

EFEM4RT1170UG

Enabling Additional Edgefast BT PAL Examples on M4 core for RT1170

Rev. 1 — 19 August 2021

User Guide

1 Introduction

RT1170 works with two cores: M7 and M4, on which both all EdgeFast examples can run. However, all the EdgeFast examples in the release package are enabled on M7. Only the A2DP source example is enabled on M4.

EdgeFast projects for both the cores share the demo source files but with different project settings. Therefore, the examples can be migrated.

This document describes the steps to migrate EdgeFast examples from M7 to M4 with different toolchains. There are four main steps required. Additionally, you can also delete the function.

1. Create an M4 project
2. Rearrange source files
3. Rearrange project files
4. Adjust project settings
5. Delete function

In this document, the `peripheral_ht` example is used to demonstrate how to enable EdgeFast examples on M4 core with IAR and ARMGCC.

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2 IAR

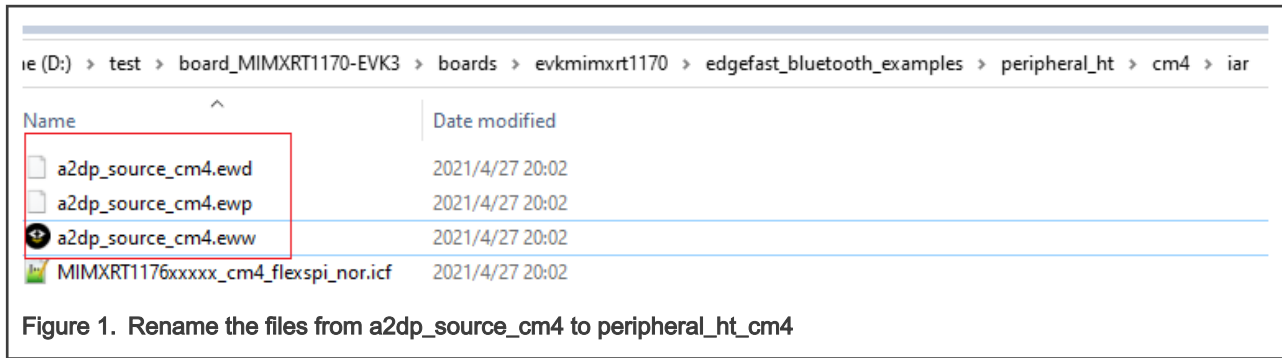
This section describes the steps to create an M4 project with IAR, rearrange source and project files, adjust project settings, and delete function.

2.1 Create an M4 project

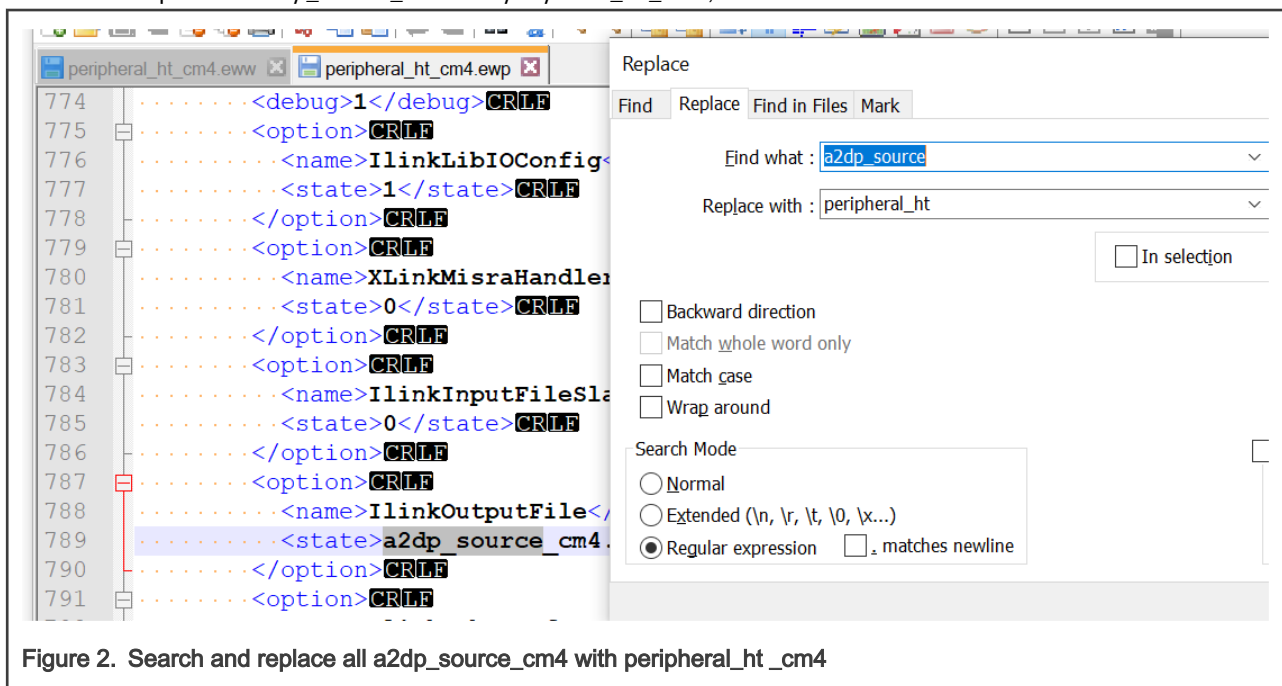
To create an M4 project, perform the following steps:

1. Copy the folder `cm4` in the directory `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\source\cm4` into the folder in which the example should be enabled. In this case, copy the folder `cm4` into the directory `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht`.
2. Open the folder `iar` in the directory `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\iar`.
3. Rename the files. Change the file name `a2dp_source_cm4` to `peripheral_ht_cm4` in all the respective files.





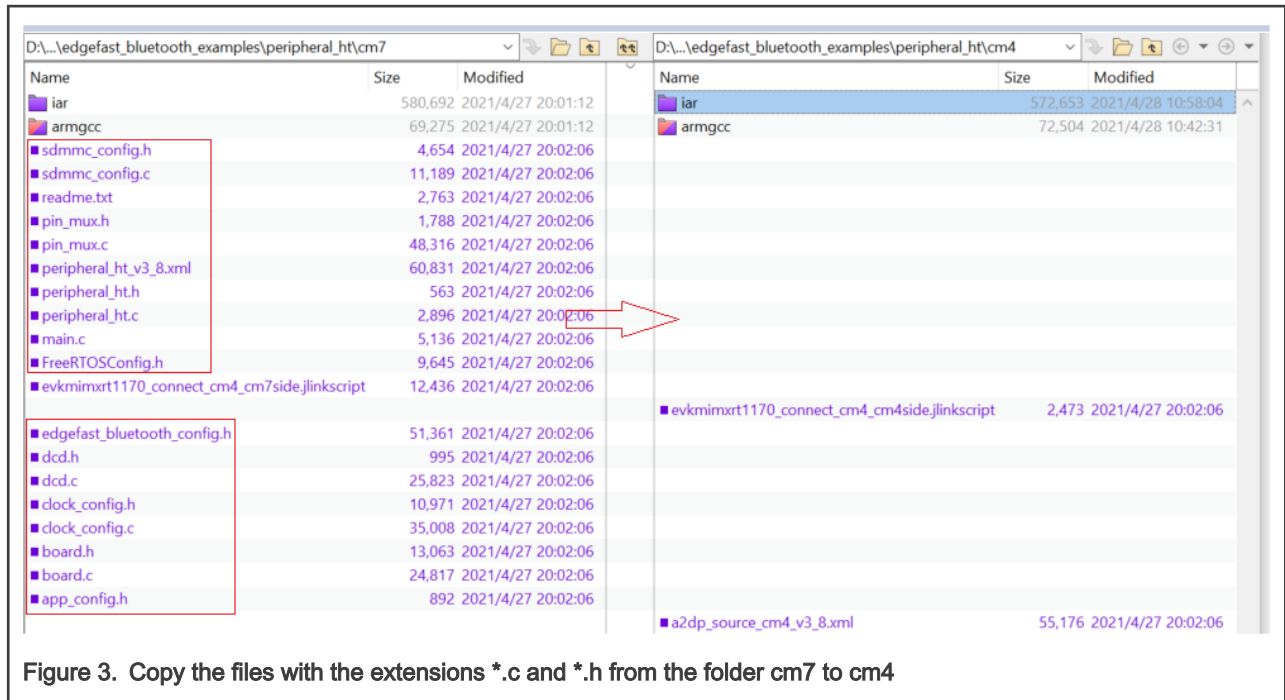
- Open the files *peripheral_ht_cm4.eww* and *peripheral_ht_cm4.ewp* with a text editor, such as Notepad, Notepad++, Sublime, or Visual Studio Code.
- Search and replace all *a2dp_source_cm4* with *peripheral_ht_cm4*, and then save the files.



2.2 Rearrange source files

To rearrange source files, perform the following steps:

- Open the folder *cm4* in the directory `<install_dir> boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4` and delete all files with the extensions **.c* and **.h*.
- Copy the files with the extensions **.c* and **.h* from the folder `boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7` to the folder `<install_dir> boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4`.



2.3 Rearrange project files

To rearrange project files, perform the following steps:

- Open the *peripheral_ht_cm7* and *peripheral_ht_cm4* IAR projects in the directories
`<install_dir>boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\iar` and `<install_dir>boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\iar`.
 - Compare the whole project directory, find file groups that the cm7 project has but are missing in the cm4 project. Add the missing file groups from the cm7 project into the cm4 project.
 - Compare the difference between the two groups with the same name. Remove files that do not exist in the cm7 project but exist in the cm4 project. Find files that are available in the cm7 project but are missing in the cm4 project. Add the missing files from the cm7 project into the cm4 project.
- For example, in [Figure 4](#), the files in the source group in the cm4 project must be removed, and the files in the path:
`<install_dir>boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht` with the same name as the files in the cm7 project must be added into the *source* group.

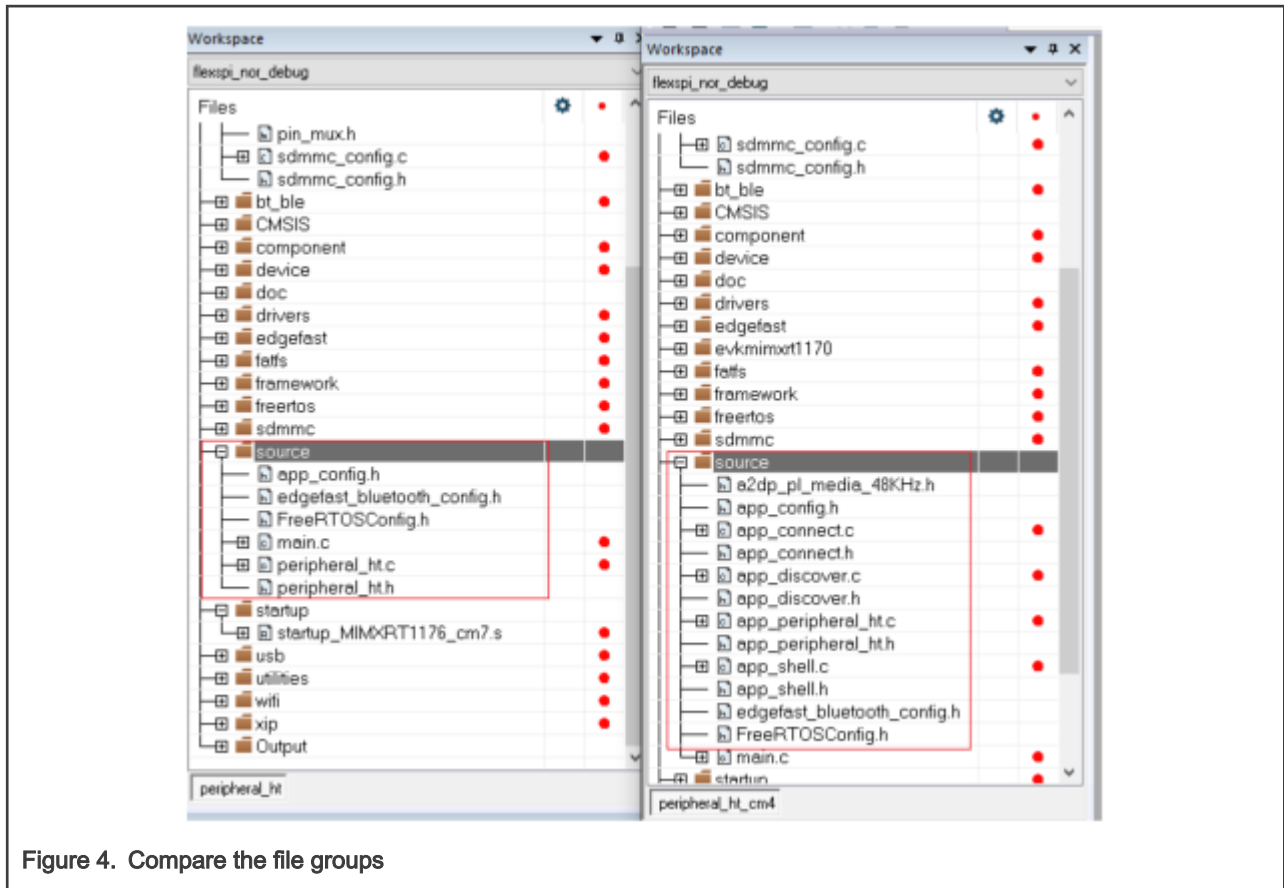


Figure 4. Compare the file groups

3. Compare the *services* group.

The peripheral hts profile is in the *services* folder. Add the hts.c file to the *services* group of the *cm4* folder.

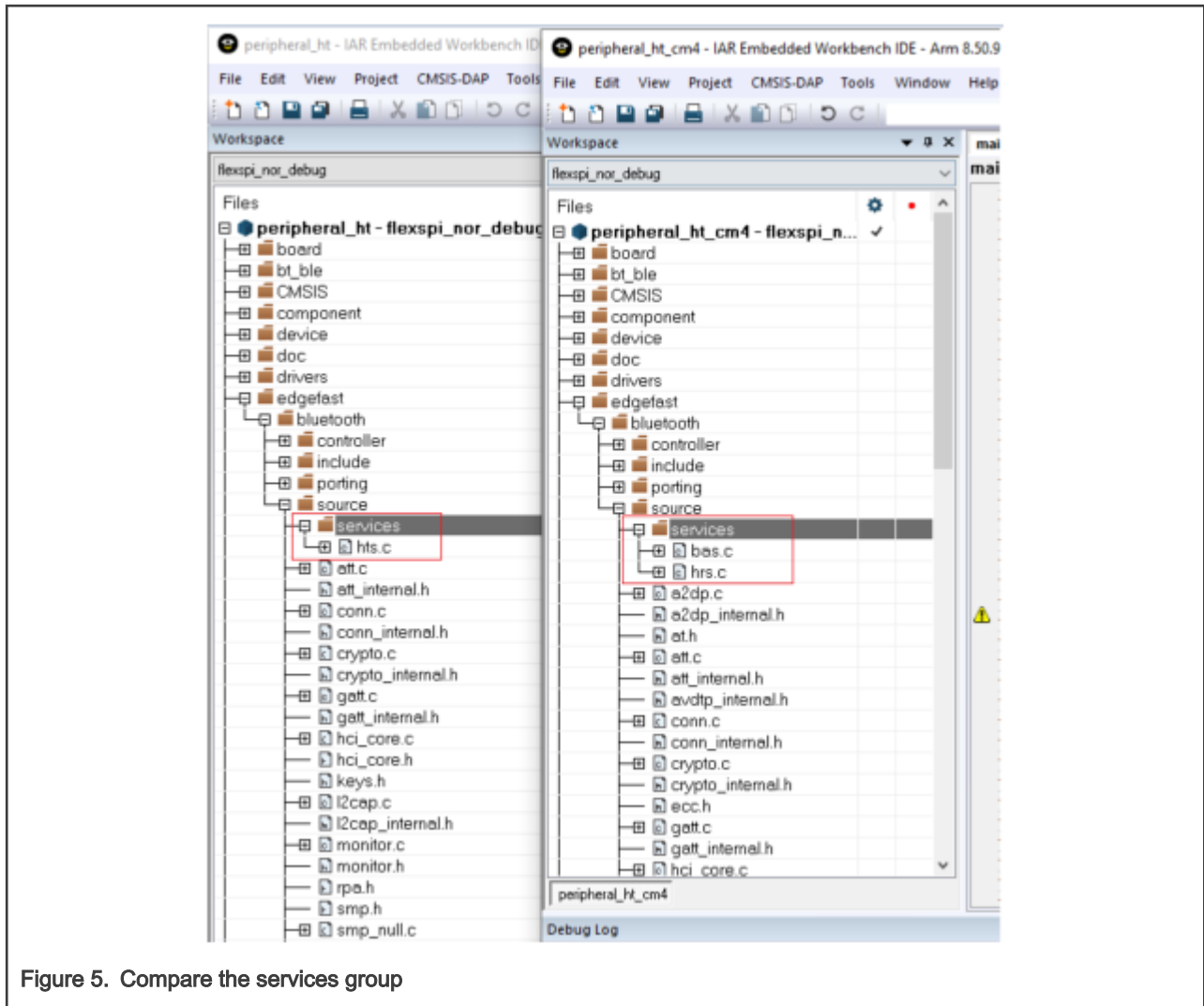


Figure 5. Compare the services group

2.4 Adjust project settings

To adjust the project settings, perform the following steps:

1. Compare the macro in the project settings: **Option > C/C++ compiler > Preprocessor**.
2. Find the macros that do not exist in the **cm4** project but are available in the **cm7** project. Delete these macro. The rule is that **m7** macro setting should be same with **m4**.

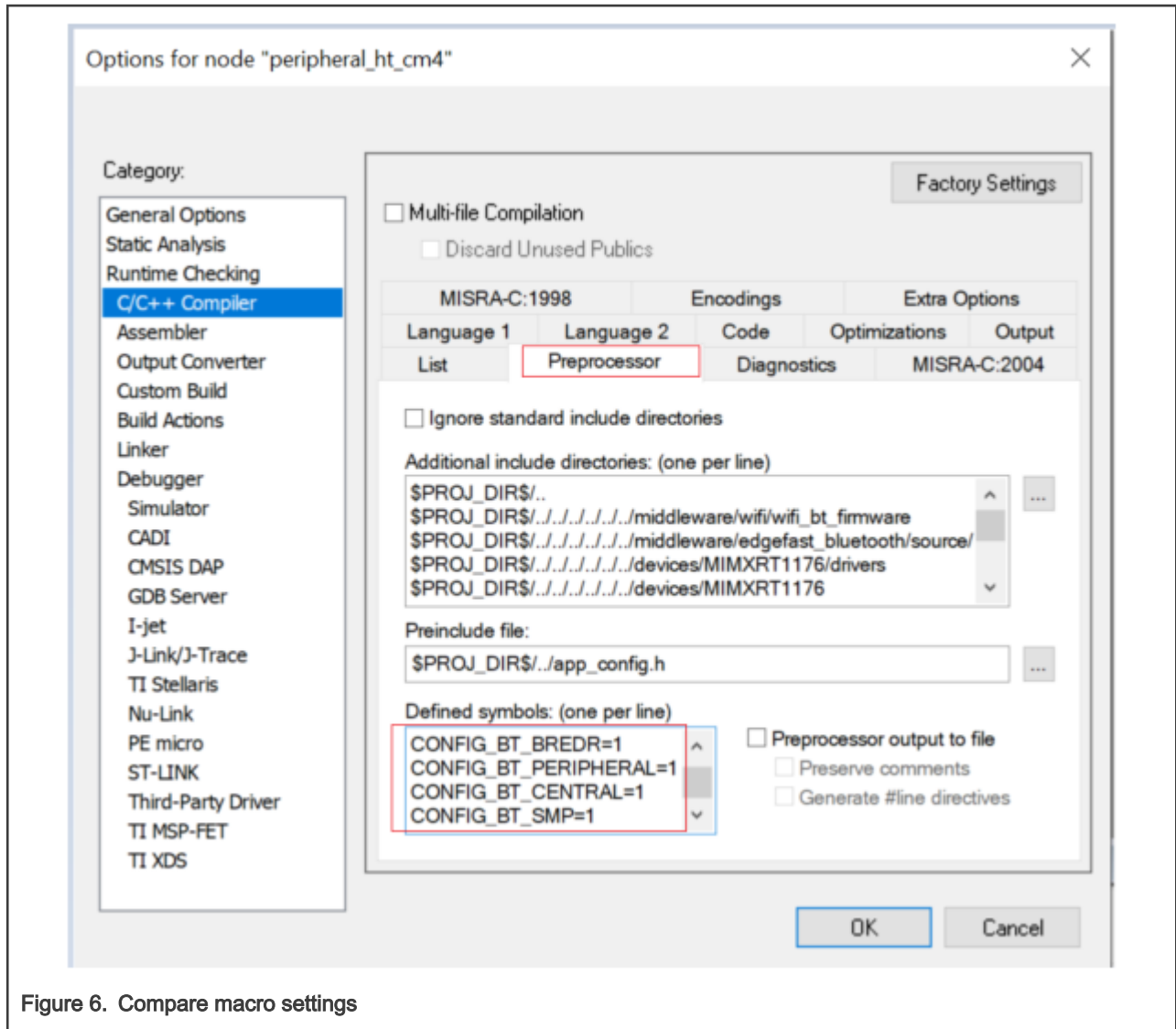


Figure 6. Compare macro settings

The macros are in the **peripheral_ht_cm4.ewp** file.

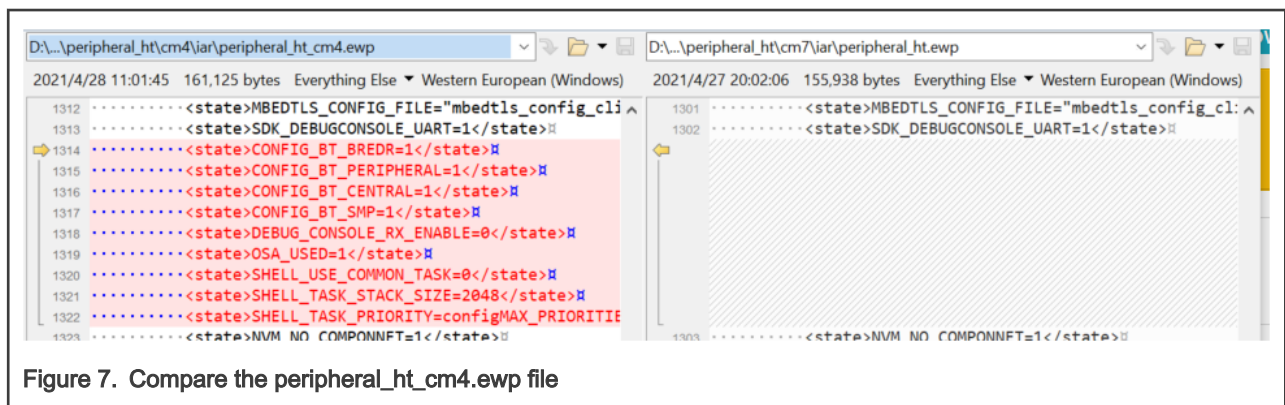


Figure 7. Compare the peripheral_ht_cm4.ewp file

2.5 Delete function

As a final step, remove the function "*SCB_DisableDCache()*" in *main.c*.

On the completion of the above steps, the M7 project successfully migrates to an M4 project. You can now download and debug the M4 example project.

3 Arm GCC

This section describes the steps to create an M4 project with Arm GCC, rearrange source and project files, adjust project settings, and delete function.

3.1 Create an M4 project

To create an M4 project, perform the following steps:

1. Copy the folder `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\la2dp_source\cm4` into another folder in which the example should be enabled. In this case, copy the folder `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\la2dp_source\cm4` into `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4`.
2. Open the file `CMakeLists.txt` located in the path: `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\armgcc`.
3. Search and replace all `a2dp_source_cm4` with `peripheral_ht_cm4`, and then save the files.

3.2 Rearrange source files

To rearrange source files, perform the following steps:

1. Open the folder `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4` and delete all files with the extensions `*.c` and `*.h`.
2. Copy the files with the extensions `*.c` and `*.h` in the folder `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7` to the folder `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4`.

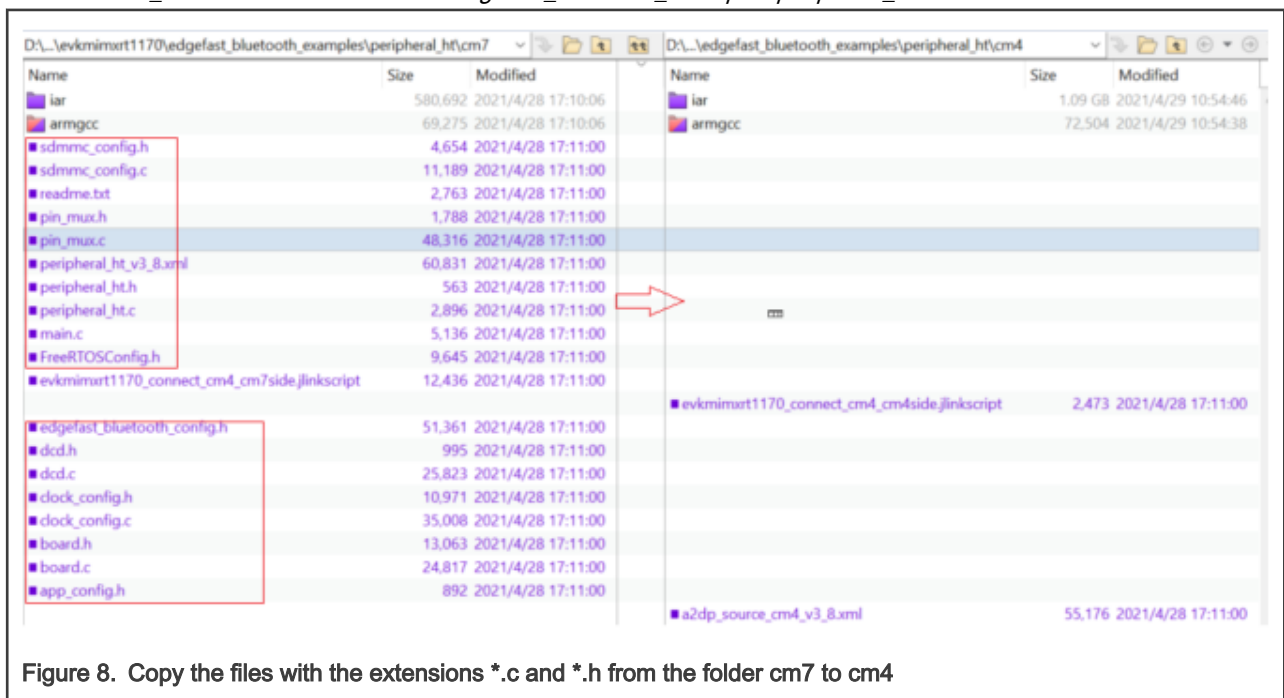


Figure 8. Copy the files with the extensions `*.c` and `*.h` from the folder `cm7` to `cm4`

3.3 Rearrange project files

To rearrange project files, perform the following steps:

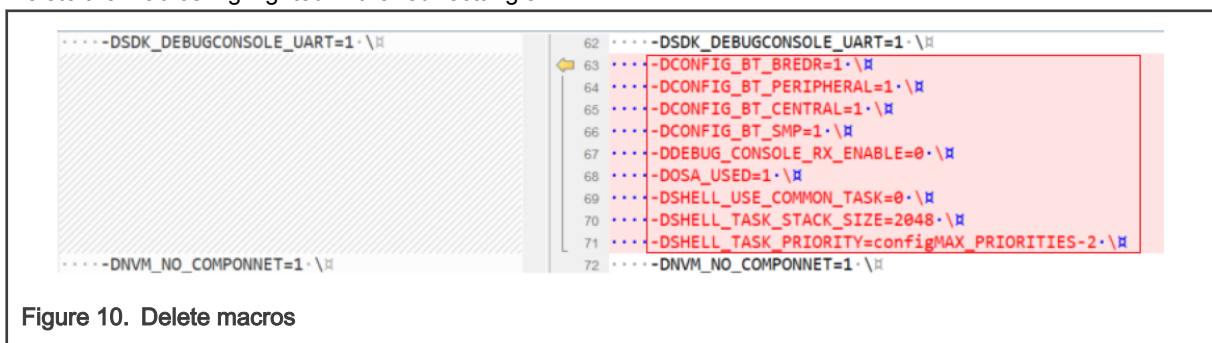
1. Open the *CMakeLists.txt* of the two examples respectively. The two files are in the `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\armgcc` and `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\armgcc` folders respectively.
2. Search the section *add_executable*. Compare the difference between the two sections. Remove files that do not exist in the *cm7* project but are available in the *cm4* project. Add the files that exist in the *cm7* project but are not available in the *cm4* project into the *cm4* project. For example, in [Figure 9](#) the files in the red box should be removed and the files in the green box must be added into the *cm4* project.



3.4 Adjust project setting

To adjust the project settings, perform the following steps:

1. Open the *flags.cmake* of the two examples respectively. The two files are in the `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\armgcc` and `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\armgcc` folders respectively.
2. Search the **CMAKE_C_FLAGS_DEBUG** section.
 - a. Compare the macro between the two sections.
 - b. Add the macros that do not exist in the **cm4** project but are available in the **cm7** project into the **cm4** project. The rule is that macro setting should be same.
 - c. Delete the macros highlighted in the red rectangle.



3.5 Delete function

As a final step, remove the function `SCB_DisableDCache()` in `main.c`.

On the completion of the above steps, the M7 project successfully migrates to an M4 project. You can now download and debug the M4 example project.

4 MDK

This section describes the steps to create an M4 project with MDK, rearrange source and project files, adjust project settings, and delete function.

4.1 Create an M4 project

1. Copy folder `cm4` from `<install_dir>\boards\evkmimxrt1170\edgefast_bluetooth_examples\la2dp_source\cm4` into the folder in where the example must be enabled. In this case, copy folder `cm4` into directory `<install_dir>\boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht`.
2. Open folder `mdk` from `<install_dir>\boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\mdk`.

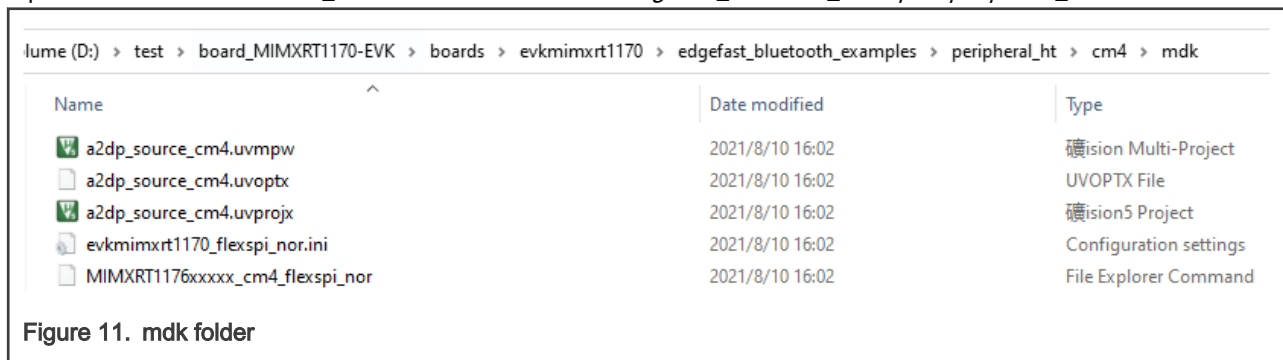


Figure 11. mdk folder

3. Change the filename `a2dp_source_cm4` to `peripheral_ht_cm4` respectively.
4. Open the files `peripheral_ht_cm4.uvmpw` and `peripheral_ht_cm4.uvoptx`, `peripheral_ht_cm4.uvprojx` with a text editor, such as Notepad, Notepad++, Sublime, or Visual Studio code.
5. Search and replace `a2dp_source_cm4` with `peripheral_ht_cm4`, and then save the files.

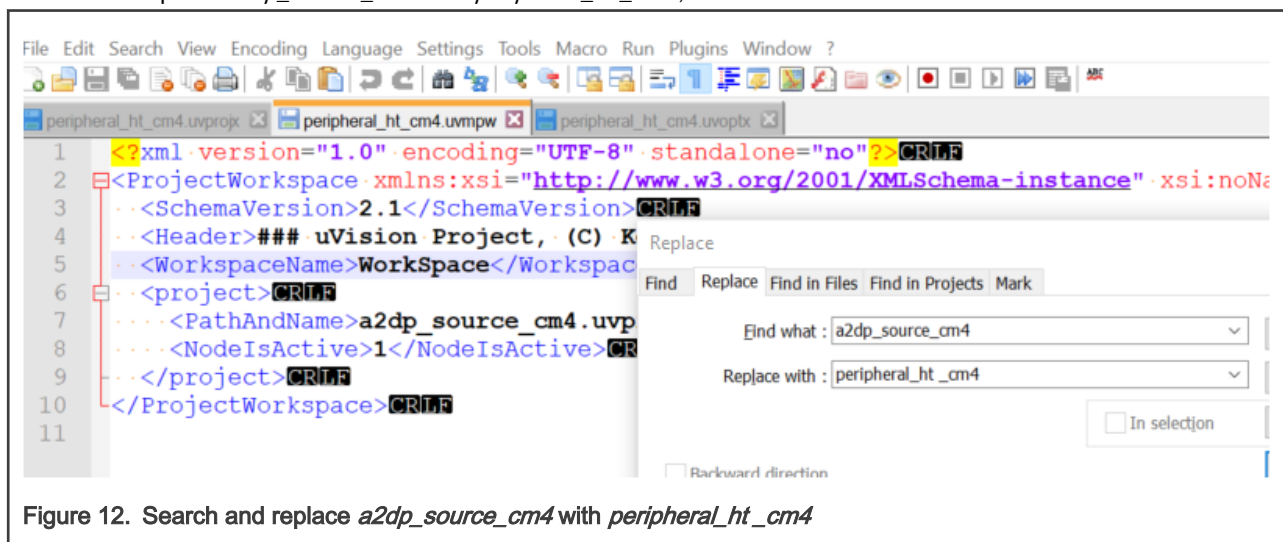


Figure 12. Search and replace `a2dp_source_cm4` with `peripheral_ht_cm4`

4.2 Rearrange source files

1. Open folder *cm4* in `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4`, and delete all files with the `.c` and `.h` file name extension.
2. Copy files with the `.c` and `.h` filename extension in folder *cm7* with directory `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7` to folder *cm4* with directory `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4`.

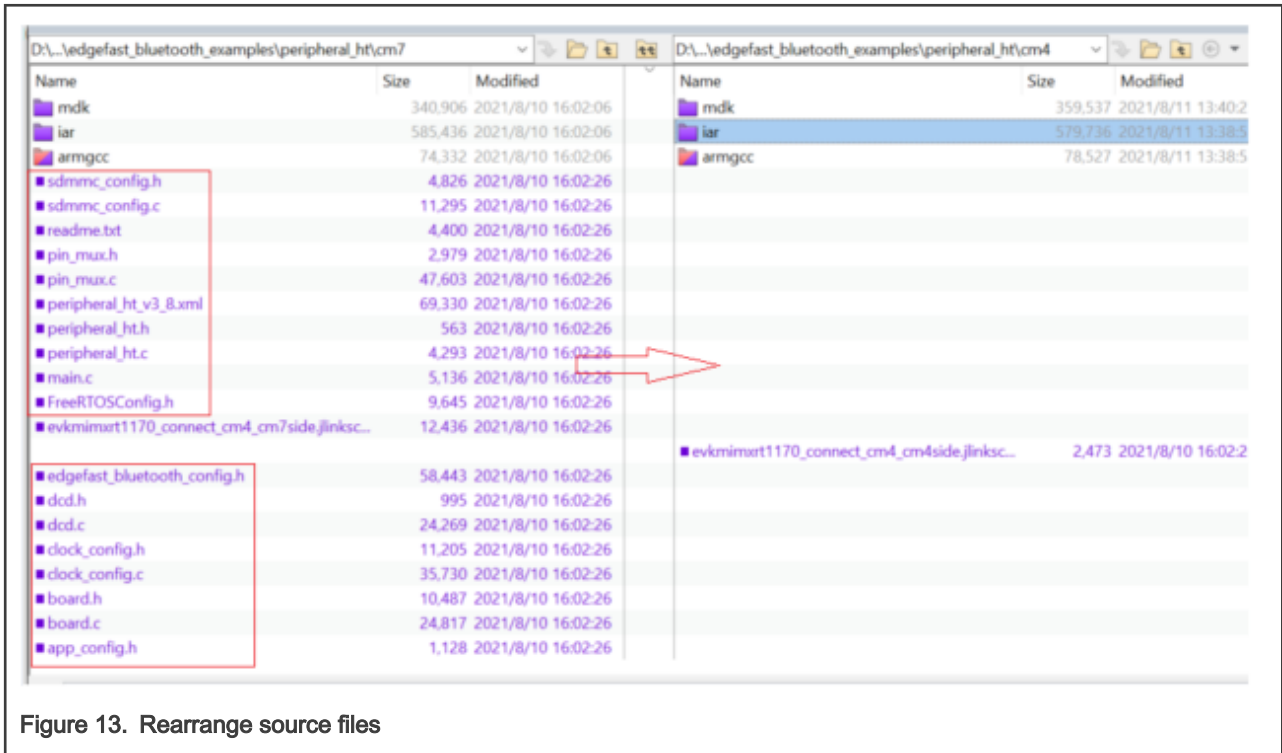


Figure 13. Rearrange source files

4.3 Rearrange project files

1. Open the *peripheral_ht_cm7* and *peripheral_ht_cm4* IAR projects. The two workspaces are located in `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\mdk` and `<install_dir>boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4\mdk` respectively.
 - Compare the whole project directory, find file groups that the *cm7* project has but the *cm4* project not and then add these groups into the *cm4* project.
 - Compare the difference between the two groups with the same name, remove files that do not exist in the *cm7* project but exist in the *cm4* project; find files that the *cm7* project has but the *cm4* project not and then add these files into the *cm4* project.
2. For the *source* group, in this case, the files in the source group in the *cm4* project must be removed, and the files in the path `<install_dir>boards\levkmimxrt1170\boards\levkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4` with the same name as the files in the *cm7* project must be added into the *source* group.

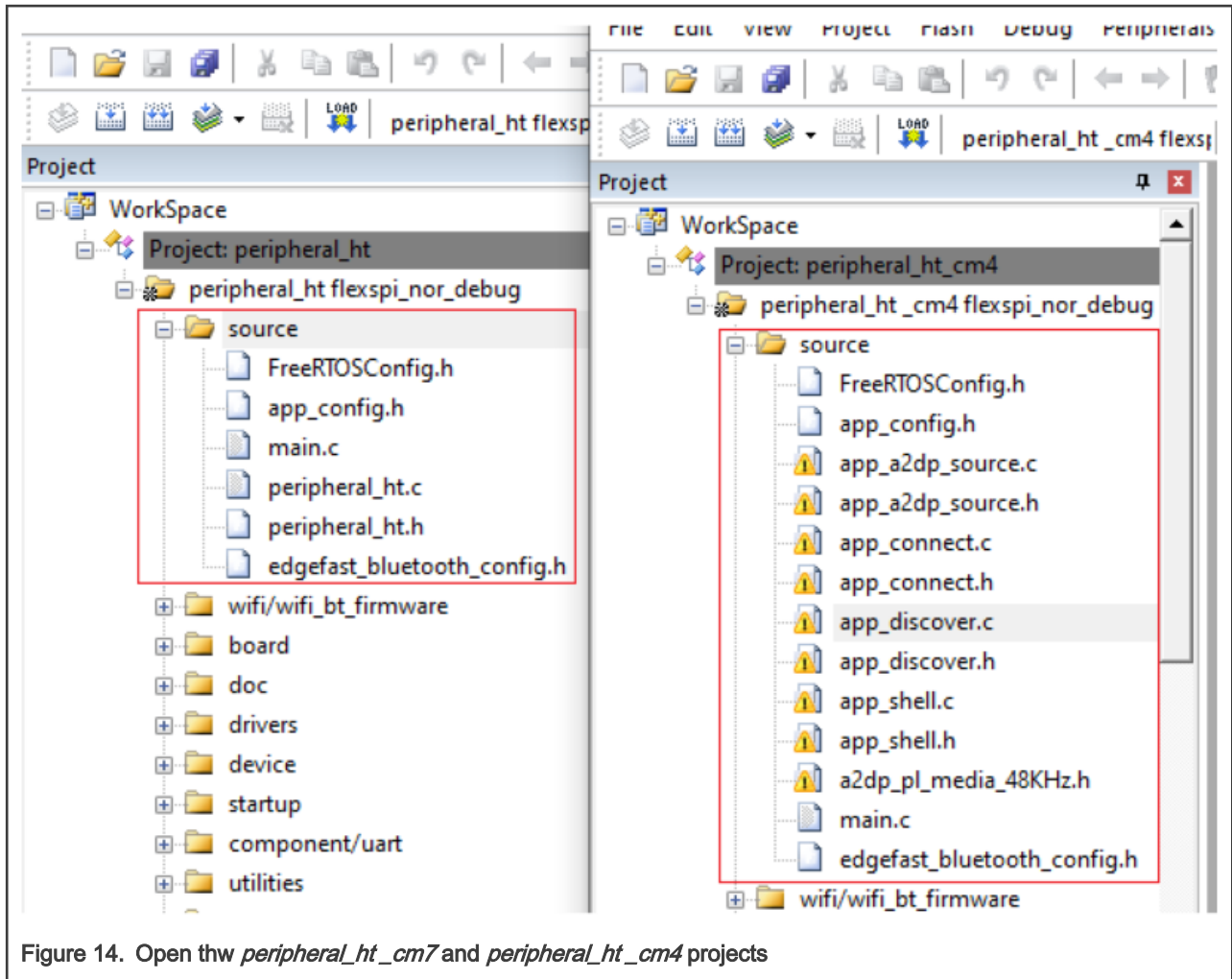


Figure 14. Open thw *peripheral_ht_cm7* and *peripheral_ht_cm4* projects

3. Compare the **service** group.

Peripheral hts profile is located in "**service**" folder. Add the hts.c file to the services group of the cm4 folder.

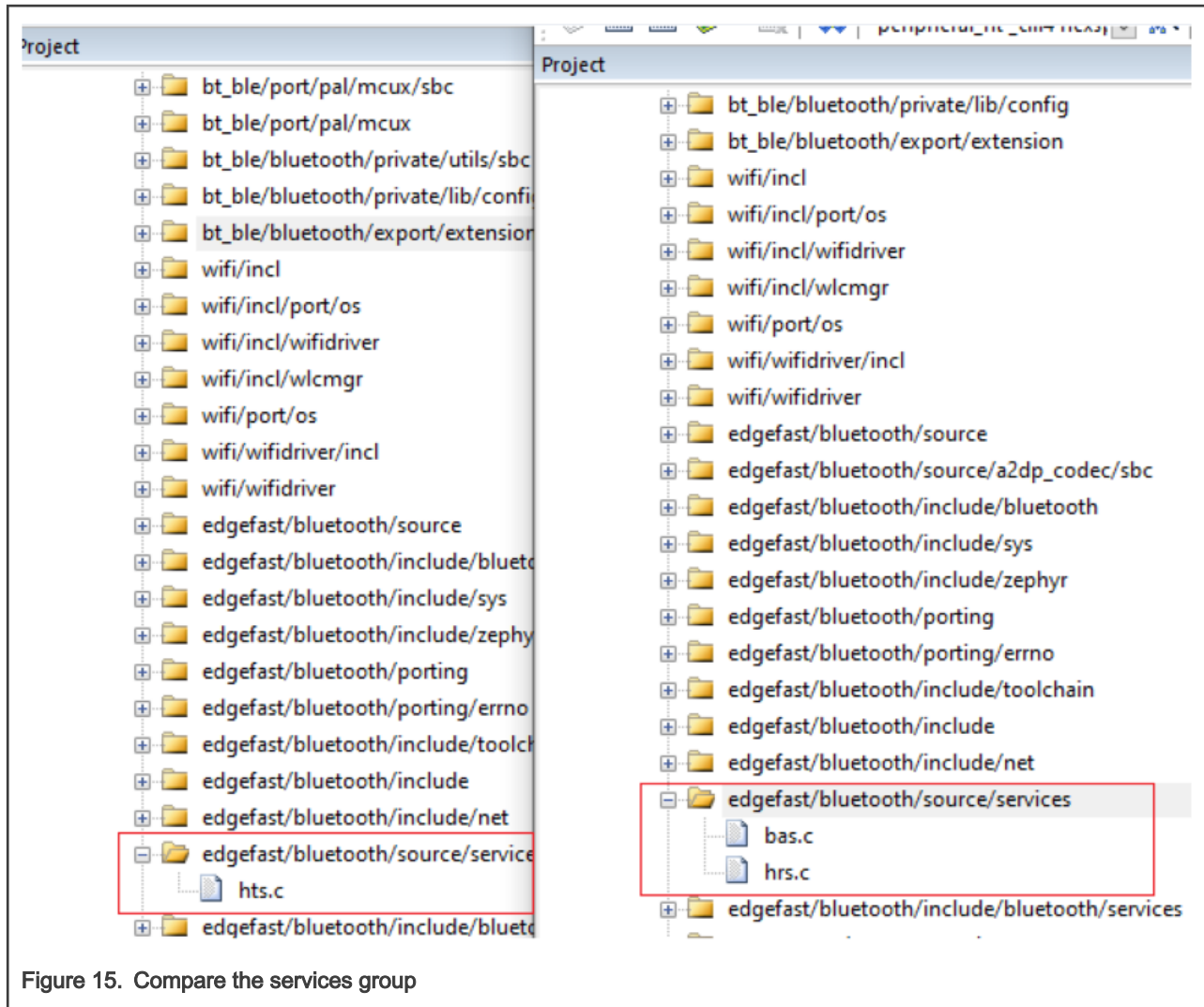


Figure 15. Compare the services group

4.4 Adjust project settings

1. Compare the macro in the project settings: *preprocessor symbols*.
2. Compare the macro that does exist in the cm4 project but exists in the cm7 project.
3. Delete the following macro. The rule is that m7 macro setting should be same as m4 .

The macro could also be found in be eripheral_ht_cm4.uvprojx.

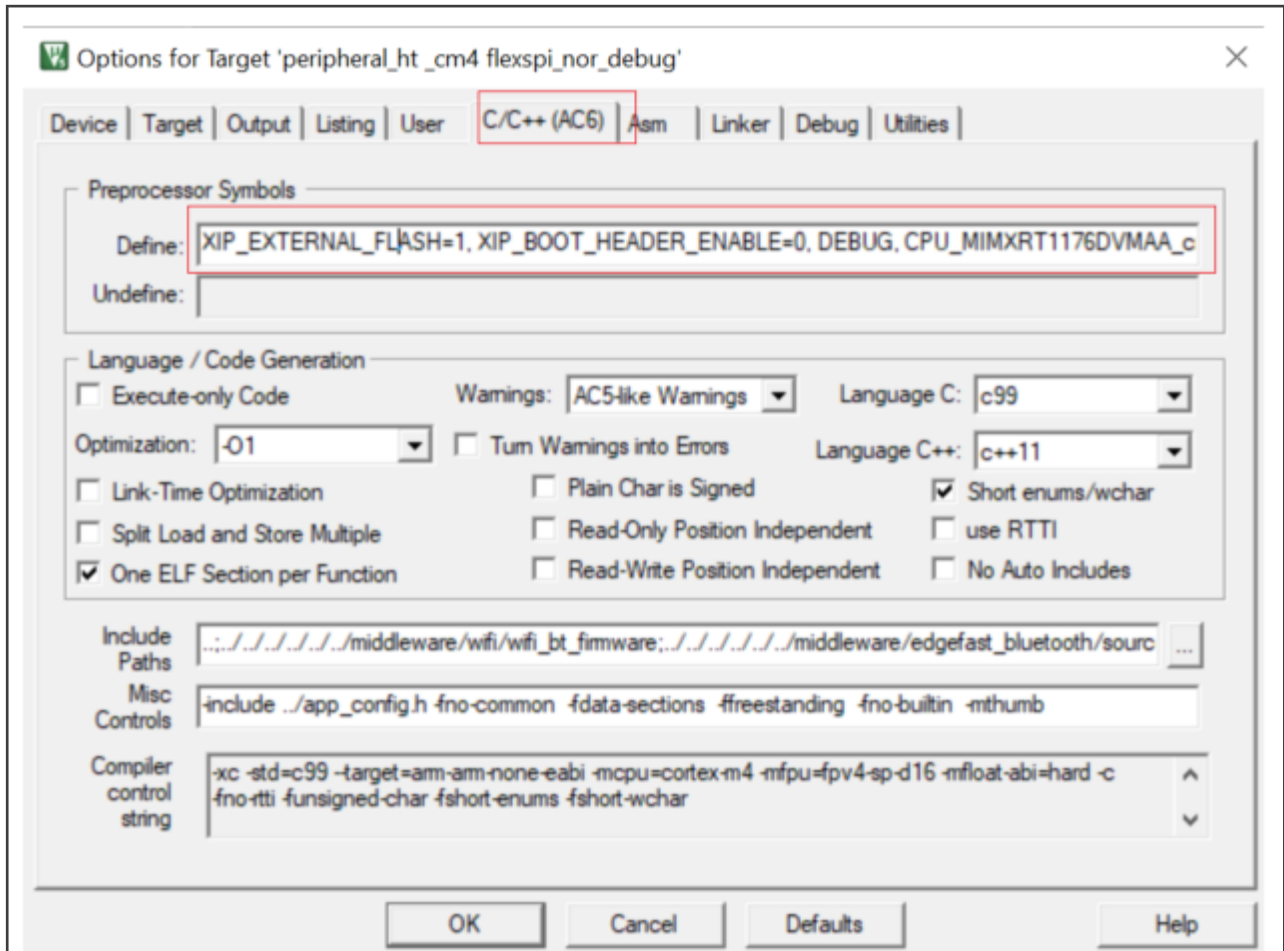


Figure 16. Compare preprocessor symbols

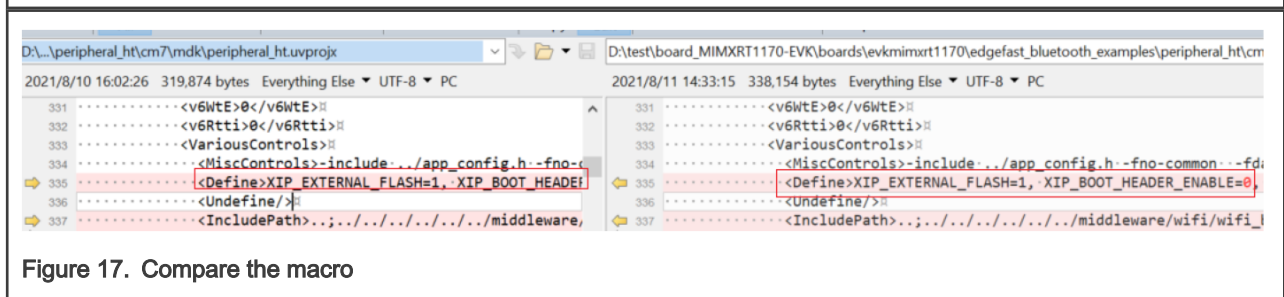


Figure 17. Compare the macro

4.5 Delete function

Remove function `SCB_DisableDCache()` in `main.c`.

On successful completion of the above steps, the M7 project is changed to the M4 project. You can now download and debug the M4 example project.

5 Note

The above steps are based on the **a2dp_source** example and help enable the **peripheral_ht** example on the **m4** core. You can use the same steps for other examples and migrate them from an **m7** project to an **m4** project.

6 Revision history

[Table 1](#) summarizes revisions to this document.

Table 1. Revision history

Revision number	Date	Substantive changes
0	10 June 2021	Initial release
1	19 August 2021	Updated for MCUXSDK 2.10.1

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