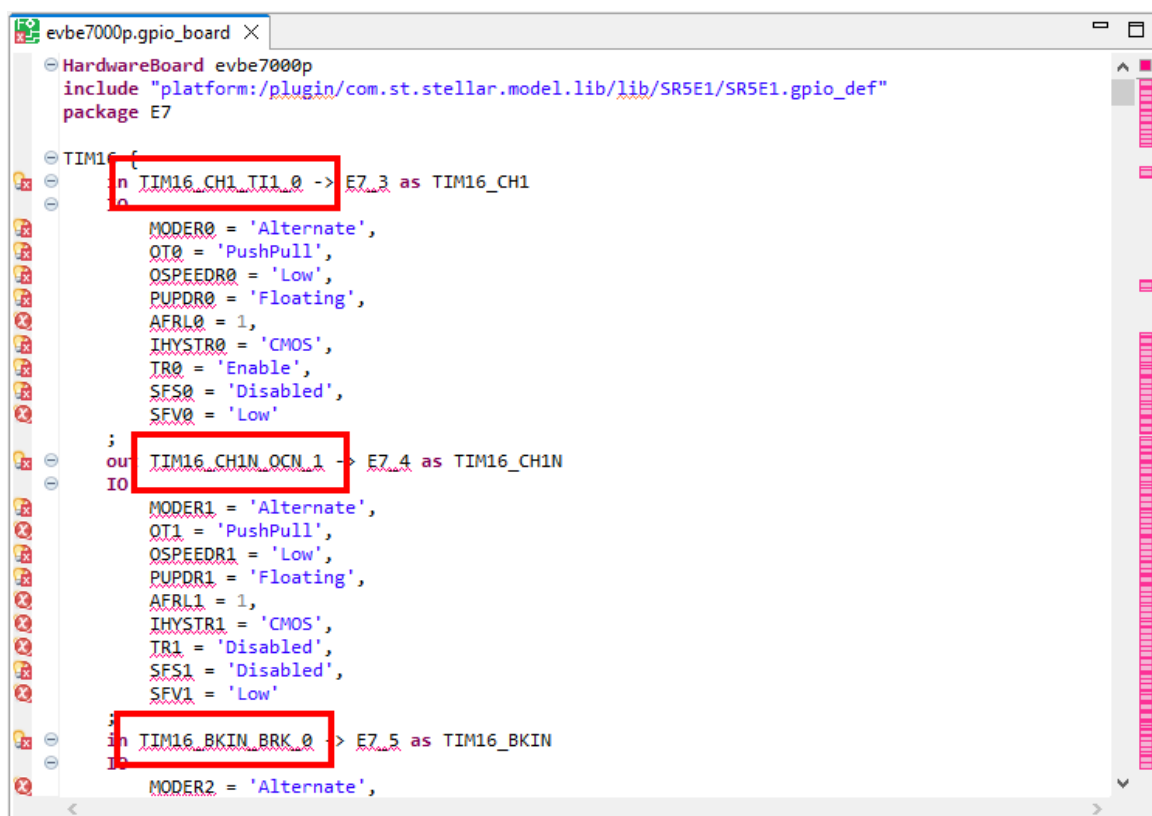
For some of these errors, a quick fix is available.

### 3.7 Application migration

Between successive versions of the tool the underlying model of pinmap definitions may change.

In such a case, errors will appear inside the configurations when launching the tool after the update.

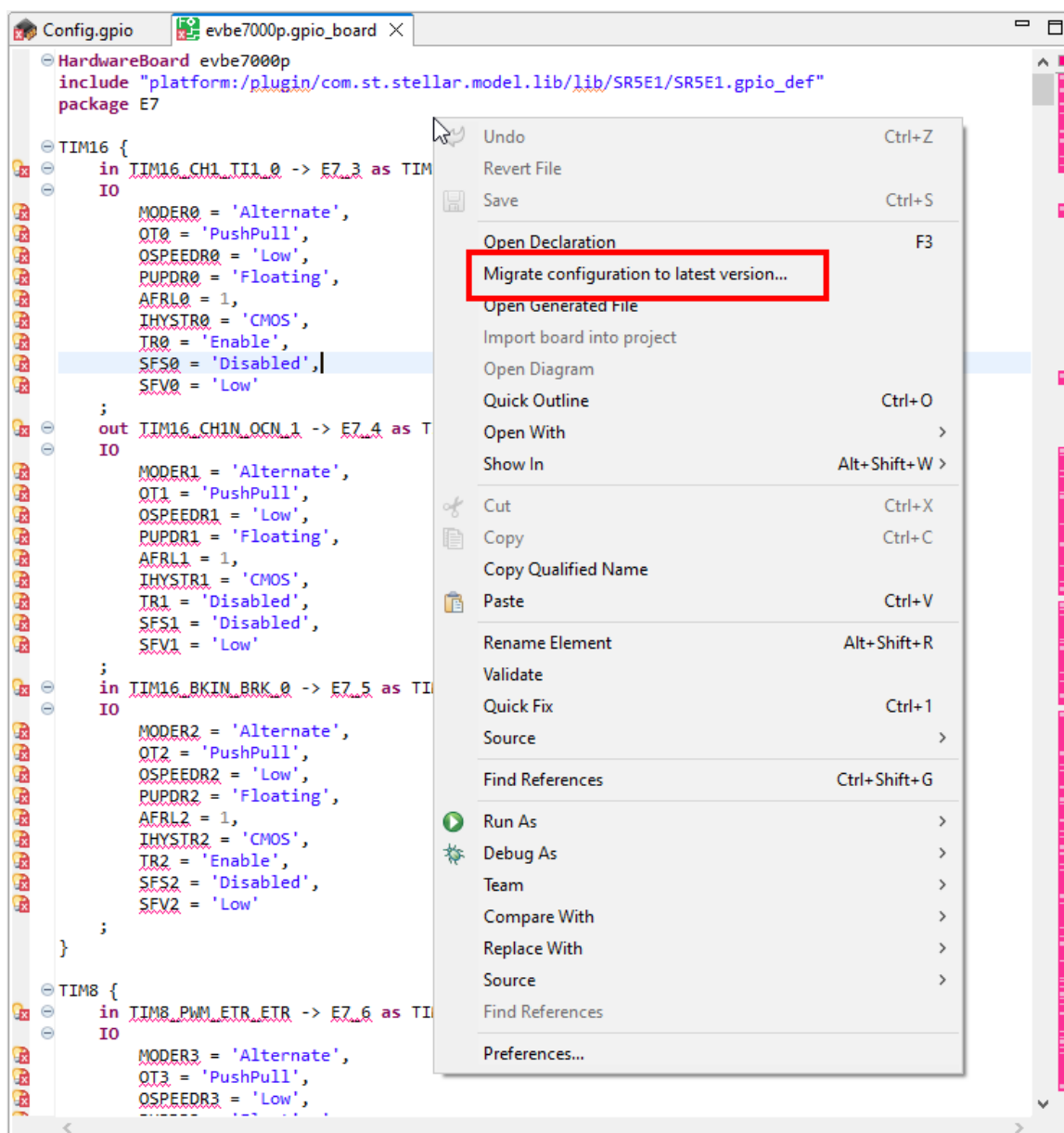
Figure 30: Old applications Migration



In the above picture, some errors have appeared because the underlying pinmap model has changed.

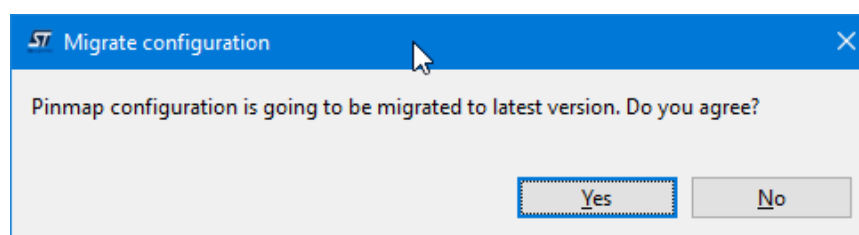
In order to fix these errors, you must use the migration tool that is accessible using right click inside the configuration editor.

Figure 31: Launching migration



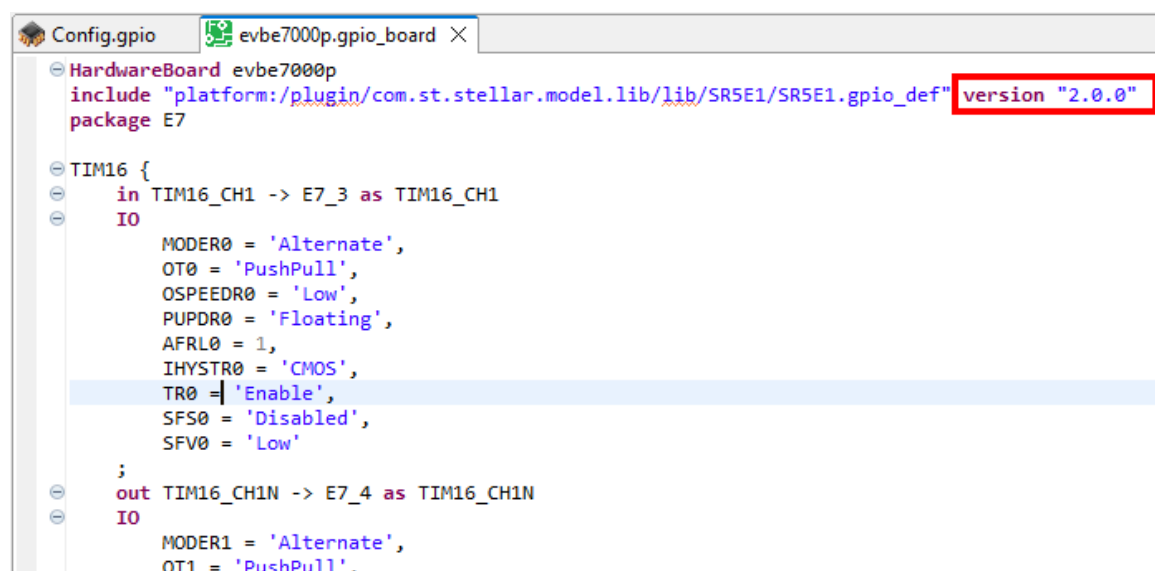
You'll be asked to confirm your choice.

Figure 32: Confirm migration



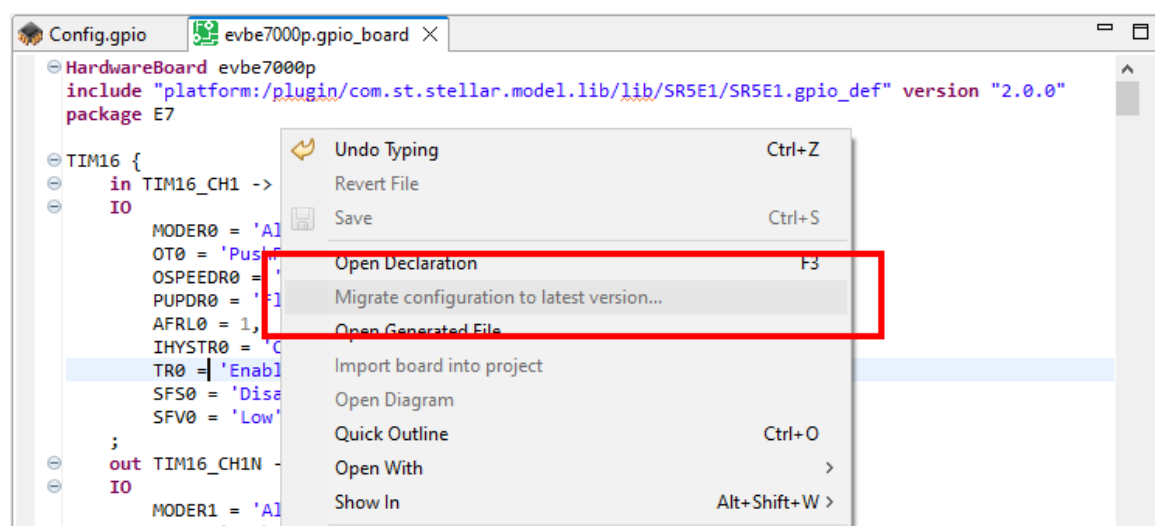
As a result the functions names has been adapted to the new names, and the version of the model is now changed and appears inside the converted file (here 2.0.0).

**Figure 33: Migration result**



As soon as the migration has been done, it is marked as not needed, and you cannot launch the migration anymore.

**Figure 34: Unneeded migration**



### 3.8 Outline

The outline view only shows the hierarchical structure of the selected editor, being the configuration editor, or the generated code.

Selecting one item in the outline will make the selected item visible in the corresponding edition area.

**Figure 35: Outline for pin configuration**

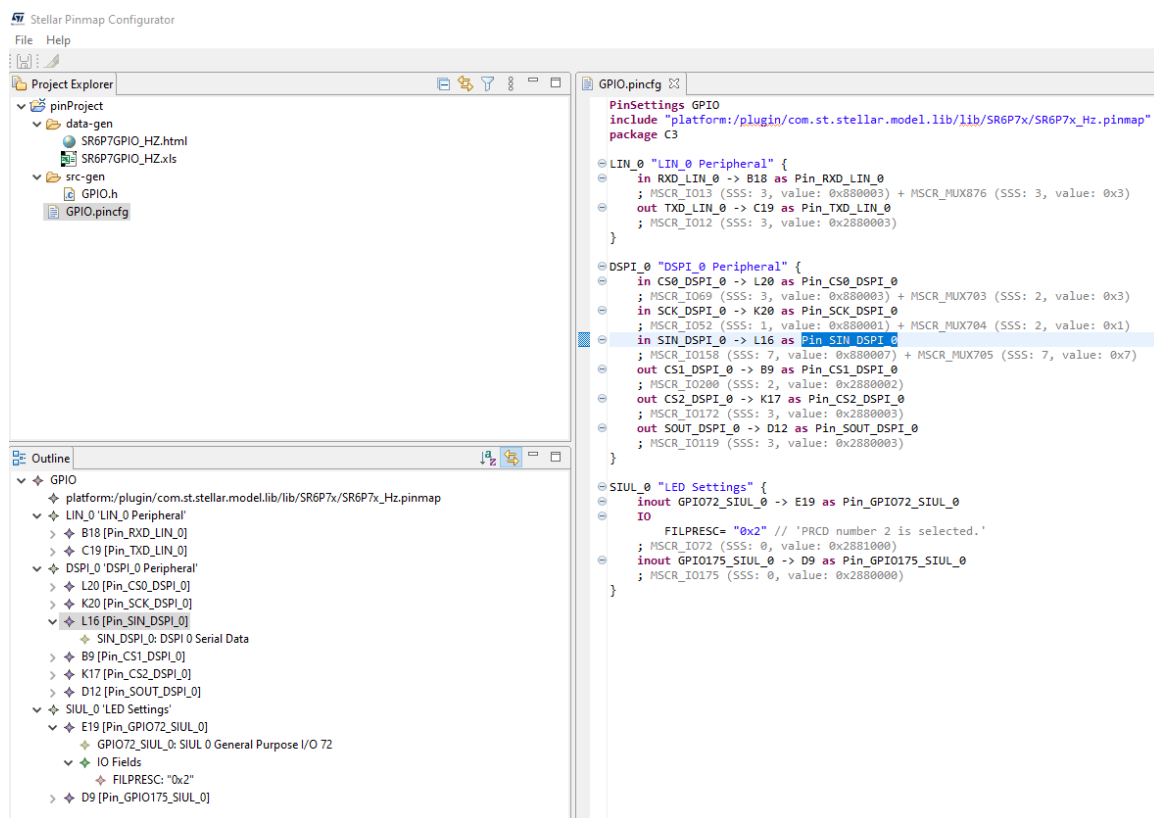
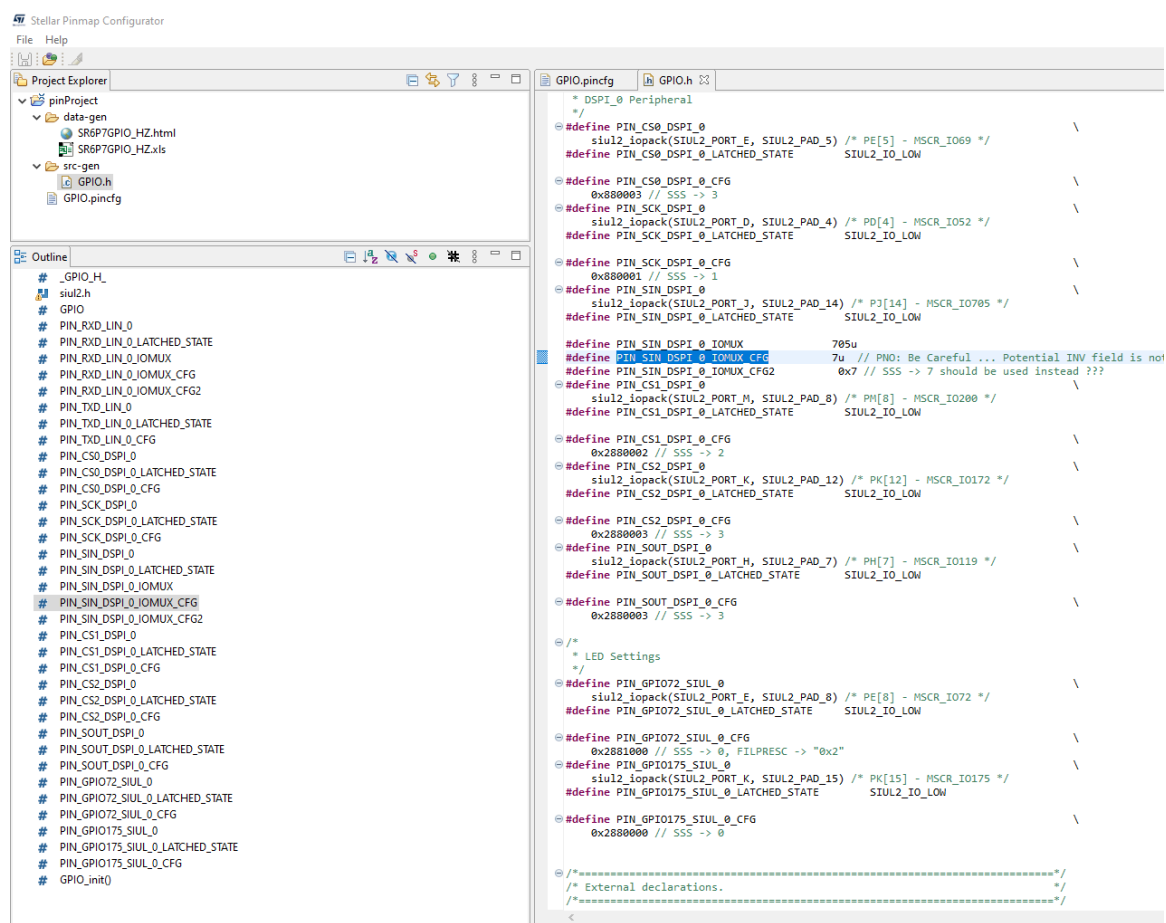


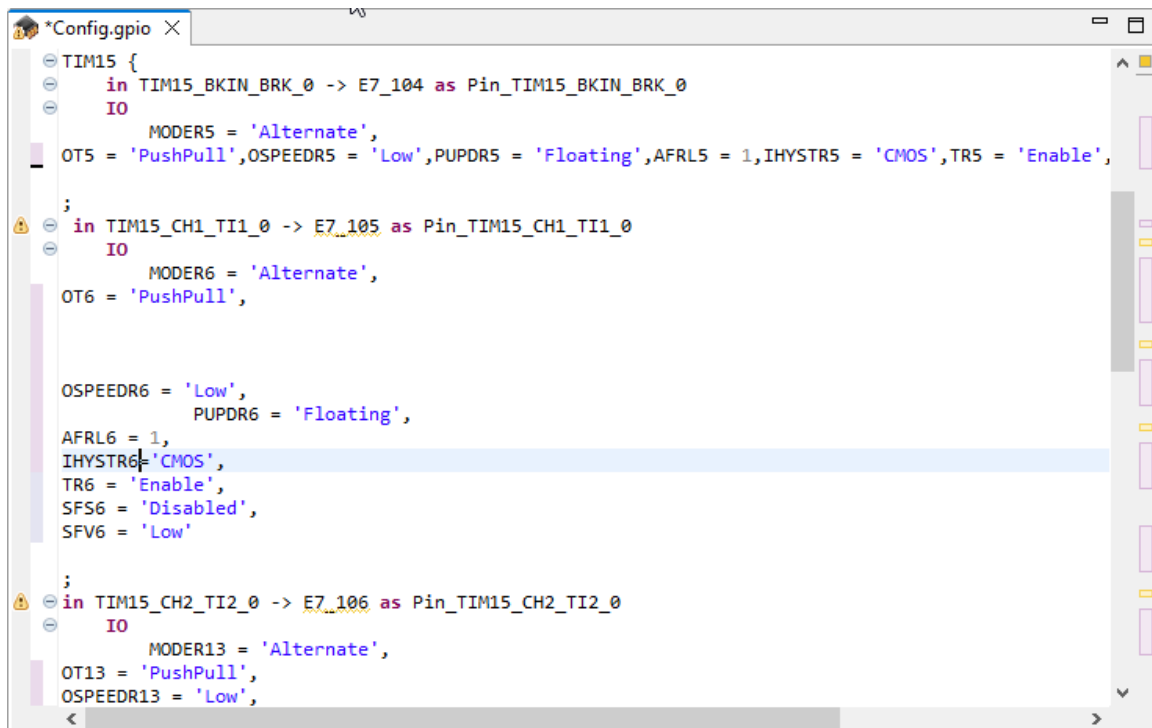
Figure 36: Outline for a C generated file



### 3.9 Pin configuration formatting

As any other textual editor, you can rearrange its appearance using a default formatting option, accessible with the key combination <CTRL><SHIFT>F

Figure 37: Example before formatting



```
*Config.gpio X
TIM15 {
  in TIM15_BKIN_BRK_0 -> E7_104 as Pin_TIM15_BKIN_BRK_0
  IO
  MODER5 = 'Alternate',
  OT5 = 'PushPull', OSPEEDR5 = 'Low', PUPDR5 = 'Floating', AFRL5 = 1, IHYSTR5 = 'CMOS', TR5 = 'Enable',
;
  in TIM15_CH1_TI1_0 -> E7_105 as Pin_TIM15_CH1_TI1_0
  IO
  MODER6 = 'Alternate',
  OT6 = 'PushPull',

  OSPEEDR6 = 'Low',
  PUPDR6 = 'Floating',
  AFRL6 = 1,
  IHYSTR6 = 'CMOS',
  TR6 = 'Enable',
  SFS6 = 'Disabled',
  SFV6 = 'Low'
;
  in TIM15_CH2_TI2_0 -> E7_106 as Pin_TIM15_CH2_TI2_0
  IO
  MODER13 = 'Alternate',
  OT13 = 'PushPull',
  OSPEEDR13 = 'Low',
```

And here is how it looks like after formatting:



Figure 38: Example after formatting



## 4 Graphical configuration of pins

The following section describes how to configure pins graphically.

### 4.1 Graphical configuration

As described in the previous sections, the fine pin configurations are achieved using the textual domain specific language (DSL) dedicated to the pin configuration. The graphical configuration allows to start configuring a pin, that the user can then fine tune using the textual configurator.

The user will be able to:

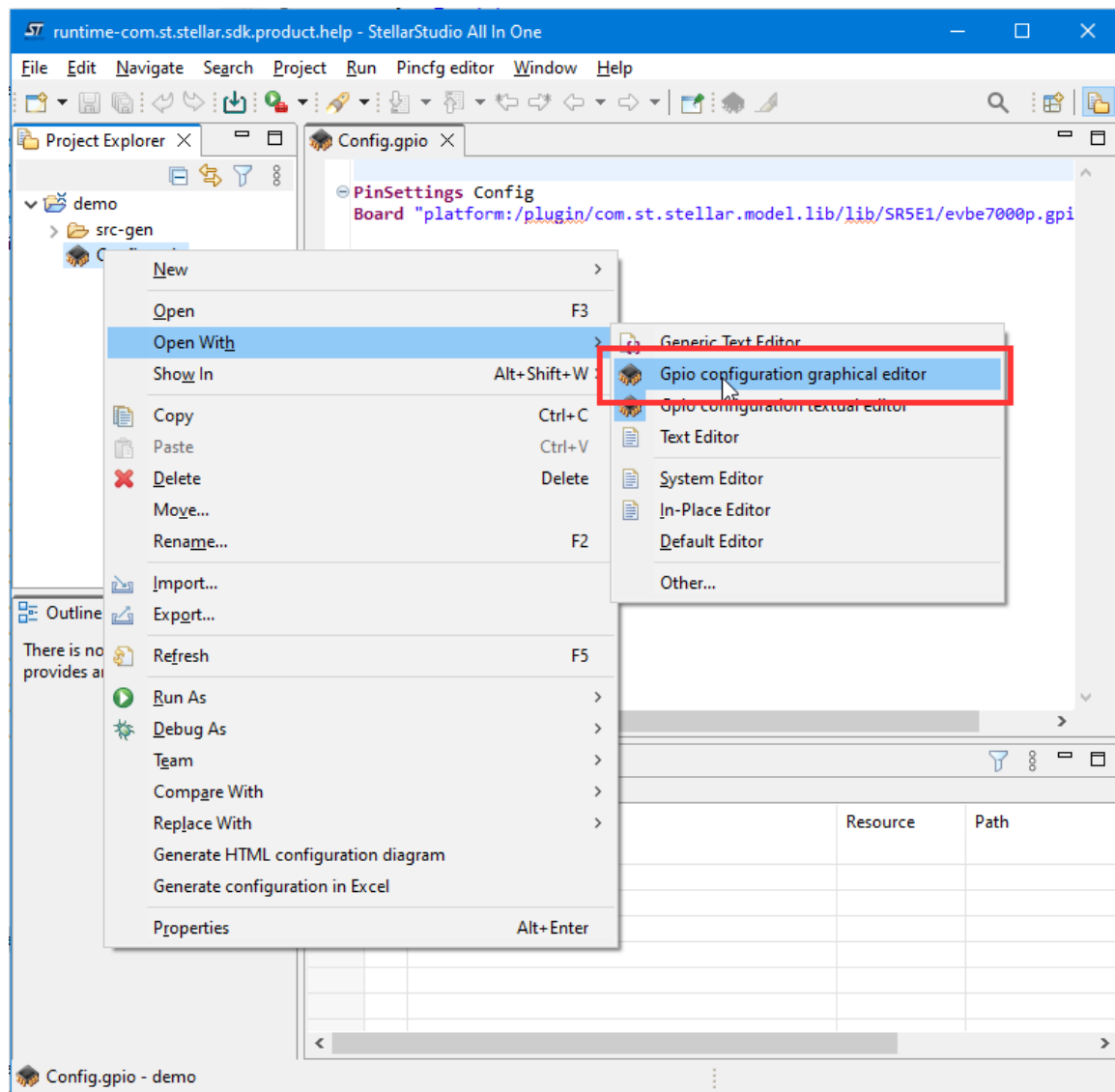
- Open the graphical configuration editor
- Use the outline view to identify where peripherals, functions or PADs are accessible,
- Graphically assign/unassign a function to/from a pin,
- Ask to show a configured pin inside the textual configuration editor,

### 4.2 Open the graphical configuration editor

There are several ways to open the graphical configuration editor.

You can open it from the project explorer, using a right click on a *.gpio* file, then choose the Open with/Gpio configuration **graphical** editor.

Figure 39: Open the graphical editor from project explorer



Alternatively you can use the Gpio editor menu, or click on the MCU icon in the toolbar.

Figure 40: Open the graphical editor from Gpio editor menu

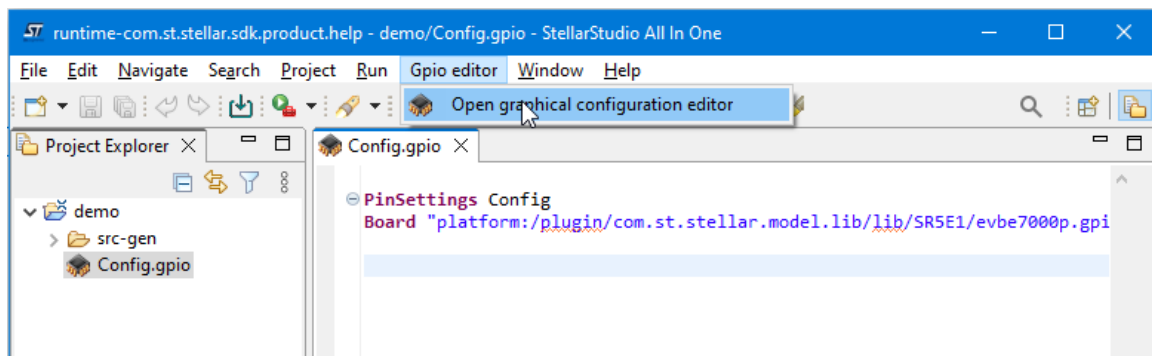
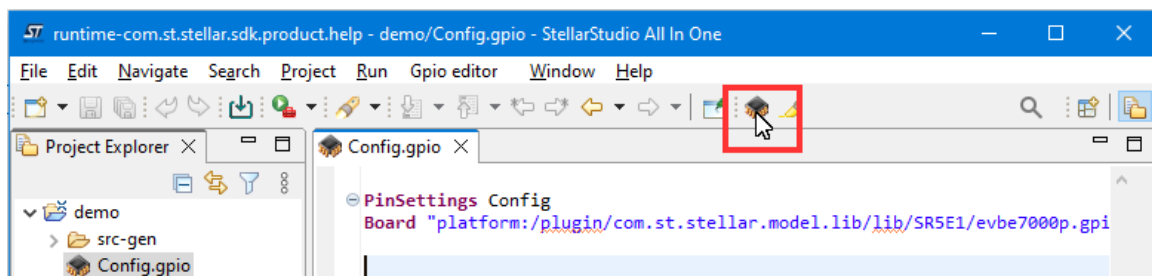
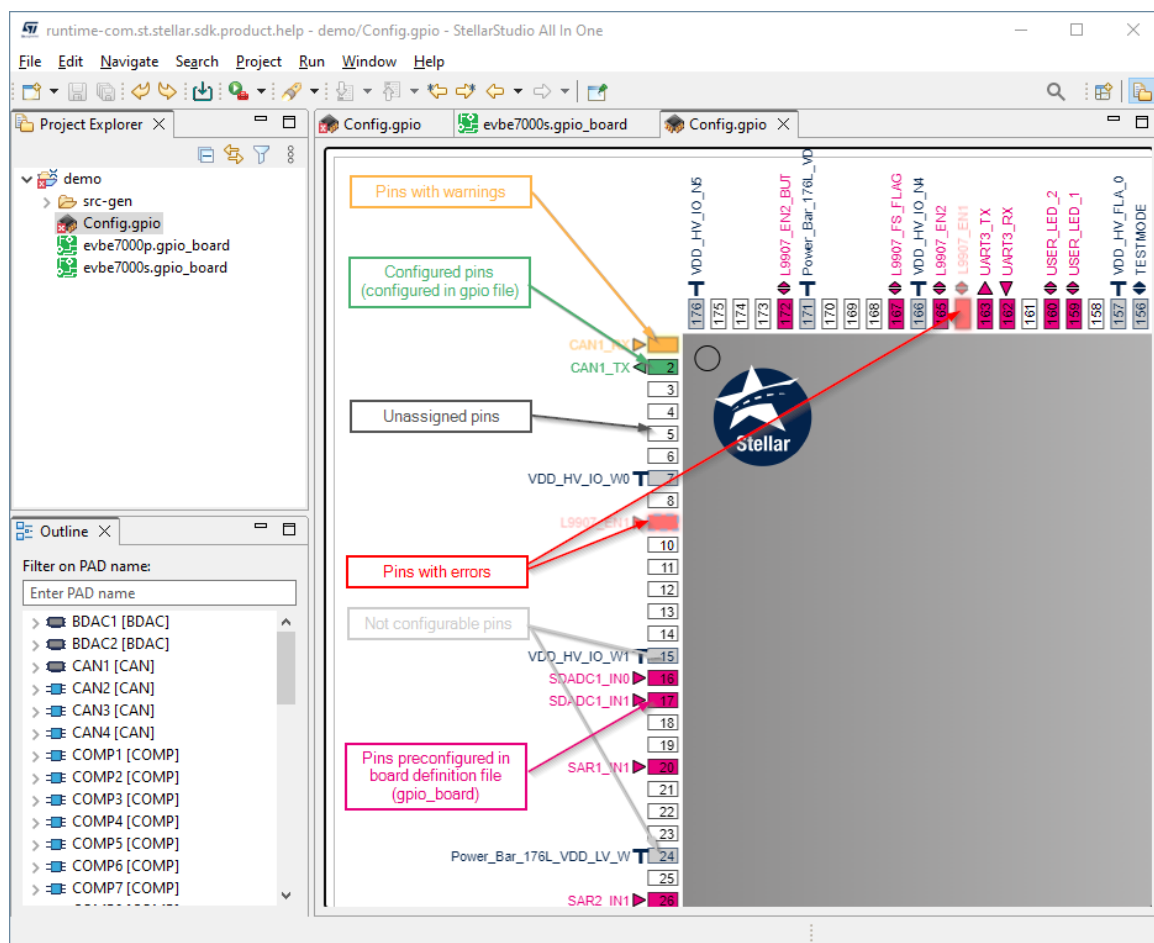


Figure 41: Open the graphical editor from the MCU icon in the toolbar



The result would be similar to the below picture.

Figure 42: Result: opened graphical editor

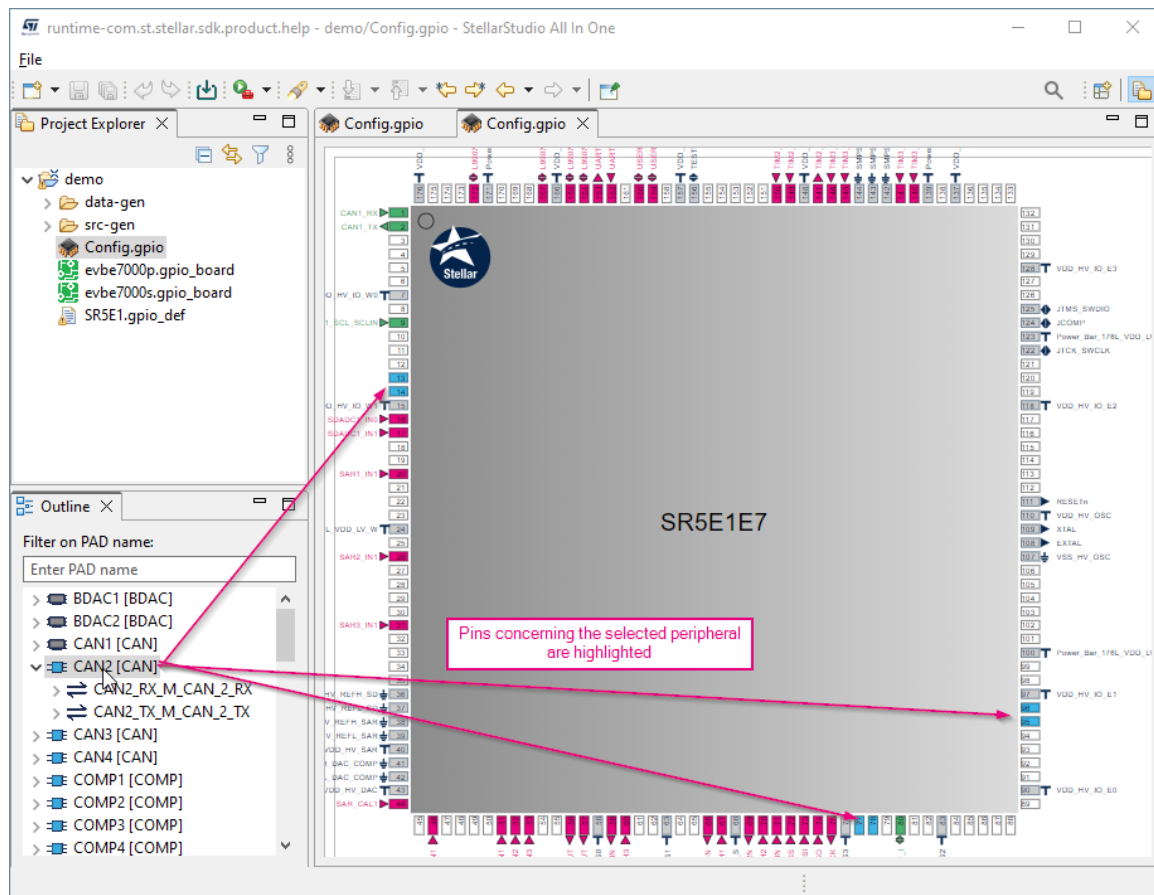


### 4.3 Using pinmap configuration outline views

Outline views in Eclipse allows to display specific information about the selected object inside an editor.

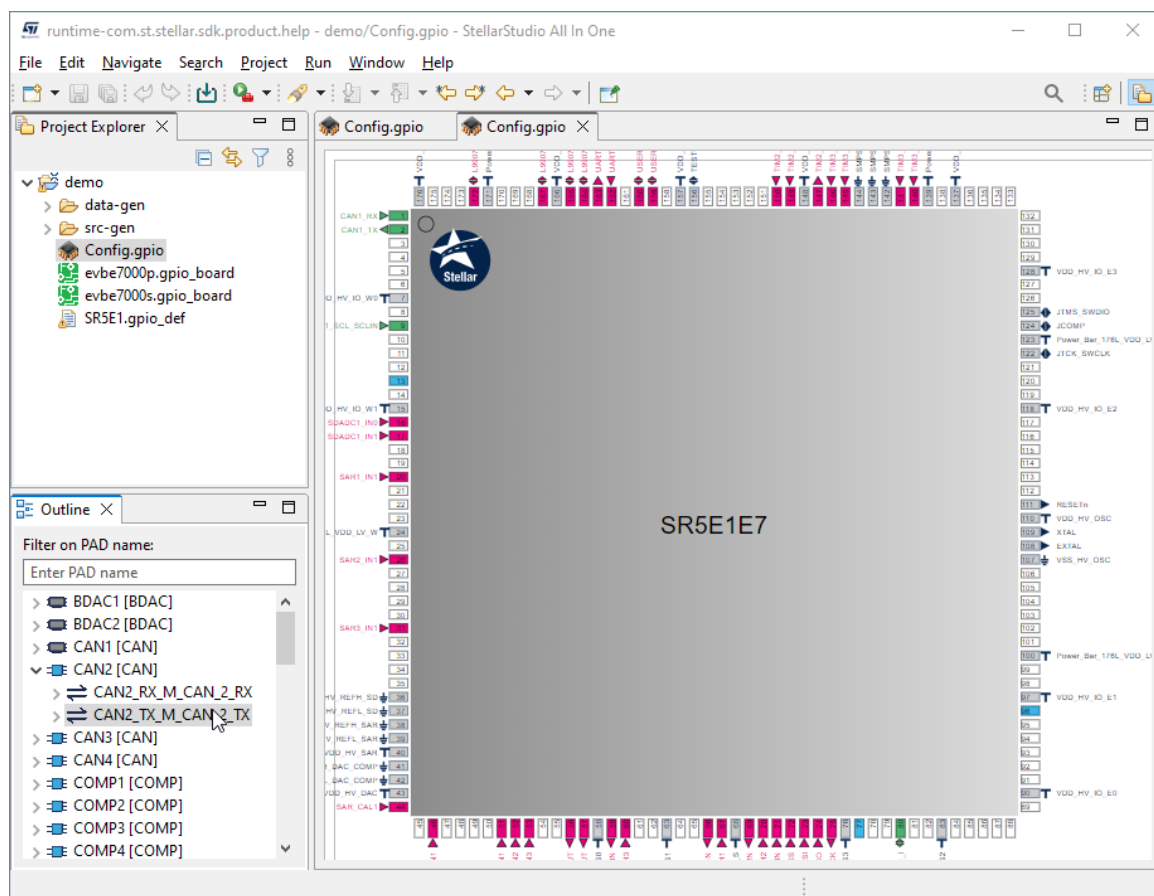
For the Gpio configuration textual editor, it displays the list of peripherals, with their assigned functions.

Figure 43: Example of selection a peripheral



For the Gpio configuration graphical editor, it shows the peripherals, with their assigned functions and the concerned pins.

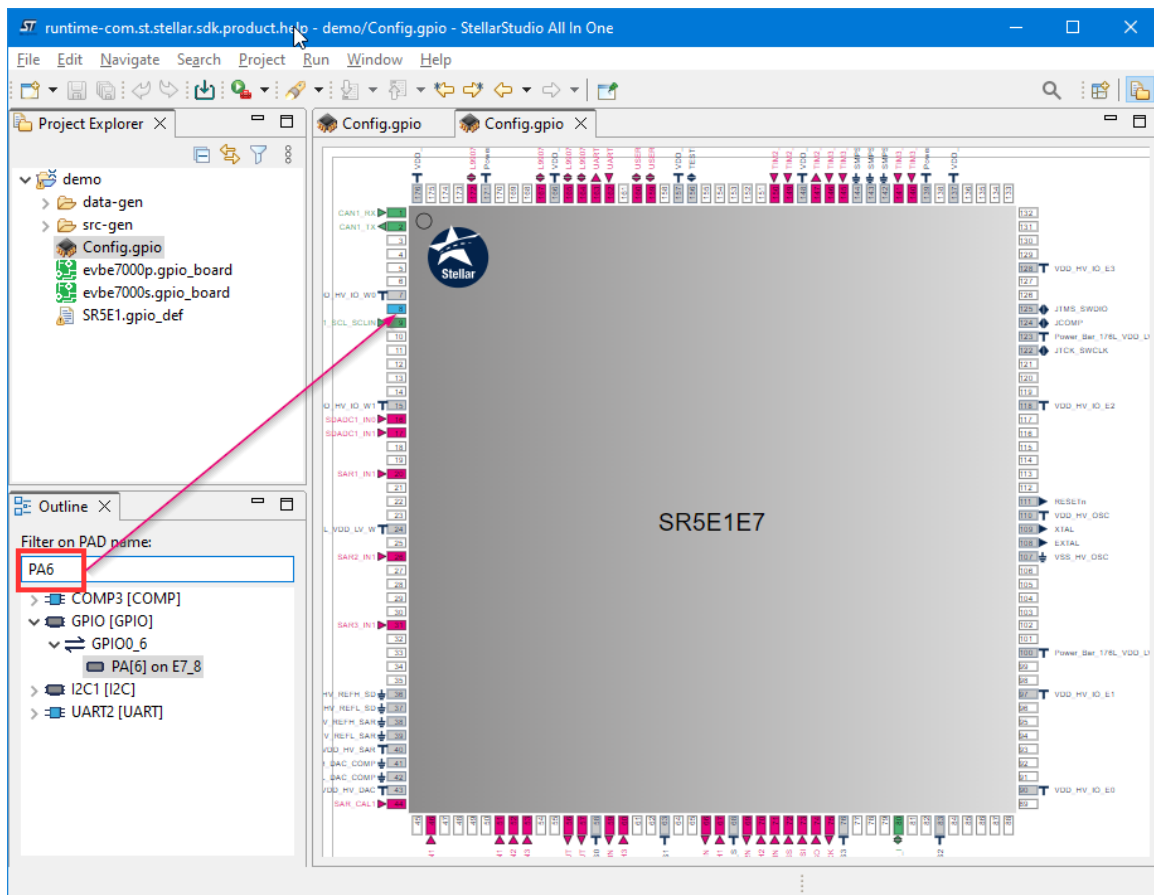
Figure 44: Example of selection a function



In particular in this view, the user can search for a particular PAD, using the filter text field.

All pins that matches the entered pad name will be displayed, so that the user can select them. A selected object in the outline would be displayed inside the graphical editor. For example, if you select a peripheral, all pins related to this peripheral will be highlighted. If you select only a function, then you can see (highlighted in the graphical editor) all the pins where you can assign this function.

**Figure 45: Example of searching of a PAD**



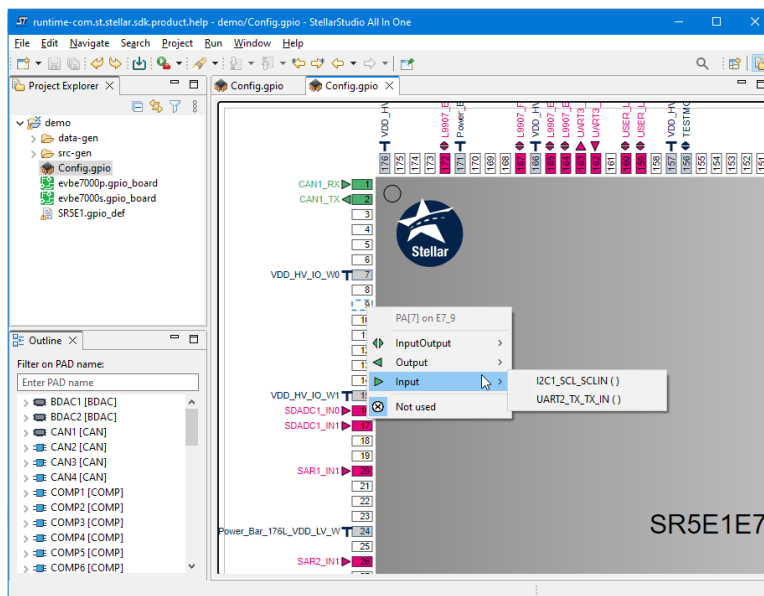
#### 4.4 Assigning a function to a pin

Now that you have chosen the pin on which you would like to assign a function, you'll need to use the contextual menu to choose the proper function to be assigned.

The menu that will be shown contains some direction sub-menus, then the possible functions accessible from the selected pin.



Figure 46: Assign a function to a pin

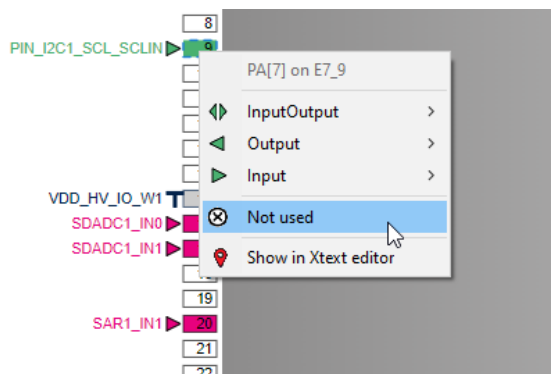


The result will show the assigned pin, with its default name.

If you want to change the pin configuration, you can choose another function, using again the same assignment operation.

Removing the assigned function is done with the same kind of operation, with the 'not used' option.

Figure 47: Unassign a function from a pin



Both textual editor and graphical editor are sharing the same resource (the .gpio file).

Please note that for the assigned function to be visible inside the textual editor, you will need to save the current graphical editor.

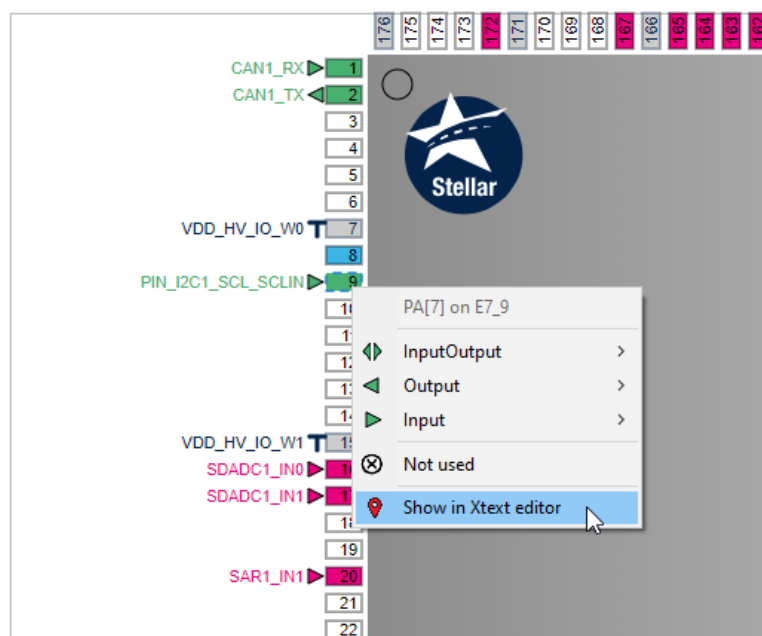
NB: Saving it (using the floppy disk from the toolbar icon) is sometimes not available. If this occurs, you'll need to click on the graphical editor tab in the editor area, then the save icon will be accessible.

## 4.5 Locate graphical pins in textual editor

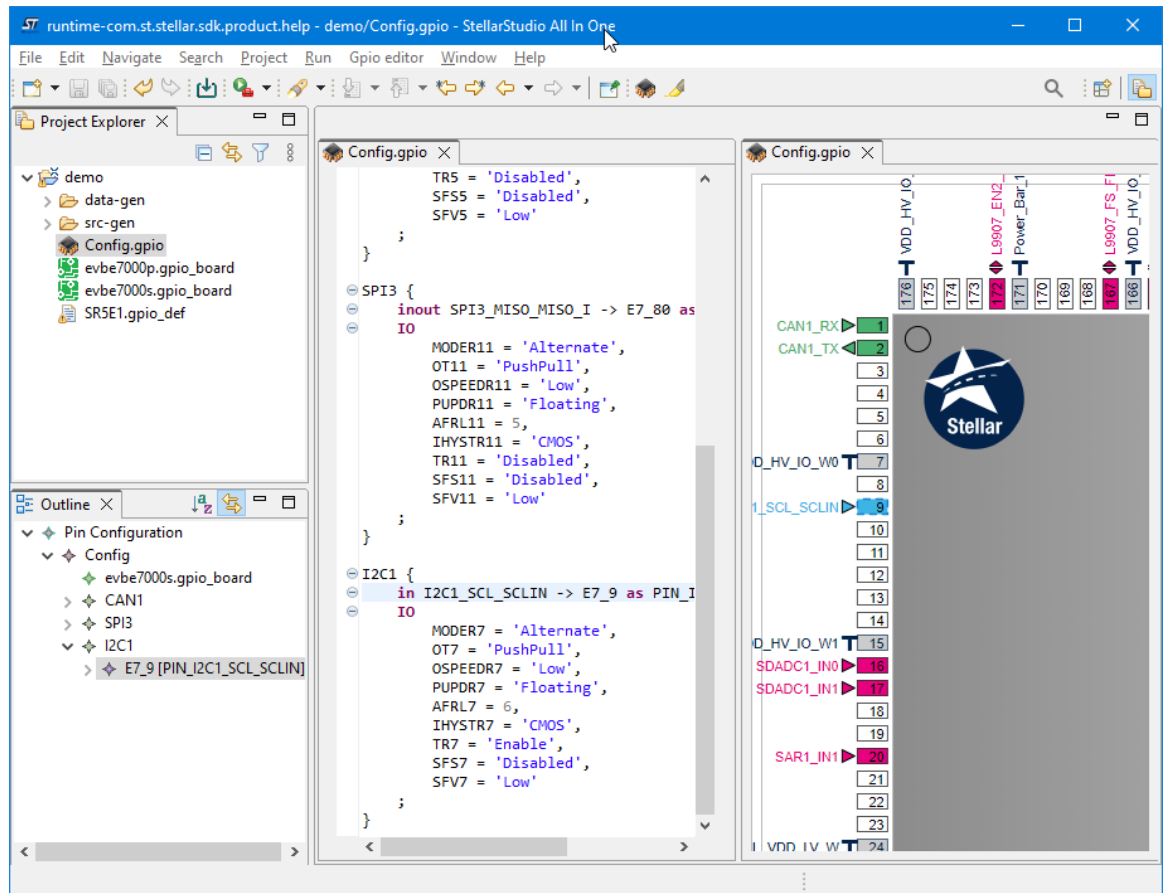
As the graphical configuration editor show a lot a pins, it is not obvious to see where is it present inside the textual editor.

For showing the textual pin configuration of a configured pin from the graphical editor, you must use the 'Show pin in Xtext editor' context menu.

**Figure 48: Show pin in xtext editor**



This will open the textual editor if not already opened, and will place the cursor location near the concerned pin configuration.



Now that the pin is located inside the textual editor, you can modify the register field instances of this configuration, or change its name, using the textual editor like described in the chapter named *manipulation of a pinmap configuration*.

A similar operation is done whenever you move the edition cursor inside the textual editor, if the graphical editor is opened as well (as in the picture above). The selected pin will be shown and centered in the graphical editor.

## 5 Integration

Now that you have manipulated your configuration and configured your peripherals, the following section describes how to integrate your generated file or pin configuration in IDE product.

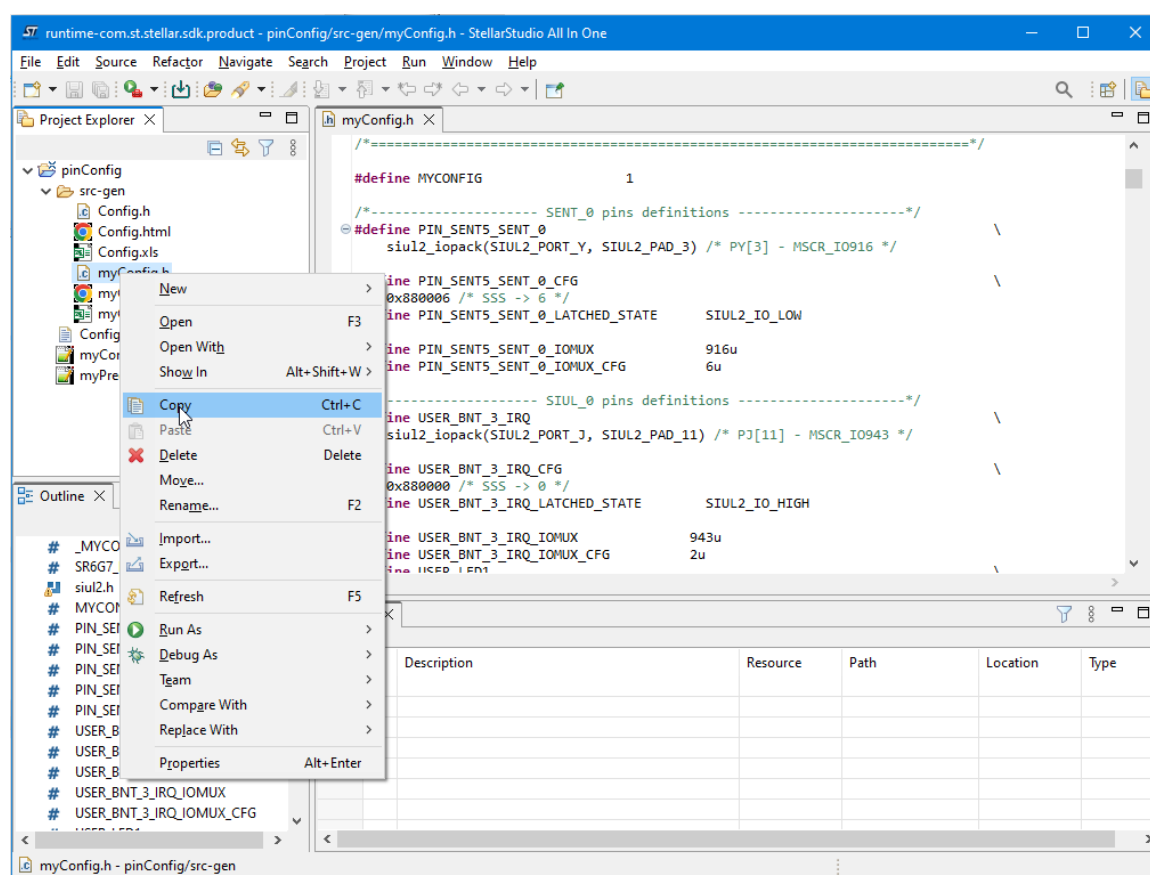
### 5.1 Integration of your generated file (C file)

Your generated file can be integrated from standalone product in any developer tools.

Select your C file

With contextual menu, copy your file

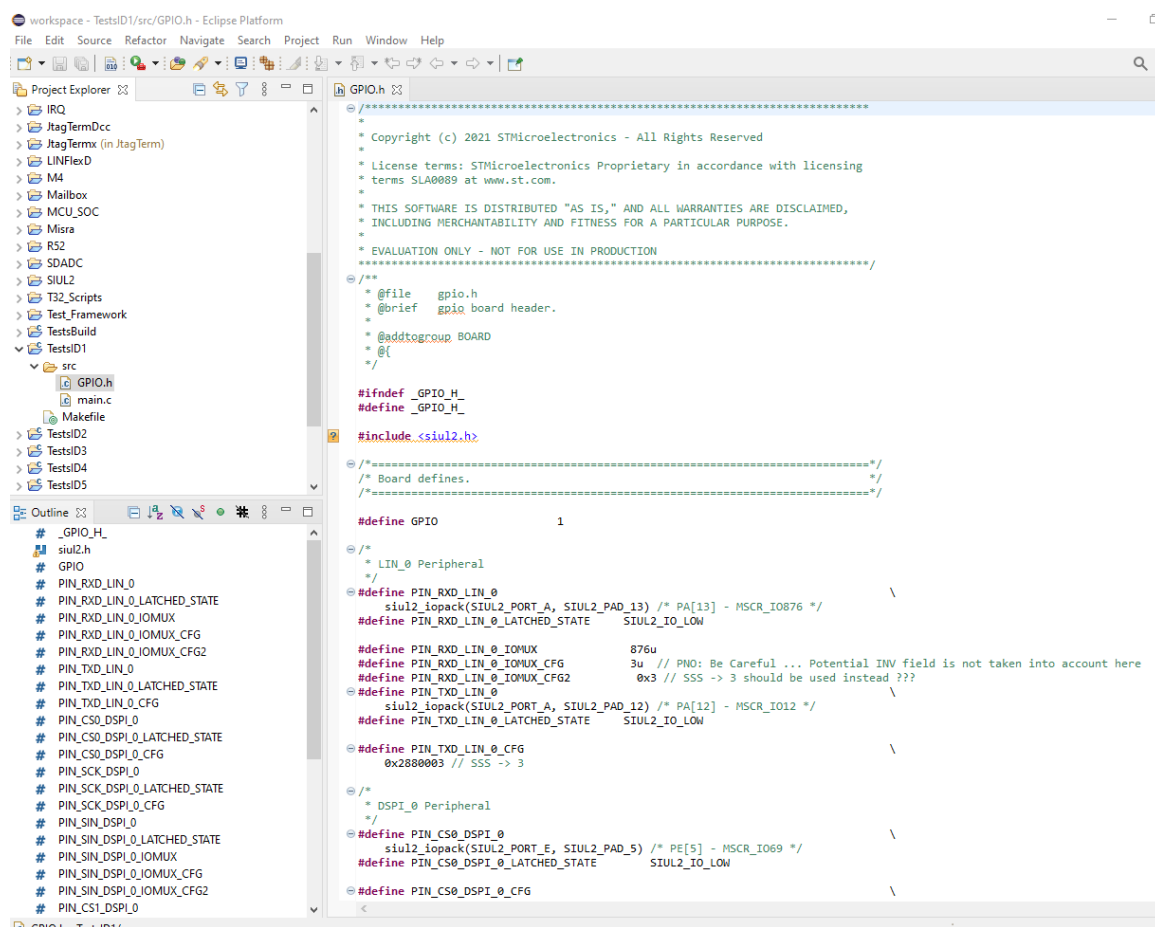
Figure 49: Copy your C file



Integrate it, in your favorite developer tool (Eclipse, Visual Studio Code and so on ..).

With contextual menu, paste your file.

Figure 50: Paste your C file in your favorite developer tool



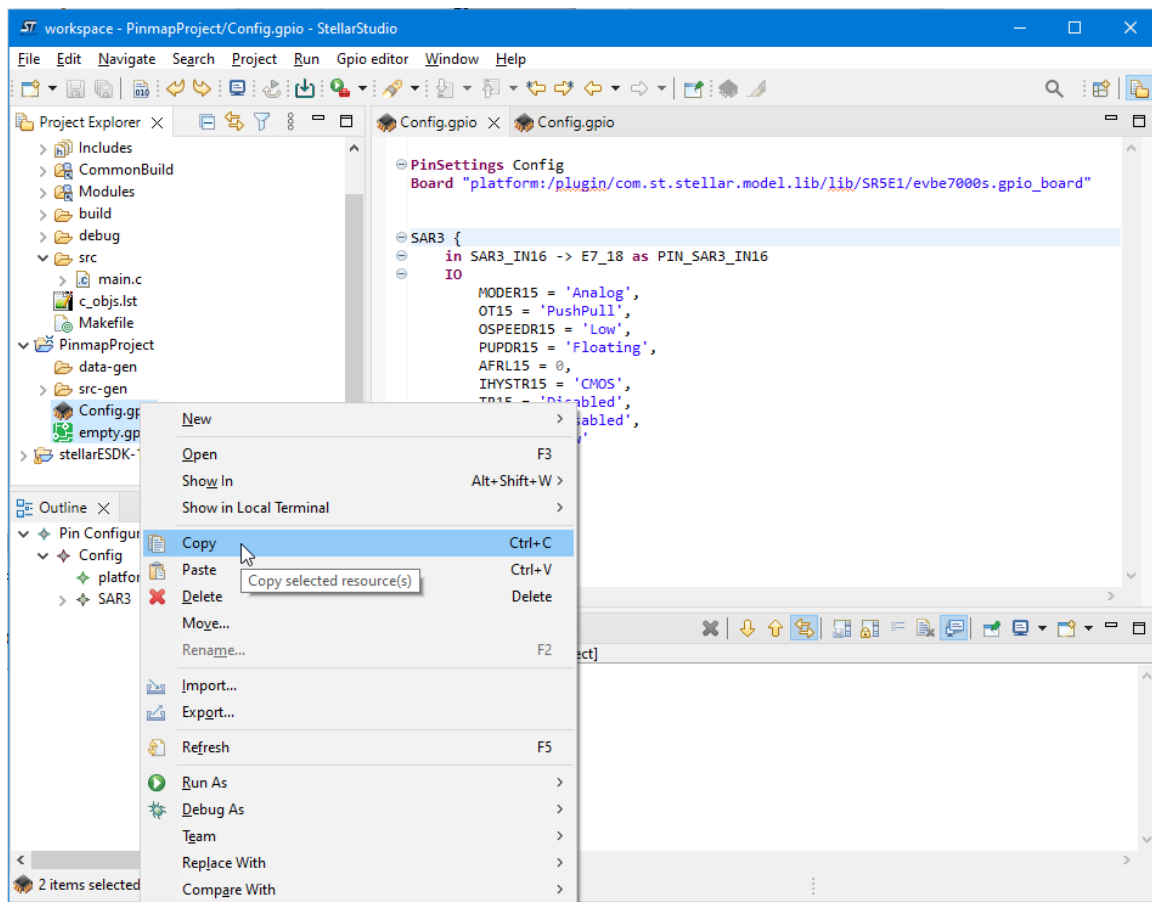
## 5.2 Integration of your gpio file

you can integrate your pinmap configuration in StellarStudio product

From StellarStudio pinmap configurator, select your *gpio* file

With contextual menu, copy your file

Figure 51: Copy your file

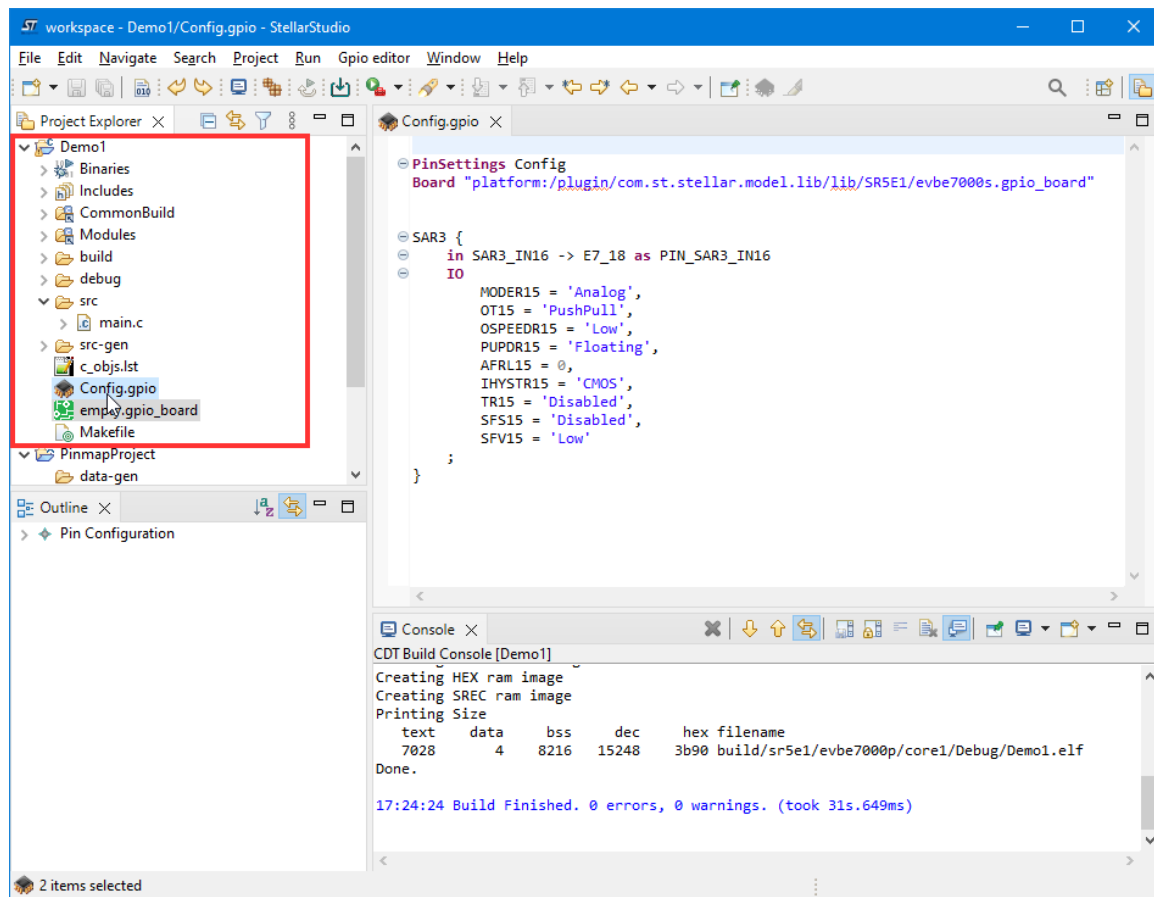


Integrate it, in StellarStudio product.

With contextual menu, paste your file in your favorite project.

after clicking yes on the conversion on a xtext project,

if your *gpio* is valid, generated files should be visible in *src-gen* folder

Figure 52: Paste your *gpio* file in StellarStudio product

### 5.3 Adapt project's Makefile

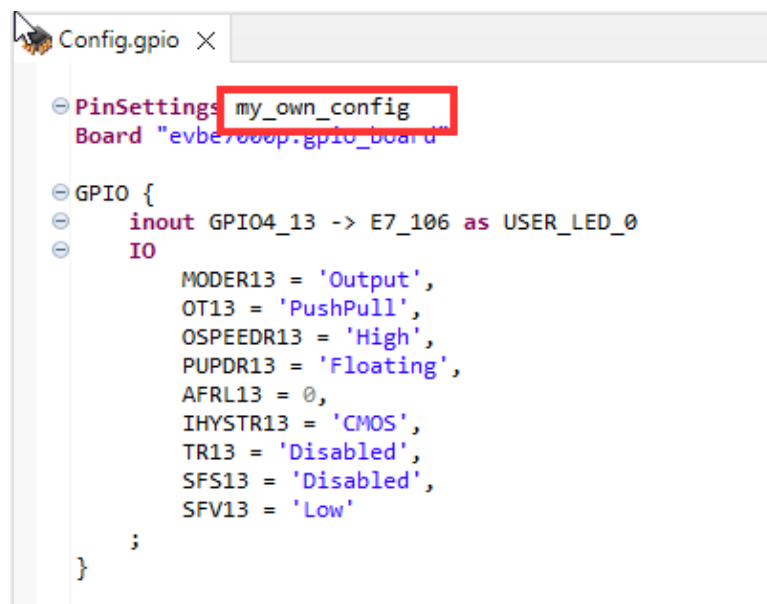
If you want your project to use the pinmap configuration that you've created, you'll need to adapt the Makefile to point to the correct generated configuration header file, generated from your *.gpio* file.

The default Makefile uses the board *evbe7000p* from the E-SDK, we need to replace this name with the name of the generated configuration header file.

The Makefile must contain the correct `CONFIG_BOARD` variable, and we need to adapt the `C_INCS`

1. `CONFIG_BOARD`: must contain the name of the configuration (i.e. the identifier directly following the PinSetting keyword in the *.gpio* file).

Figure 53: Name of the configuration to be used

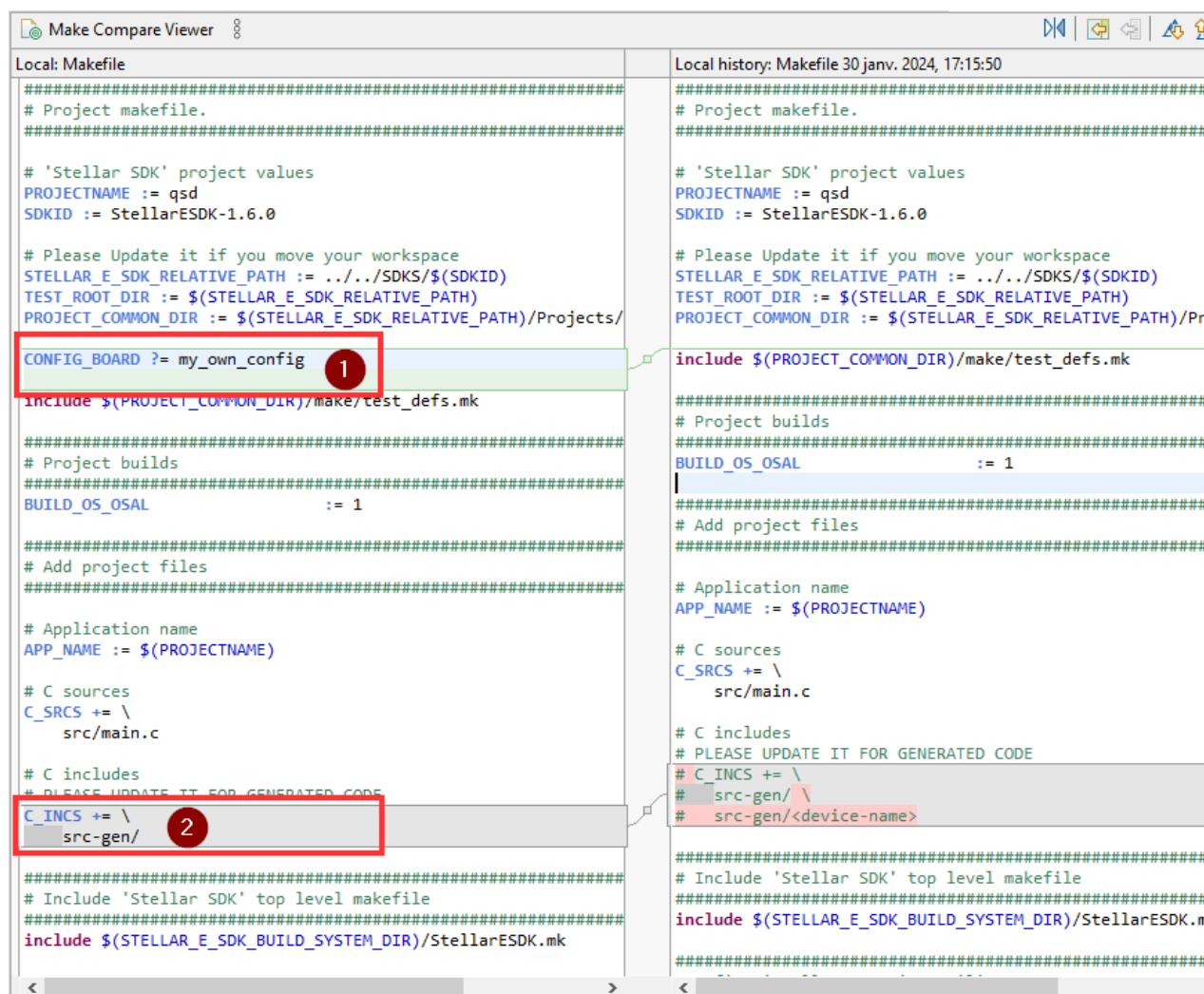


2. C\_INCS: must be augmented with the location of the folder containing the generated header file (i.e. src-gen project's folder).

Here are the two modifications, illustrated in the diff window below. The right part illustrates the default content of the Makefile, while the left part shows the modifications.



Figure 54: Adapt CONFIG\_BOARD and C\_INCS



Now that the Makefile is updated, you can compile your project, which now points to the good configuration.

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