EFEM4RT1170UG

Enabling Additional Edgefast BT PAL Examples on M4 core for RT1170

Rev. 4 — 27 July 2023 User manual

Document Information

Information	Content
Keywords	EdgeFast examples, M7, M4, toolchains, IAR, ARMGCC
Abstract	This document describes the steps to migrate EdgeFast examples from M7 to M4 with different toolchains

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.

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\evkmimxrt1170\edgefast_bluetooth_examples \a2dp_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\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht*.
2. Open the folder *iar* in the directory *<install_dir>boards\evkmimxrt1170\edgefast_bluetooth_examples \peripheral_ht\cm4\iar*.
3. Rename the files. Change the file name name *a2dp_source_cm4* to *peripheral_ht_cm4* in all the respective files.

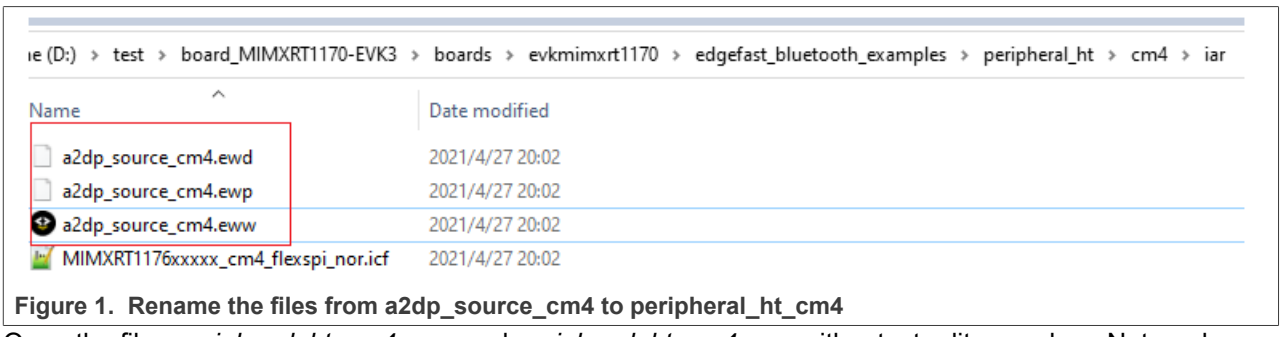

Figure 1. Rename the files from a2dp_source_cm4 to peripheral_ht_cm4

4. 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.
5. Search and replace all *a2dp_source_cm4* with *peripheral_ht _cm4*, and then save the files.

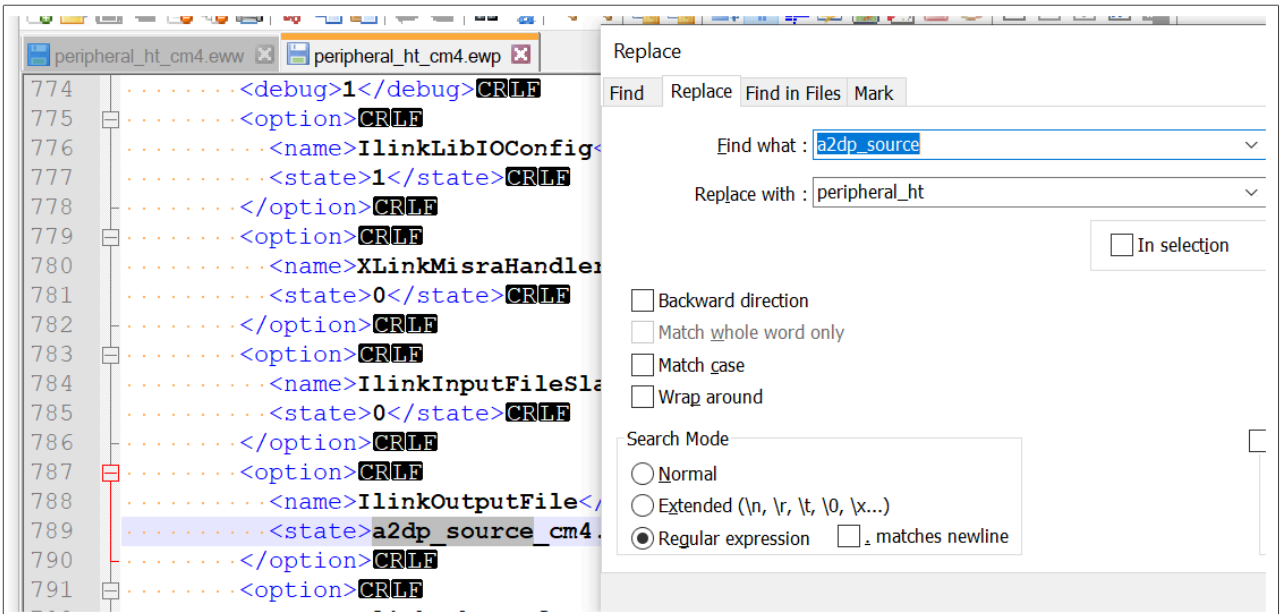

Figure 2. Search and replace all a2dp_source_cm4 with peripheral_ht _cm4

2.2 Rearrange source files

To rearrange source files, perform the following steps:

1. 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.
2. 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_exa mples\peripheral_ht\cm4*.

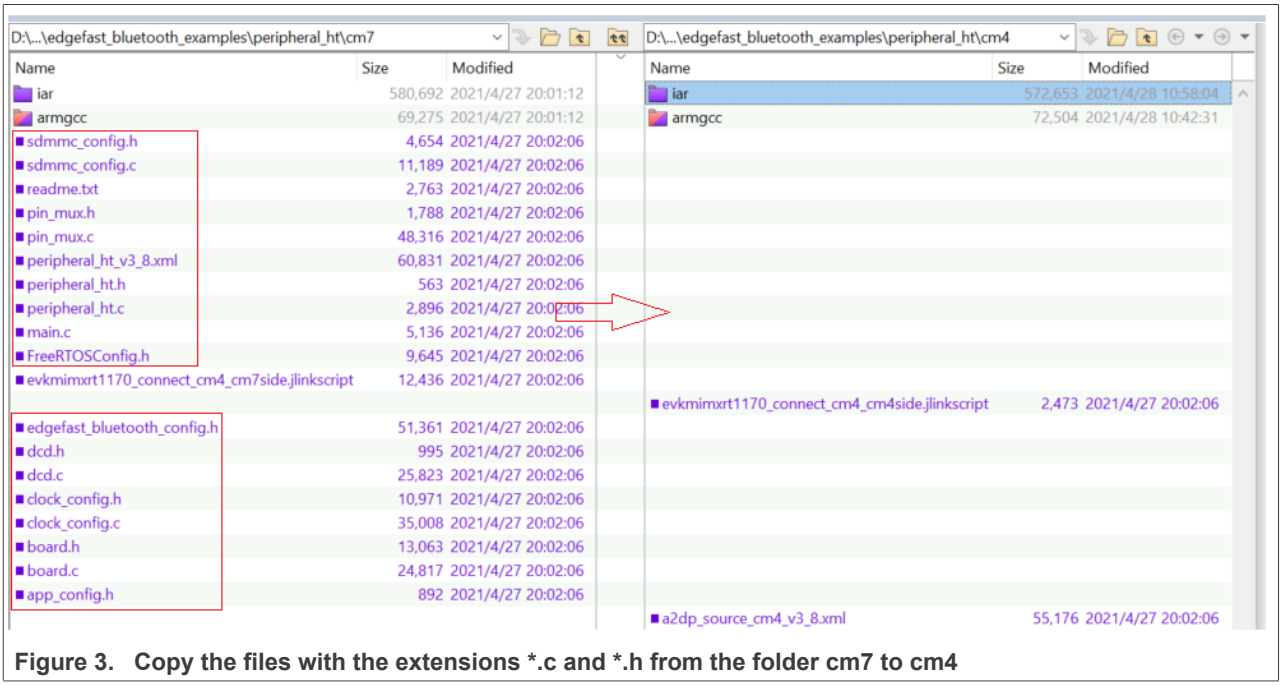

Figure 3. Copy the files with the extensions *.c and *.h from the folder cm7 to cm4

2.3 Rearrange project files

To rearrange project files, perform the following steps:

1. 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*.
   a. 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.
   b. 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.
2. 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.

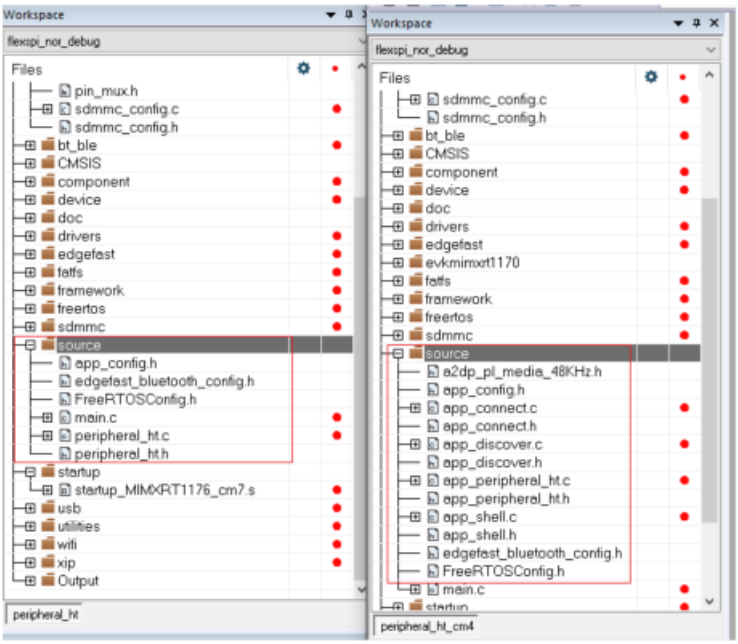

Figure 4. Compare the file groups

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.

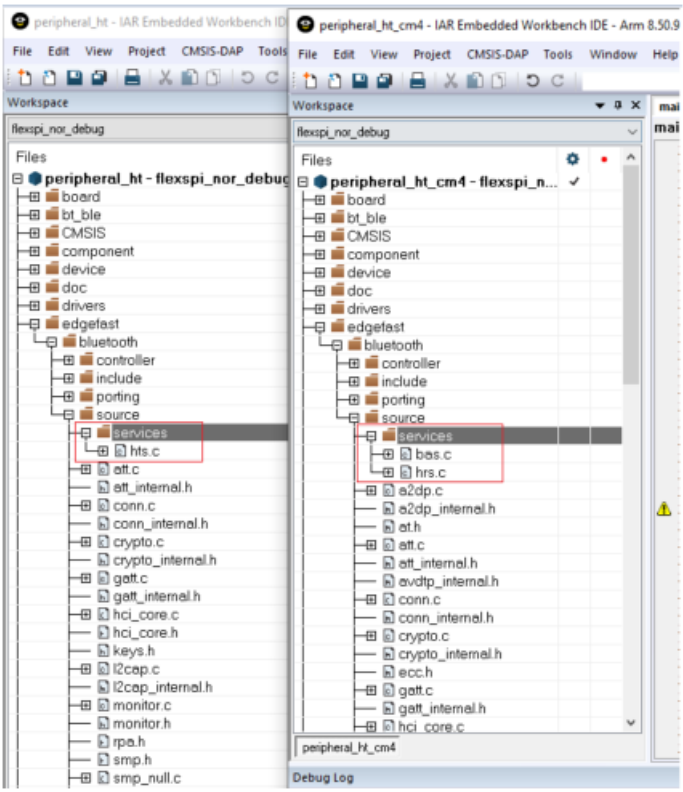

Figure 5. Compare the services group

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**.

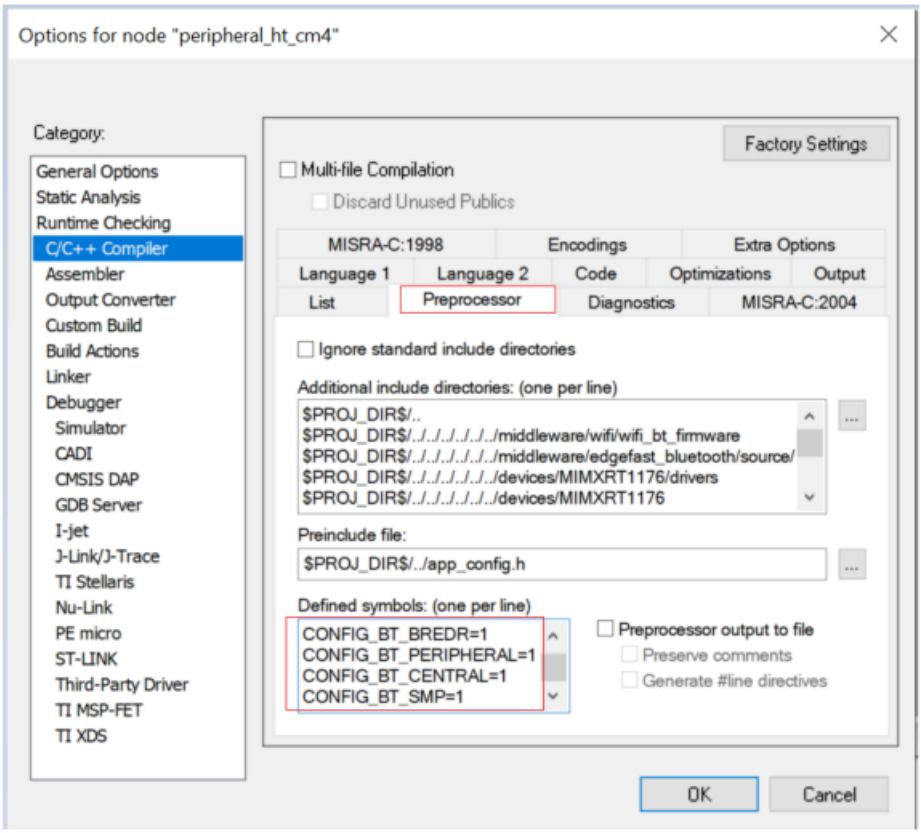

Figure 6. Compare macro settings

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

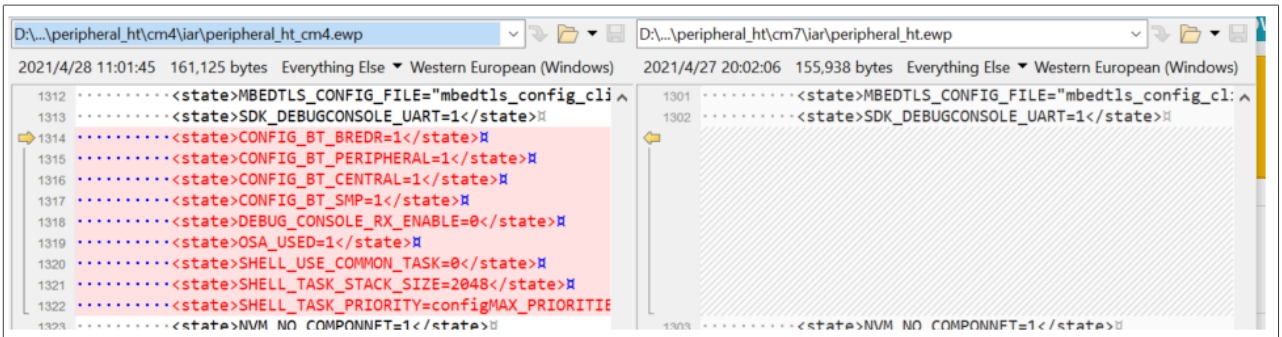

Figure 7. Compare the peripheral_ht_cm4.ewp file

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\evkmimxrt1170\edgefast_bluetooth_examples\a2dp_source \cm4* into another folder in which the example should be enabled. In this case, copy the folder *<install_dir> boards\evkmimxrt1170\edgefast_bluetooth_examples\a2dp_source \cm4* into *<install_dir> boards \evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4*.
2. Open the file *CMakeLists.txt* located in the path: *<install_dir> boards\evkmimxrt1170\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\evkmimxrt1170\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\evkmimxrt1170\edgefast_ bluetooth_examples\peripheral_ht\cm7* to the folder *<install_dir>boards\evkmimxrt1170\edgefast_ bluetooth_examples\peripheral_ht\cm4*.

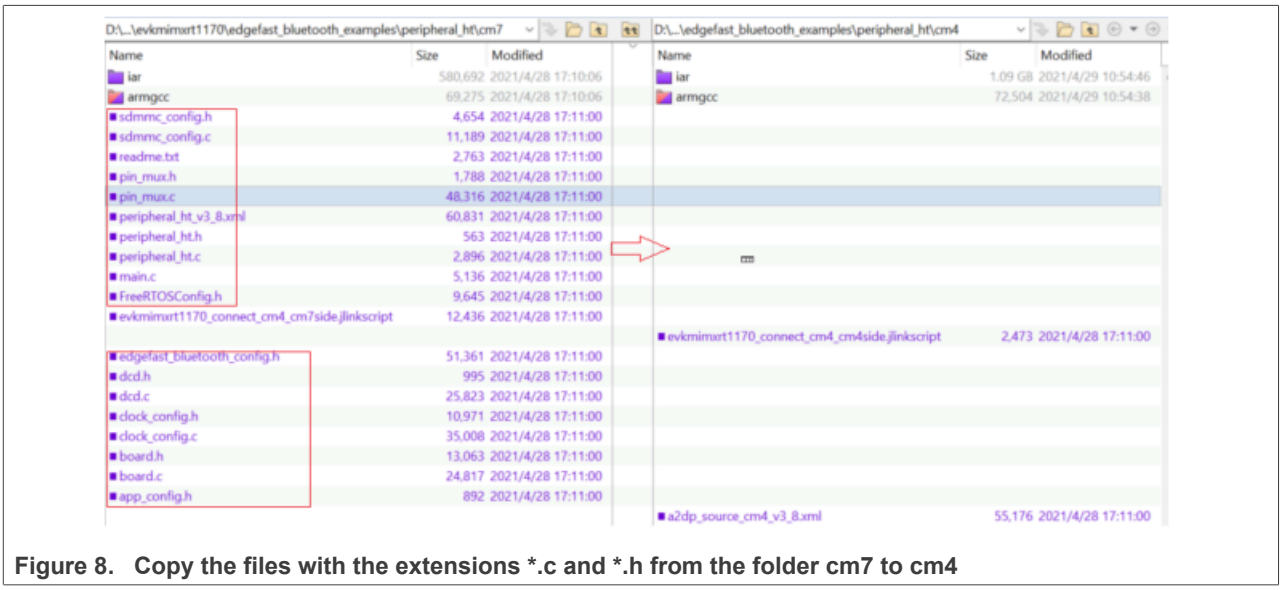

Figure 8. Copy the files with the extensions *.c and *.h from the folder cm7 to cm4

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 \evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\armgcc* and *<install_dir>boards \evkmimxrt1170\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.

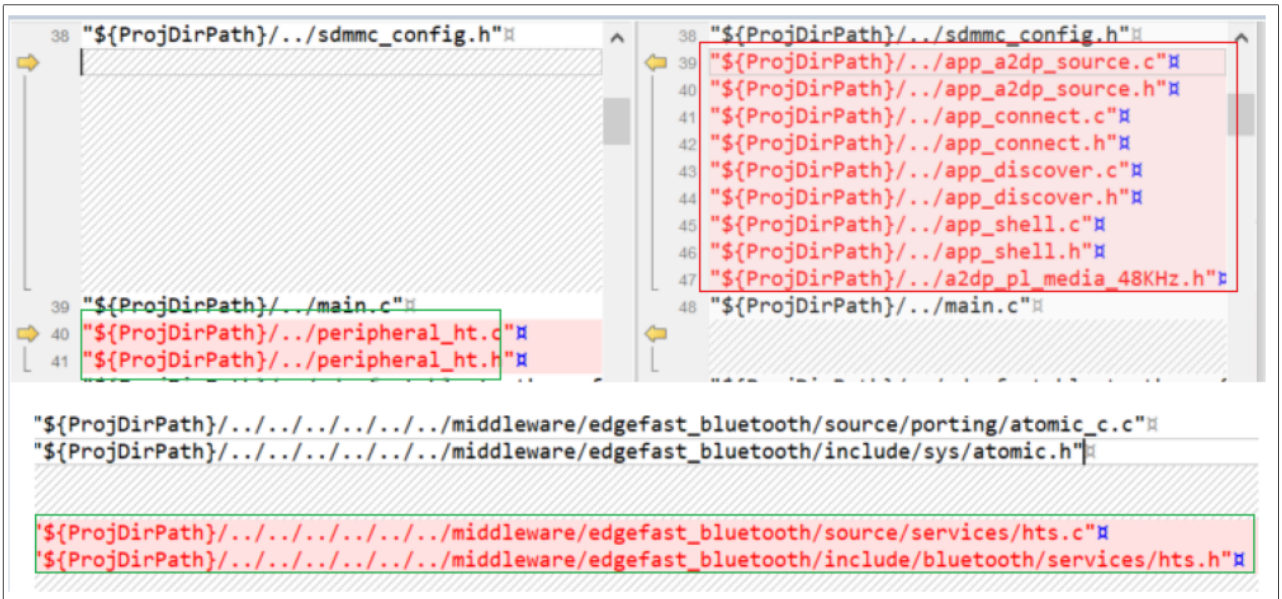

Figure 9. Compare the difference

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\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7\armgcc* and *<install_dir>boards\evkmimxrt1170\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.

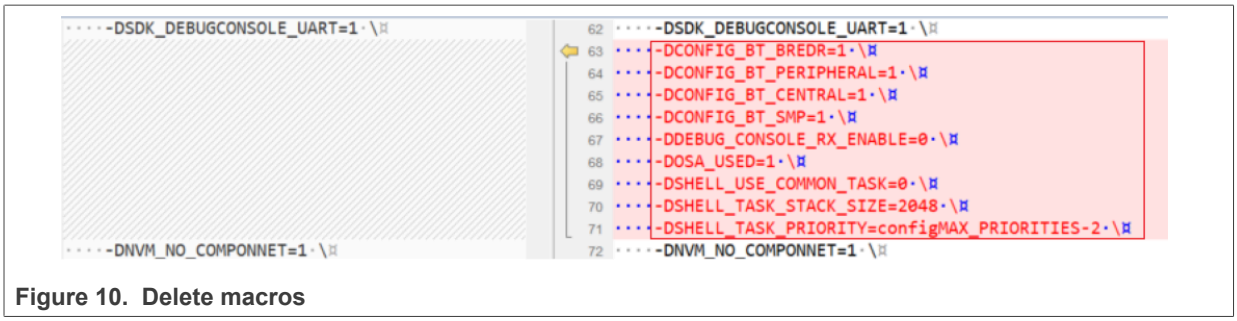

Figure 10. Delete macros

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\a2dp_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*.

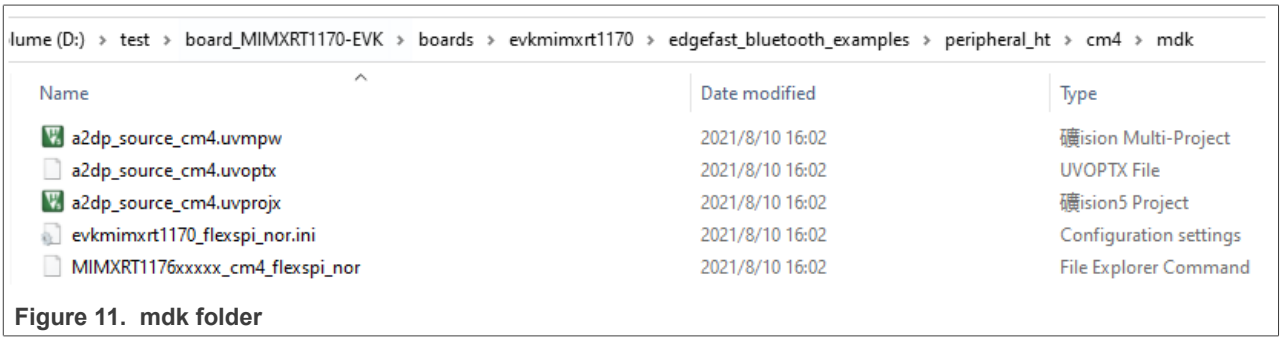

Figure 11. mdk folder

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.

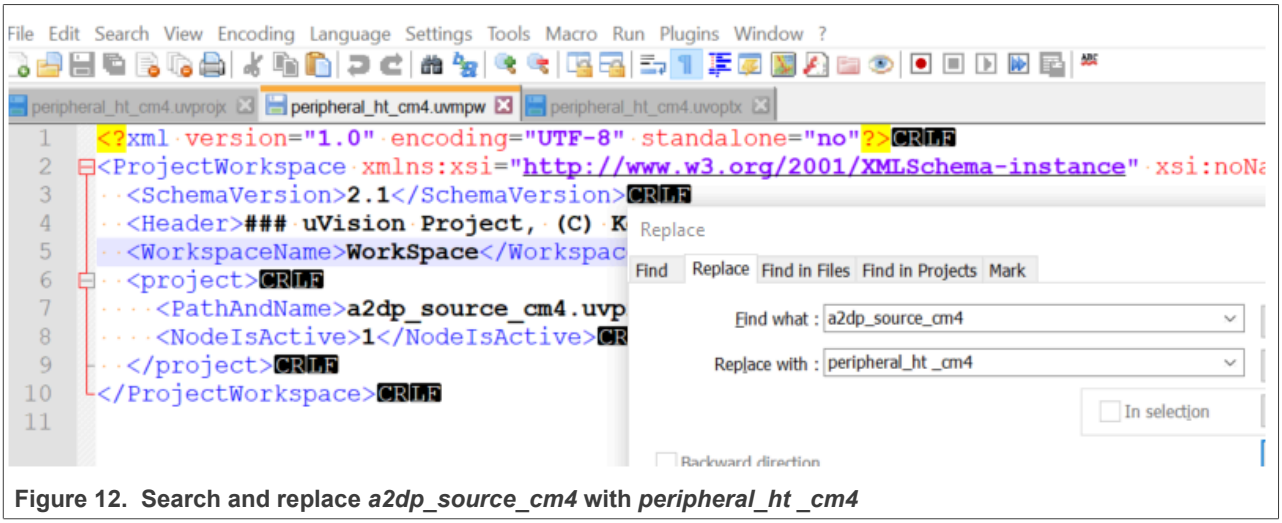

Figure 12. Search and replace *a2dp_source_cm4* with *peripheral_ht _cm4*

4.2 Rearrange source files

1. Open folder *cm4* in *<install_dir>boards\evkmimxrt1170\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 \evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm7* to folder *cm4* with directory *<install_dir>boards\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht\cm4*.

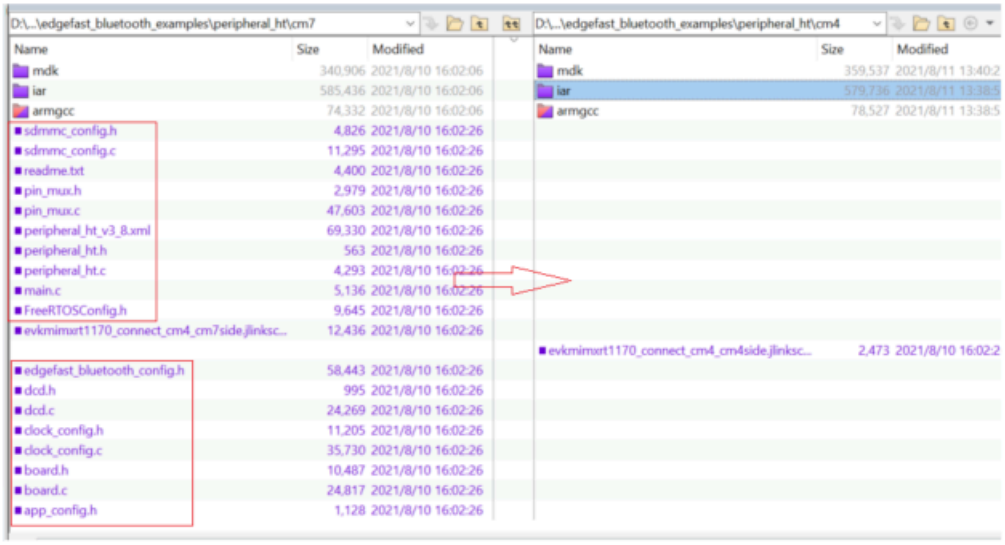

Figure 13. Rearrange source files

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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\evkmimxrt1170\edgefast_bluetooth_examples\peripheral_ht \cm7\mdk* and *<install_dir>boards\evkmimxrt1170\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\evkmimxrt1170\boards\evkmimxrt1170\edgefast_bluetooth_examples \peripheral_ht\cm4* with the same name as the files in the cm7 project must be added into the *source* group.

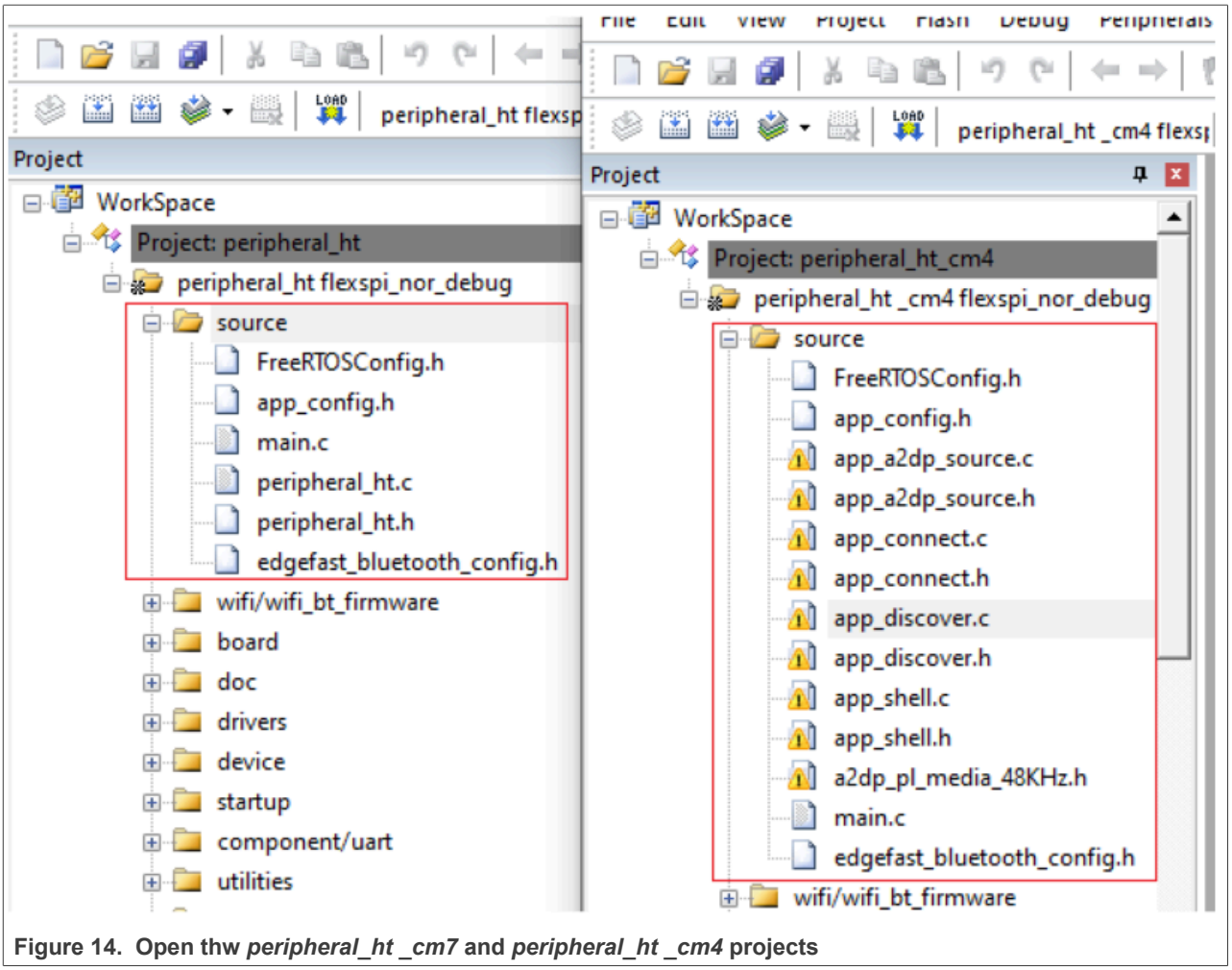

Figure 14. Open thw *peripheral_ht _cm7* and *peripheral_ht _cm4* projects

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.

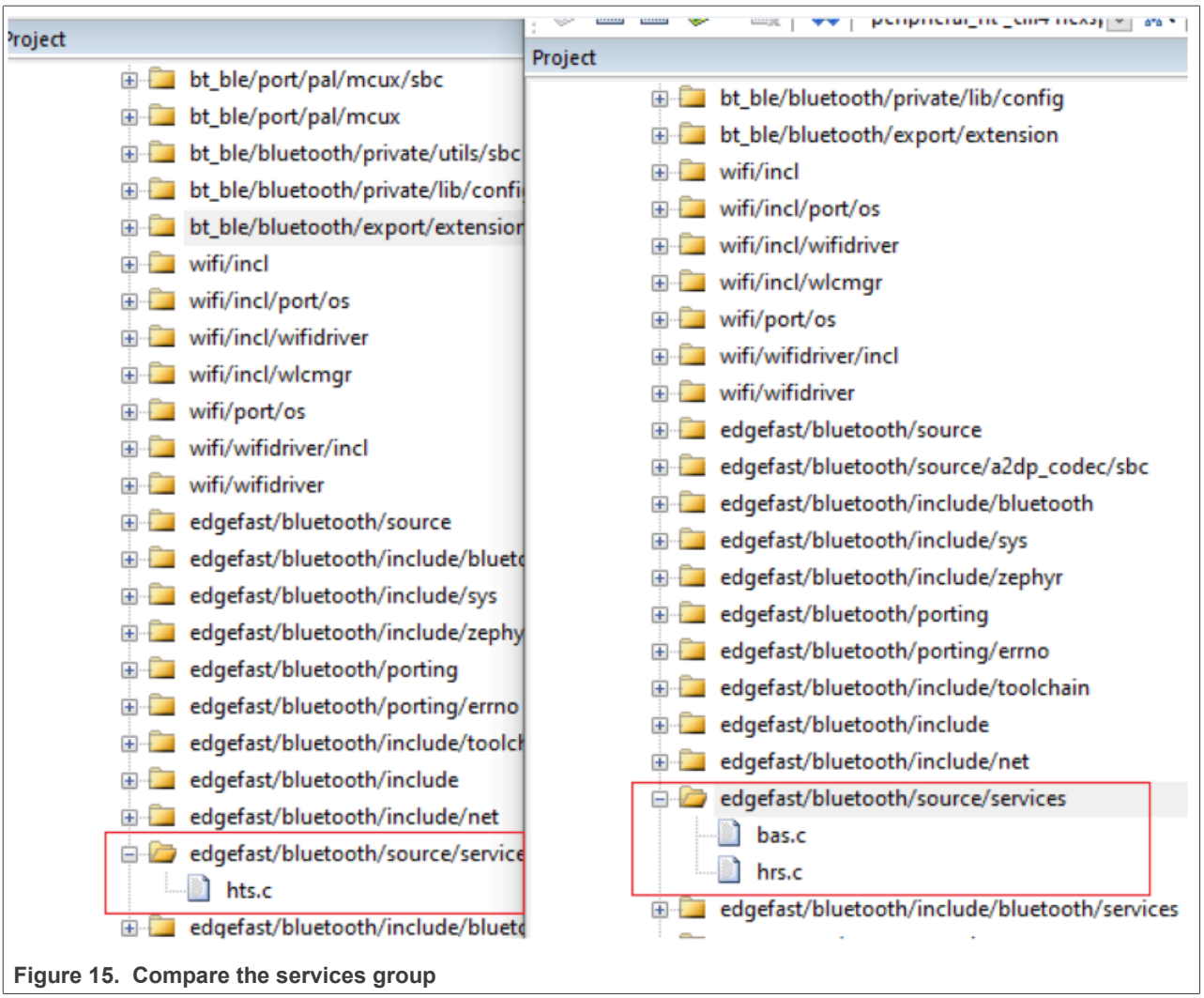

Figure 15. Compare the services group

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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.

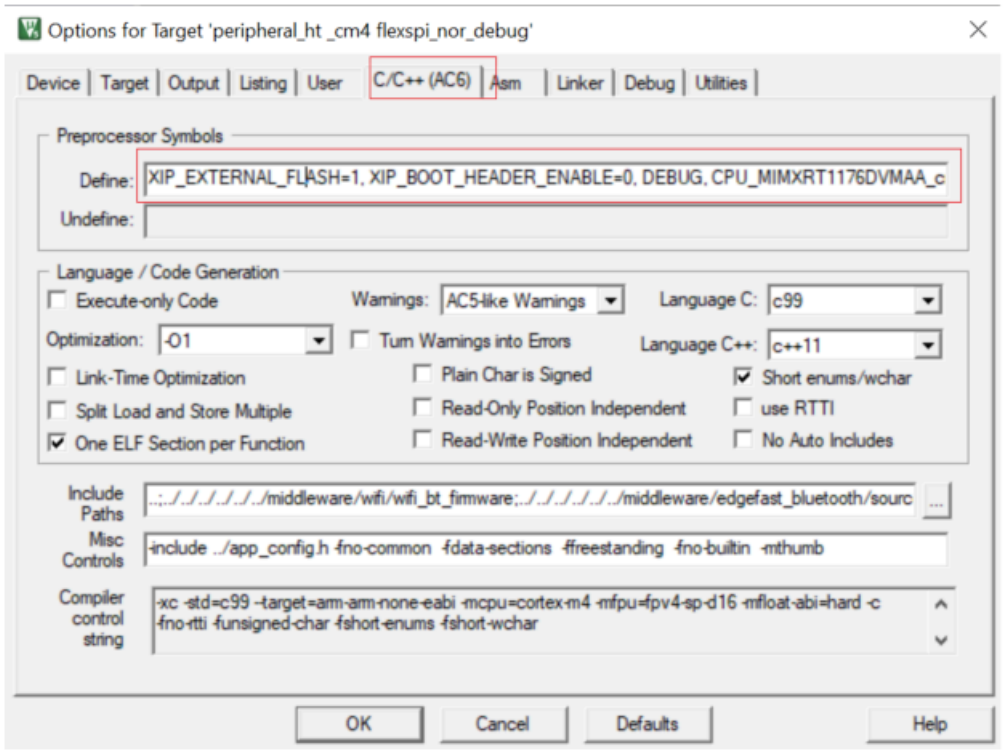

Figure 16. Compare preprocessor symbols

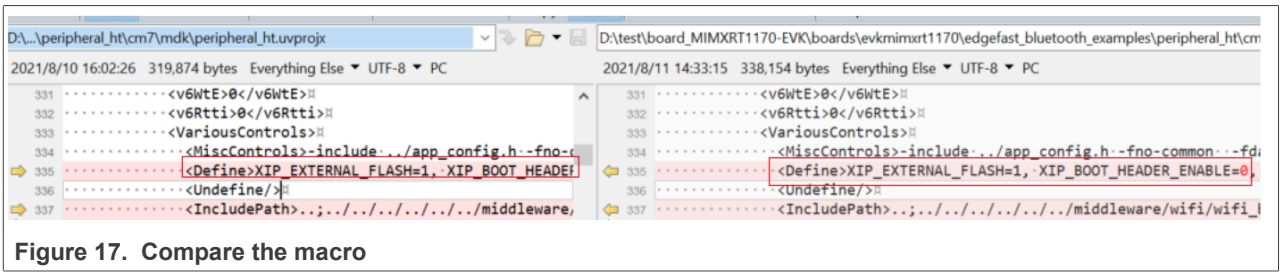

Figure 17. Compare the macro

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
2	13 June 2022	Layout updated for MCUXSDK 2.12.0
3	30 November 2022	Layout updated for MCUXSDK 2.13.0
4	27 July 2023	Updated for MCUXpresso SDK for 2.14.0

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