Freescale Semiconductor
Application Note

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Migrating Applications from SMAC 4.1c to SMAC for BeeKit™ Codebase 1.0.4

Introduction

Customers currently using the Freescale Simple Media Access Controller (SMAC) version 4.1c should upgrade their applications to the latest version of SMAC Codebase 1.0.4. Upgrading to SMAC Codebase 1.0.4 allows users to more quickly and efficiently develop applications. This note provides an example upgrade path for any application written using SMAC 4.1c and covers the following topics:

- How to make a new solution in BeeKit using an exist SMAC Codebase 1.0.4 project template
- How to configure the solution in BeeKit
- How to export the solution from BeeKit
- How to import the solution using CodeWarrior™ to obtain a `.mcp` file
- The sources and headers files that must be removed and deleted from the SMAC Codebase 1.0.4 project template
- The sources and header files that must be copied from the SMAC 4.1c application to the SMAC Codebase 1.0.4 application
- Editing sources and header files to achieve a complete and successful migration

Figure 1 shows the task flow for this upgrade.

Contents

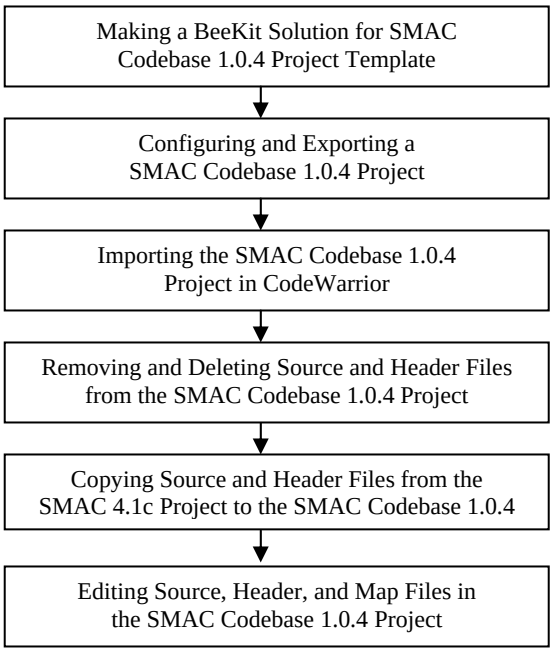

Figure 1. Task Flow

This note explains the steps and provides an example of how to migrate applications from SMAC 4.1c to SMAC Codebase 1.0.4. In this note, the Wireless UART Demonstration application using a MC1321x-SRB development board is the example SMAC 4.1c application being migrated using the Accelerometer Demonstration application template from SMAC Codebase 1.0.4 as a migration guide. Using the Accelerometer Demonstration application as a migration guide greatly reduces the number of steps required to migrate a project.

All software for this project was written using CodeWarrior Development Studio for Freescale HC(S) 08/RS08 Microcontrollers V5.1 which can be downloaded from www.freescale.com. The project used for this application note will also work in CodeWarrior Development Studio for Freescale HC(S) 08/RS08 Microcontrollers V6.x.

Making a BeeKit Solution

The first step to migrate a SMAC 4.1c application to SMAC Codebase 1.0.4 is to generate a new solution in BeeKit using one of the existing SMAC Codebase 1.0.4 project templates. To do this, perform the following steps:

1. If BeeKit is not already installed, go to www.freescale.com/zigbee and download and install the Freescale BeeKit Wireless Connectivity Toolkit.
2. If BeeKit is already installed, launch BeeKit by clicking on Start -> All Programs -> Freescale BeeKit -> Freescale BeeKit. The BeeKit main window appears.
3. From the BeeKit main window, click on File -> Select Codebase… the Browse for Folder window appears.
4. Select the BeeKit SMAC Codebase `1.0.4` folder and click the OK button.

For detailed information about BeeKit, see the Freescale *BeeKit Wireless Connectivity Toolkit User's Guide*.

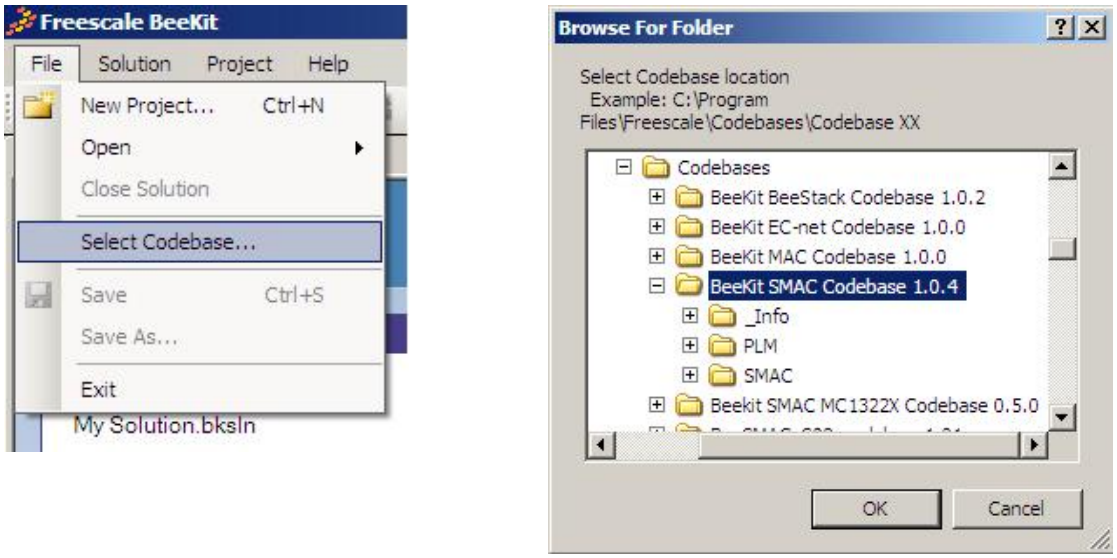

Figure 2. Codebase Selection

NOTE

If using a newer version of BeeKit, users may see a different method of selecting a Codebase than that shown in Figure 2. However, regardless of the selection method, users must choose the BeeKit SMAC Codebase 1.0.4.

5. From the BeeKit main window, click on File -> New Project. The New Project window appears as shown in Figure 3.
6. In the Templates area of this window, choose the Accelerometer option.
7. In the Project Name field at the bottom of this window enter My Application.

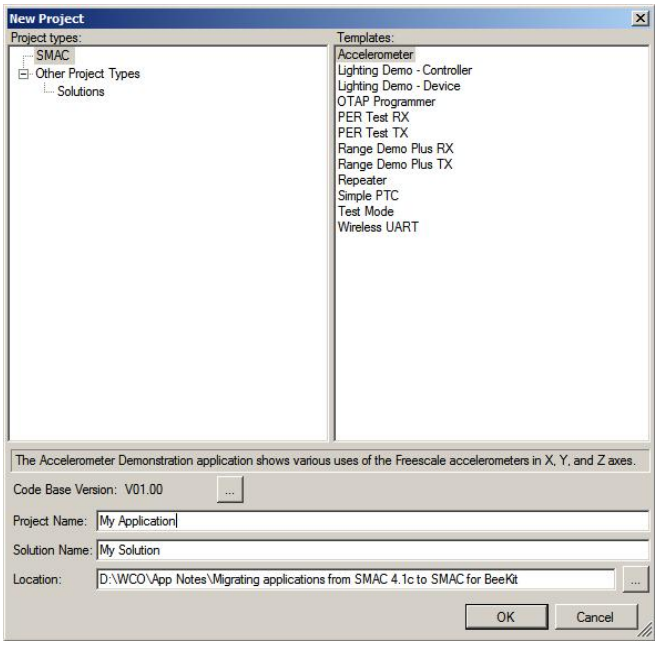

Figure 3. Naming an Accelerometer Project Template

8. Click the OK button and the BeeKit Project Wizard window appears as shown in Figure 4.
9. Under the Platform Type, choose the MC1321XSRB target hardware. If users employ different target hardware, select the appropriate option. Click the Finish button.

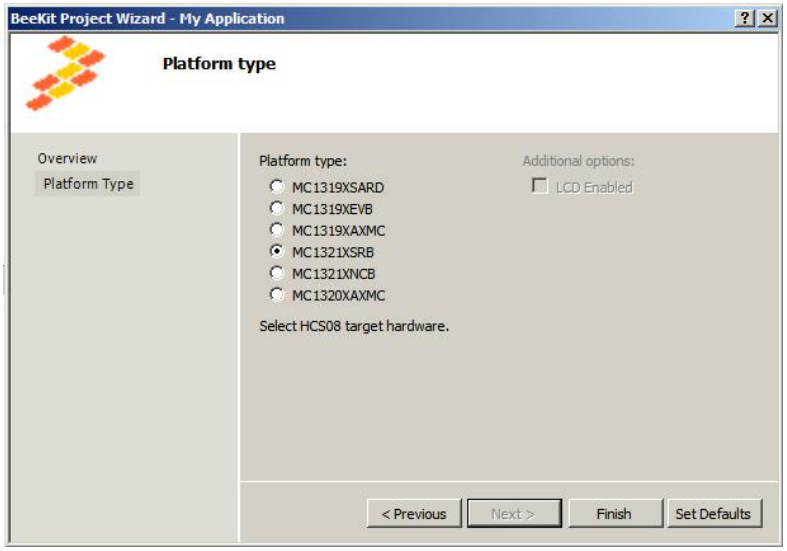

Figure 4. BeeKit Project Wizard Dialog Box

10. The BeeKit main window appears with the My Solution and My Application open in the Solution Explorer area as shown in Figure 5.

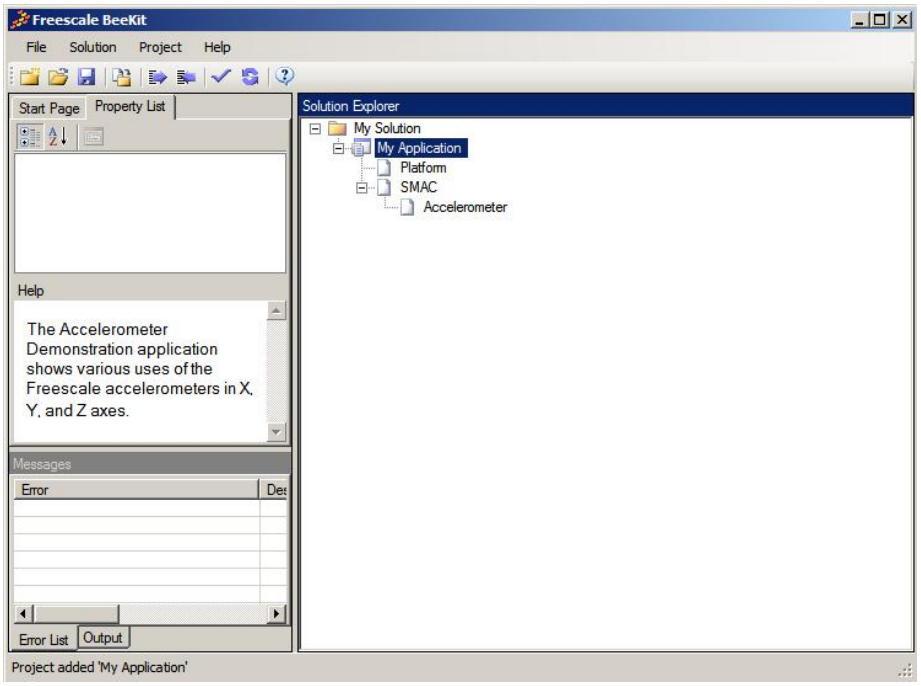

Figure 5. BeeKit Main Window

Configuring and Exporting The Solution

This part of the process must be performed correctly because it provides the foundation for the application that is being migrated. It is important to keep the same SMAC configuration settings for the SMAC Codebase 1.0.4 application that the SMAC 4.1c application has.

This note uses the Wireless UART application as the example for migrating from SMAC 4.1c to SMAC Codebase 1.0.4. The example starts by using the Accelerometer project template from SMAC Codebase 1.0.4 in BeeKit.

When performing the migration as shown in this note, the following BeeKit configuration options must be set as follows:

- Target hardware: MC1321xSRB
- LCD Enabled: False
- Default SCI port: 2
- Security Enabled: True

NOTE

If the SMAC 4.1c application that needs migration has a different configuration, configure the Accelerometer project template in BeeKit to match the configuration of the SMAC 4.1c application. The operating channel and output power can be configured in CodeWarrior once the solution is imported into CodeWarrior. Importing is covered in Section 4.

The following steps show how to configure the Accelerometer project template in BeeKit.

1. Click on the Platform software component and use the available menus to configure it (Figure 5) with the following options:

    - MC1321xSRB
    - LCD Enabled = False
    - Use number two as a default SCI port (Figure 6).

NOTE

This configuration employs a specific case. If the user's application employs a different configuration, then use that configuration as a guide.

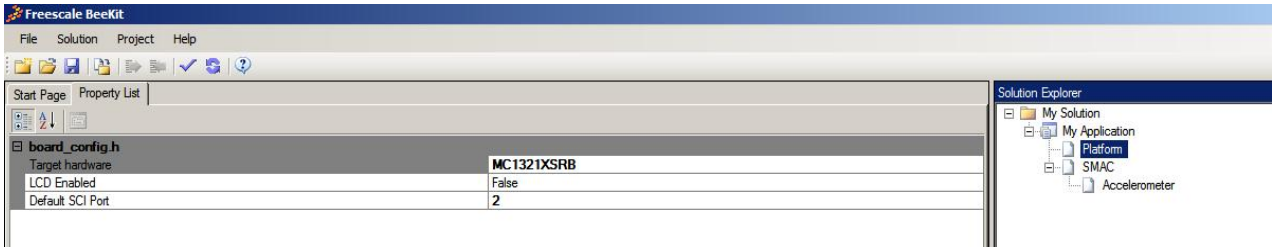

Figure 6. Platform Software Component Configuration

2. Click on the SMAC software component and use the available menus to configure it (Figure 7) with the following options:

   - Security Enabled = true

NOTE

If the current SMAC 4.1c application does not require security, ignore this step.

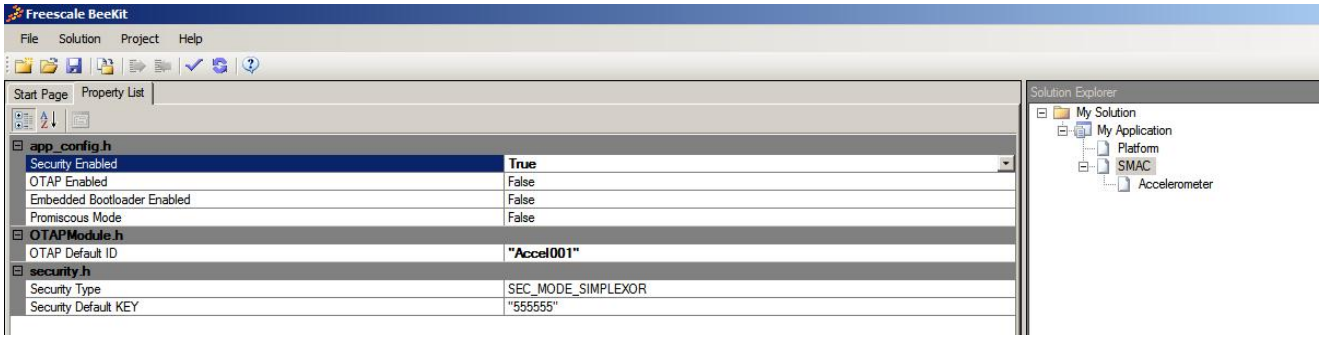

Figure 7 SMAC Software Component Configuration

3. From the BeeKit main window, click on Solution -> Validate Solution.
4. If no errors occur, continue with the next step. If an error occurs, return to the Step 1 in this section.
5. From the BeeKit main window click on the Solution -> Export Solution.
6. Click the OK button.

Importing the Solution in CodeWarrior

This section explains how to import an SMAC Codebase 1.0.4 project template into CodeWarrior. This allows users to prepare all the necessary items before migrating the SMAC 4.1c application files (in this case, the Wireless UART Demonstration application files) by using the SMAC Codebase 1.0.4 Accelerometer project as a template.

1. Open CodeWarrior and click on File -> Import Project as shown in Figure 8.

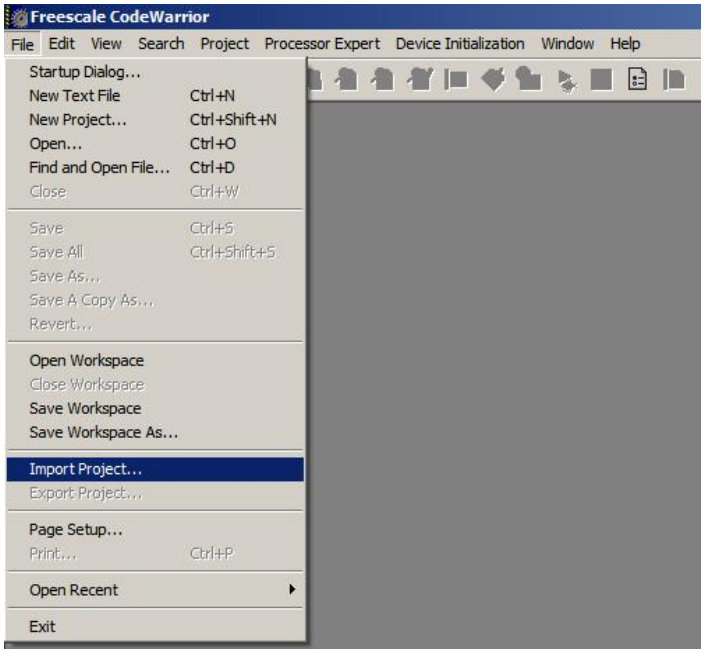

Figure 8. Importing an SMAC Codebase 1.0.4 Project

2. Navigate to the folder that contains the SMAC Codebase 1.0.4 Accelerometer project and open it. In this example, the file solution name is `My Application.xml` (Figure 9).

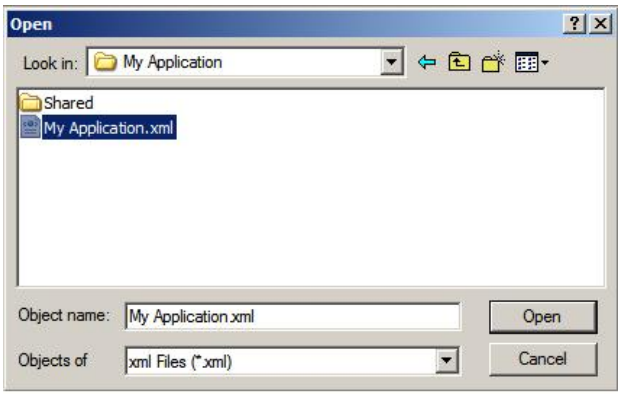

Figure 9. Opening My Application.xml

3. Name the new project My_Application in the file name space and click on the Save button. The CodeWarrior project must look like the project as shown in Figure 10.

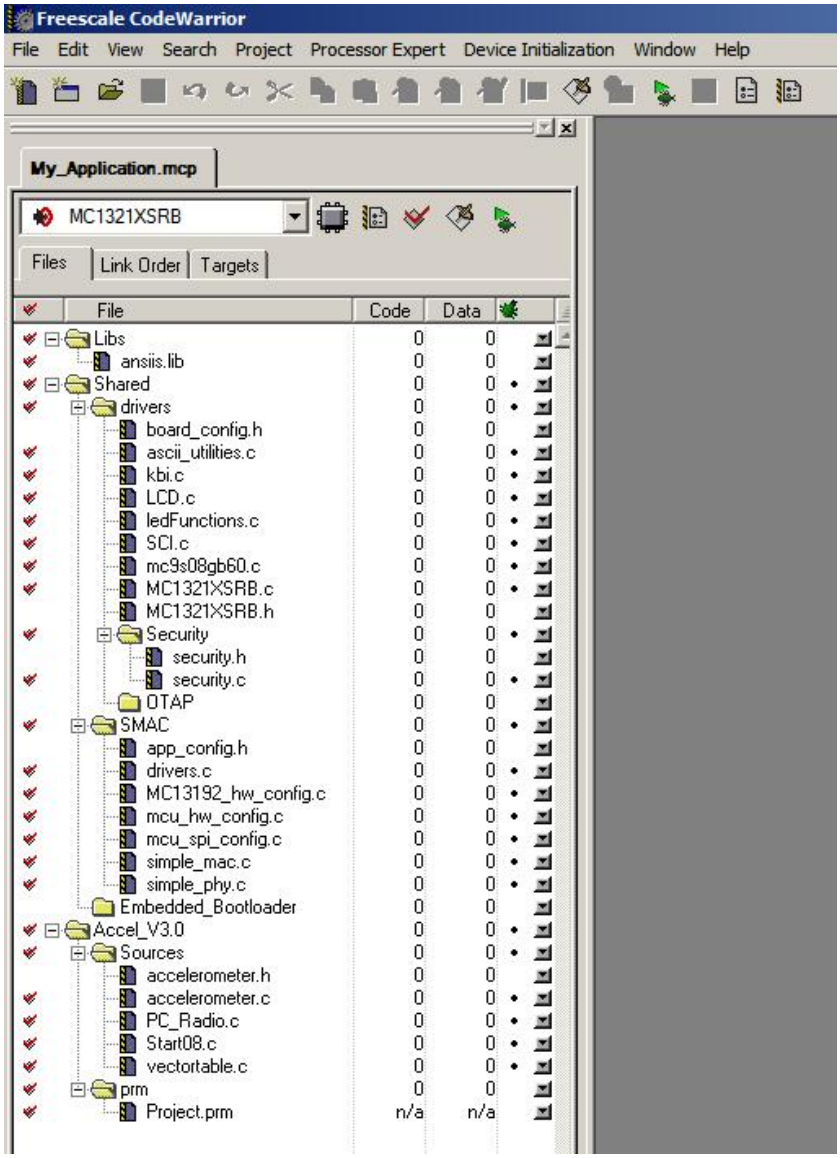

Figure 10. SMAC Codebase 1.0.4 Accelerometer Project to CodeWarrior

NOTE

It is not necessary to compile the project at this time. The project migration is not yet complete.

Merging Files

This section describes the files that must be copied from the SMAC 4.1c Wireless UART Demonstration application folder to the SMAC Codebase 1.0.4 Accelerometer Demonstration application folder. Also described are how to remove and delete the accelerometer source and header files from the Accelerometer Demonstration project to avoid possible confusion. This section also shows users how to keep the SMAC Codebase 1.0.4 for migrating future projects by removing only the current application files and adding the user application files. To copy the files, perform the following tasks:

1. In CodeWarrior select the source and header files from the Sources group, except the `Start08.c` and `vectortable.c` files. Right click on a selected file and choose Remove as shown in Figure 11. This removes the Accelerometer project applications files and keeps the entire SMAC Codebase 1.0.4 configuration.

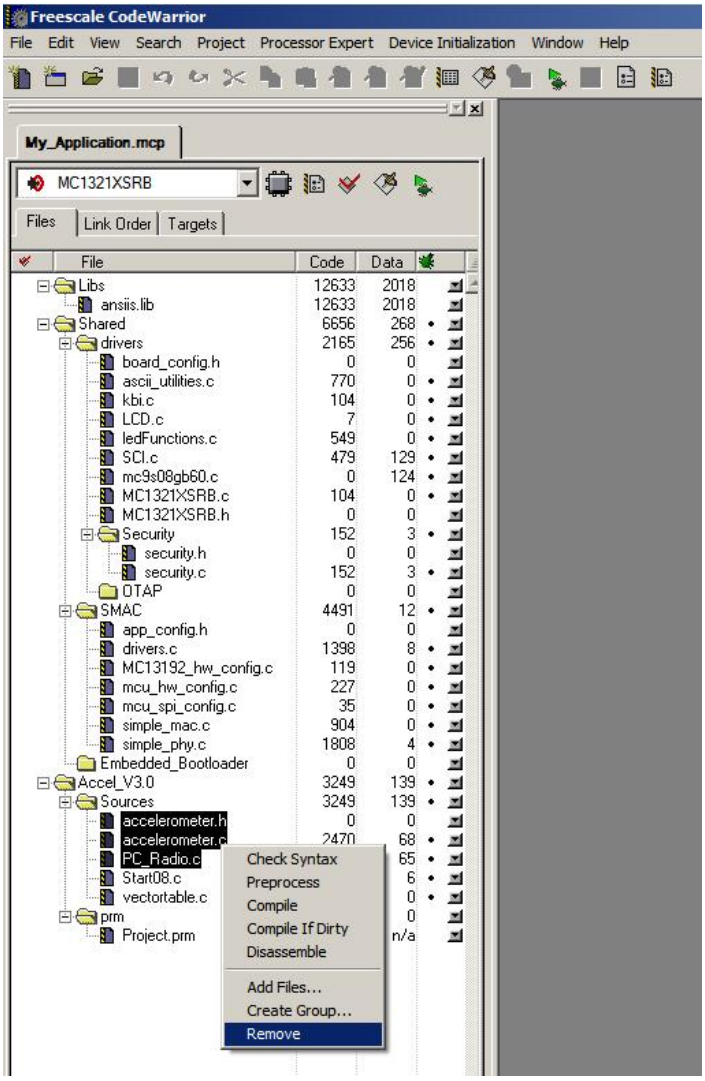

Figure 11. Removing Accelerometer Demonstration Files

2. Right click on the `Start08.c` source file and choose Open in Windows Explorer as shown in Figure 12 to go to the Sources folder of the project that have the sources and headers files of the Accelerometer application that have been removed from the project.

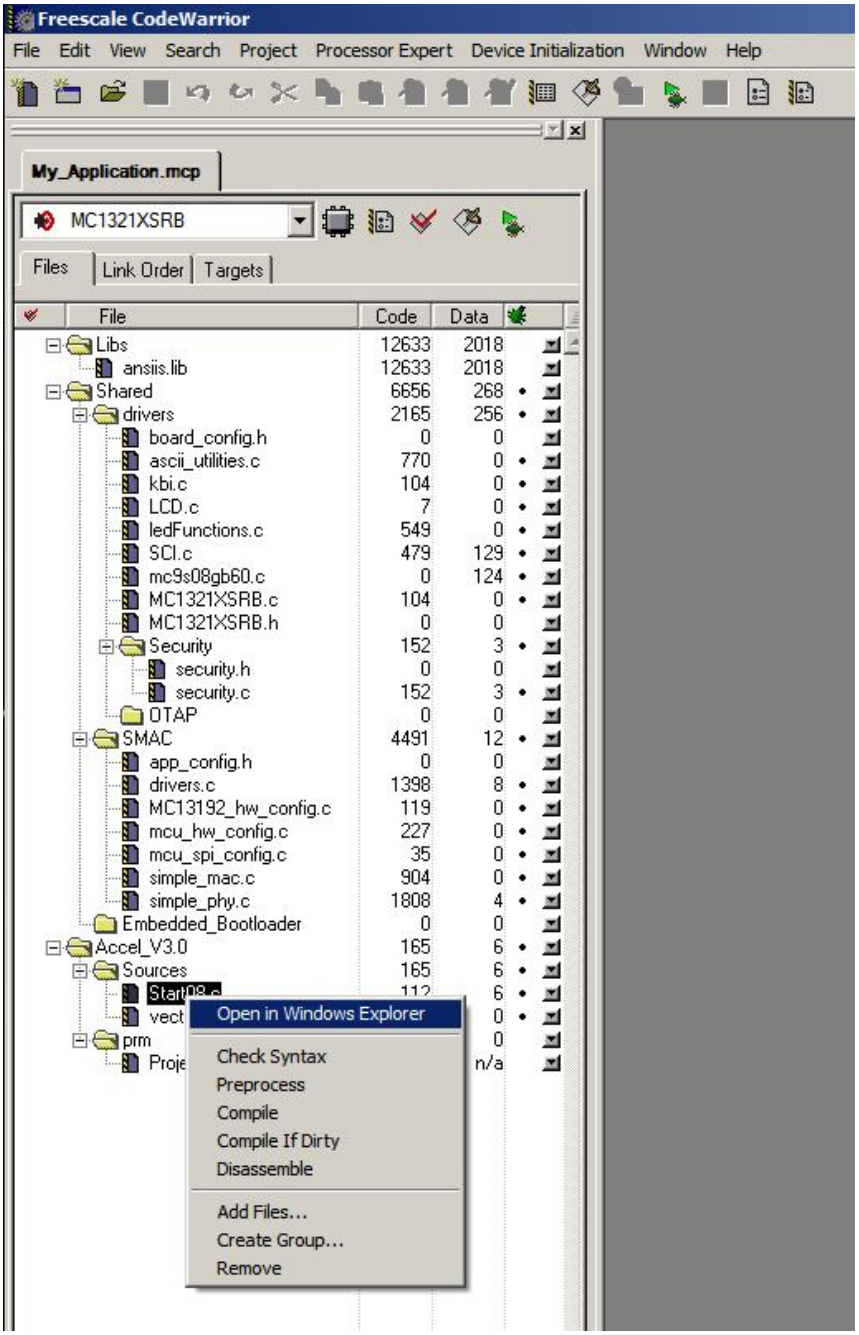

Figure 12. Open in Windows Explorer

3. When Windows Explorer appears, delete the `accelerometer.c`, `accelerometer.h` and `PC_Radio.c` files as shown in Figure 13.

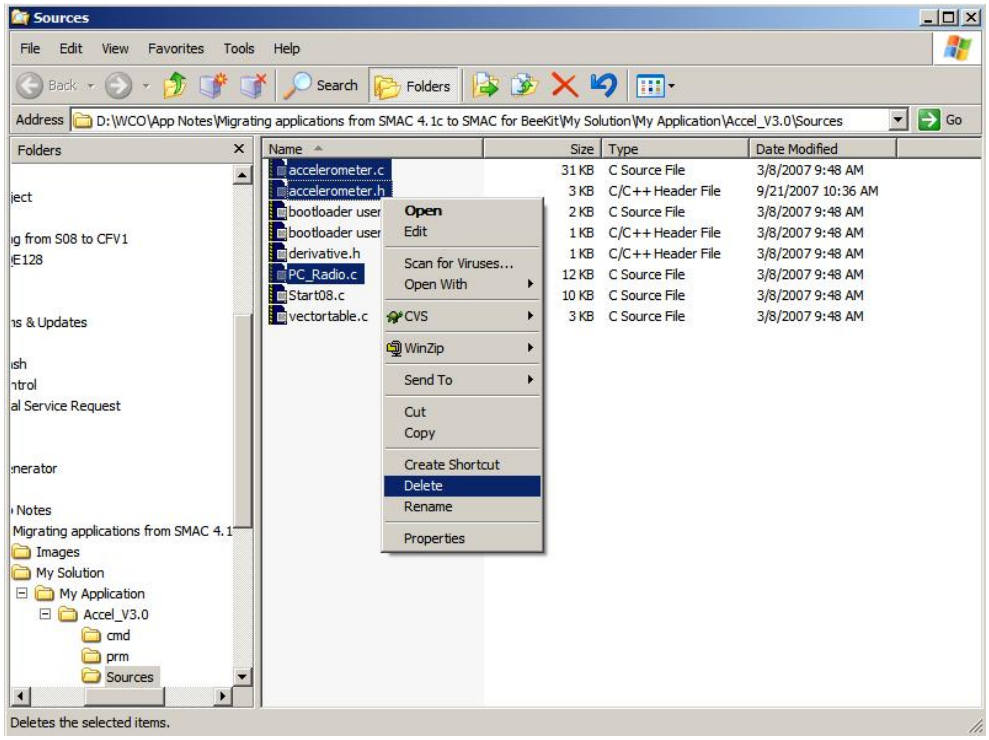

Figure 13. Deleting Accelerometer Demonstration Files

4. Go to the following folder (or where the SMAC 4.1c Wireless UART Demonstration source files are located):

```
c:\Program Files\Freescale\SMAC4.1c\apps\Wireless Uart\Sources
```

5. Select and copy the source and header files as shown in Figure 14. For the Wireless UART application, user needs to copy the wireless_uart.c and the wireless_uart.h files. For other applications, the user needs to copy the application specific (sources and headers) files.

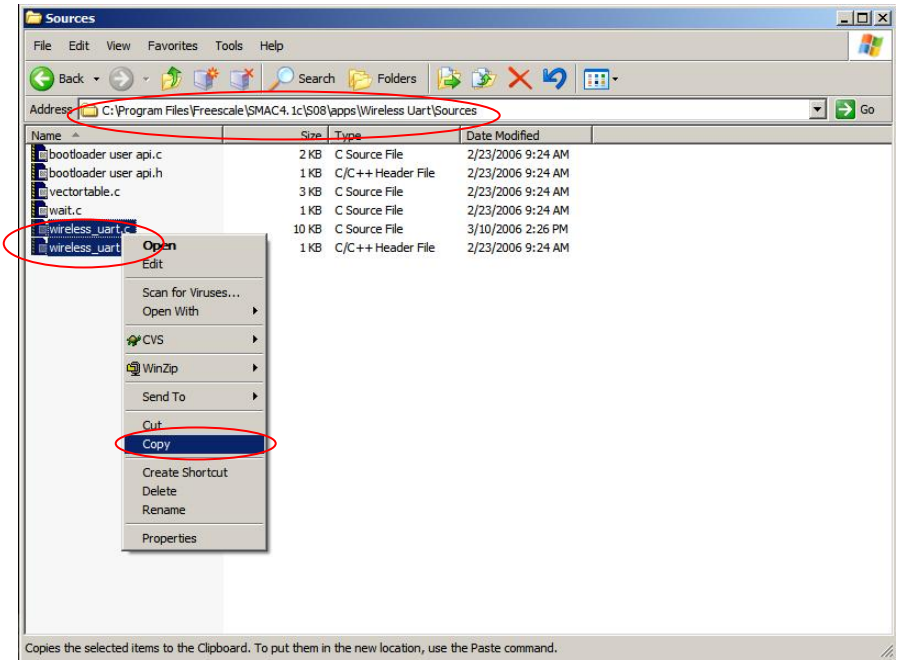

Figure 14. Copying Wireless UART Sources Files

6. Paste the Wireless UART source and header files into the Sources folder where the Accelerometer application sources and headers files were (as shown in Figure 15) to have the user application files located in the SMAC Codebase 1.0.4 project folder.

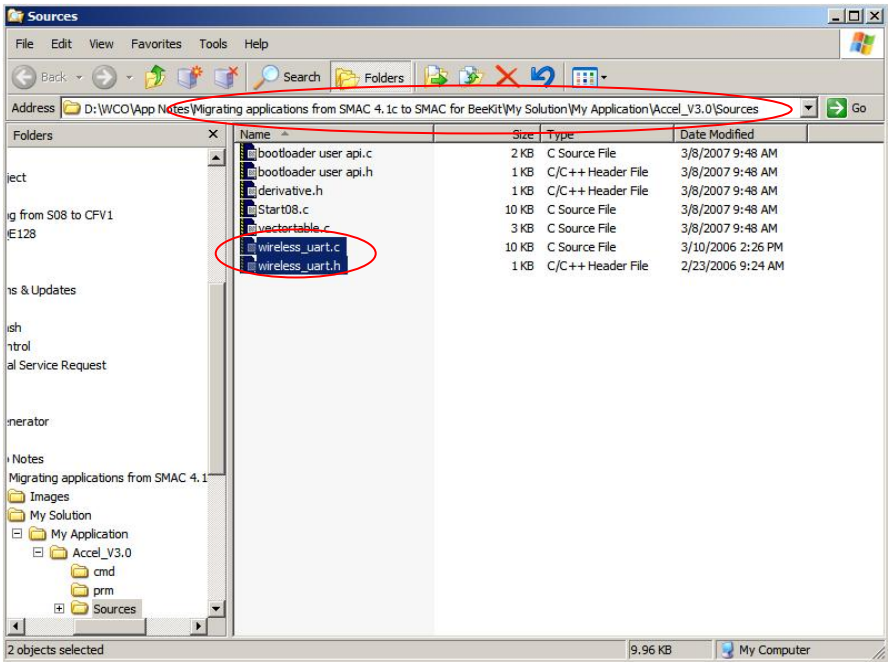

Figure 15. Paste Wireless UART files into the Accelerometer application folder

7. Add all user application source and header files (for this example, the Wireless UART files) to the CodeWarrior project as shown in Figure 16.

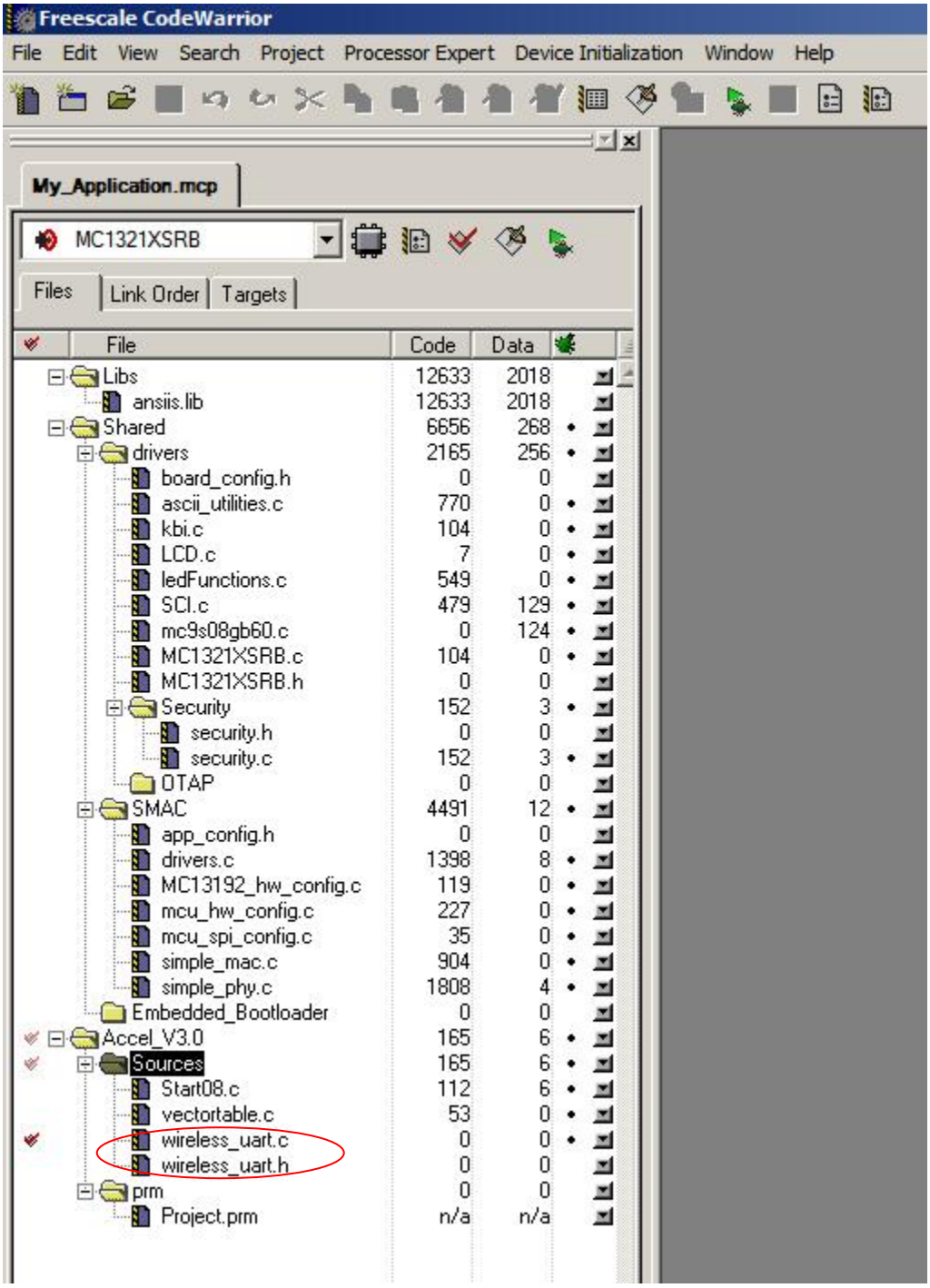

Figure 16. Adding the Wireless UART SMAC 4.1c files to the SMAC Codebase 1.0.4 Project

Editing Files

As already stated, it is necessary to modify all user application header and sources files to complete the migration from an SMAC 4.1c application to an SMAC Codebase 1.0.4 application. This section describes how to perform all the necessary file edits.

1. Modify the `app.c` source file first. For this example, this is the `wireless_uart.c` source file. Open the `wireless_uart.c` file and make the following changes:

   NOTE

   When making changes to the sources and headers files in CodeWarrior, the following warning message appears:

   File ‘file name’ is read-only. The file ‘file name’ is locked and cannot be modified. Do you want to unlock this file?

   Click on the Unlock button.

2. Delete or comment out the following include files (It does not matter if one or more of these include files do not appear.):

   ```
   #include "device_header.h"
   #include “simple_mac.h”
   #include “mcu_hw_config.h”
   #include “MC13192_hw_config.h”
   #include “drivers.h”
   #include “bootloader user api.h”
   ```

   NOTE

   If any of these include files are changed, then users must create new header files that contain all user changes and add them to the project.

3. Add the following include:

   ```
   #include “APP_SMAC_API.h”
   ```

4. Add the following lines of code after the includes:

   ```
   #if SMAC_FEATURE_OTAP == TRUE
   #include "APP_OTAP_API.h"
   #endif // SMAC_FEATURE_OTAP == TRUE

   #if SMAC_FEATURE_SECURITY == TRUE
   #include "APP_security_API.h"
   #endif // SMAC_FEATURE_SECURITY == TRUE
   #if (EMBEDDED_BOOTLOADER == TRUE)
   #include "bootloader user api.h"
   #endif
   ```

5. Search for the following code snippet (must be exact):

```
#ifdef BOOTLOADER_ENABLED
       boot_init();  /* Initialize the bootloader. */
#endif BOOTLOADER_ENABLED

#ifdef BOOTLOADER_ENABLED
       boot_call();  /* Check for user request to run bootloader. */
                     /* App will not return, if Bootloader is requested. */
#endif BOOTLOADER_ENABLED
```

6. And change it to the following:

```
#if(EMBEDDED_BOOTLOADER == TRUE)
       boot_init();   /* Initialize the bootloader. */
#endif

#if(EMBEDDED_BOOTLOADER == TRUE)
       boot_call();   /* Check for user request to run bootloader. */
                      /* App will not return, if Bootloader is requested. */
#endif
```

Modify the `app.h` header file. In this example, this is the `wireless_uart.h` header. Open the `wireless_uart.h` file and make the following changes:

1. Add the following lines of code in the defines section and set the channel number to where the SMAC 4.1c application is operating. In this example, the default Wireless UART operating channel is used.

```
#define CHANNEL_NUMBER      0
#define OUTPUT_POWER        11
```

Modify the `vectortable.c` source file if needed, but only the vector names as shown in Figure 17

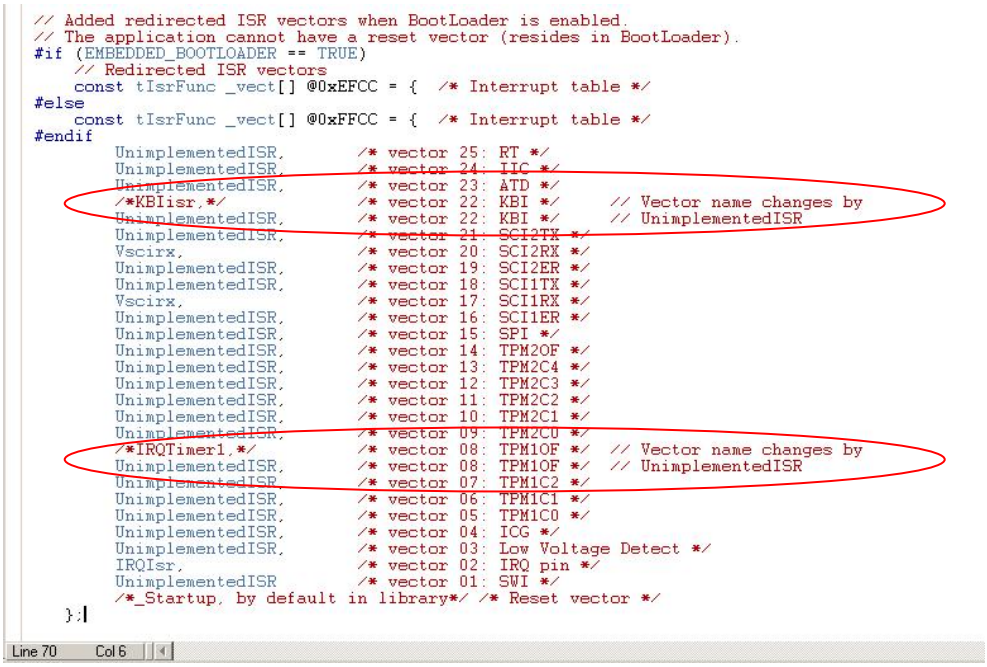

Figure 17. Vector Table Names Modifications

The `.prm` file is only modified if users need to redefine the memory map. If the `.prm` file in the SMAC 4.1c project was not modified, there is no need to modify the SMAC Codebase 1.0.4 `Project.prm` file.

At this point, a full project migration is complete. The Wireless UART Demonstration application migration from SMAC 4.1c to SMAC Codebase 1.0.4 is complete and the project should compile and function correctly.

NOTE

If the project does not compile and still shows errors when compiling, repeat all steps from Section 5 and 6.

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