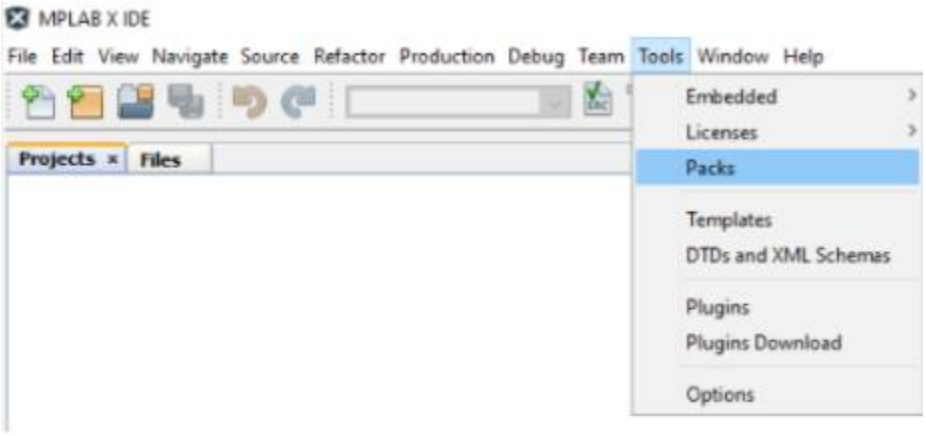
MPLAB® Code Configurator Setup for Software Development on PIC32CX_BZ2/WBZ45x

Pre-requisite: Clone the EA71C53A repo available at https://github.com/MicrochipTech/EA71C53A

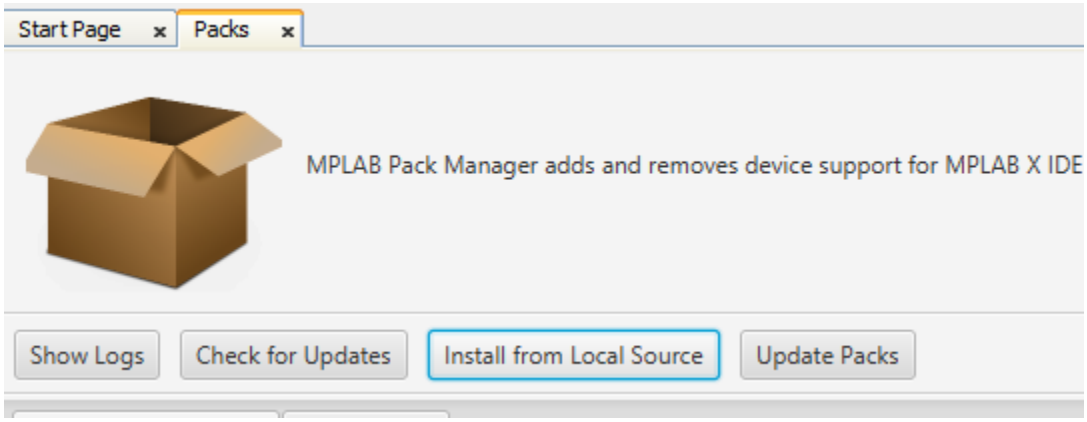
1. Install MPLAB x IDE, instructions available in EA71C53A\MPLAB X IDE folder
2. Install XC32 Compiler, instructions available in EA71C53A\Compiler
3. Install Device Family Part Pack, located in EA71C53A\MPLAB X IDE

   Device Family Packs are device description files (.PIC files for PIC® devices, .ATDF files for AVR® and SAM devices), which contain SFR names, memory regions, programming information. Device-dependent source code files (i.e., peripheral header files) are being moved to DFPs. XC8 (AVR target) and XC32 (SAM target) are implemented today. Libraries will be part of the DFP on XC8 (AVR, CSTARTUP) and XC32 – XC16 will store the libraries in the compiler directory.

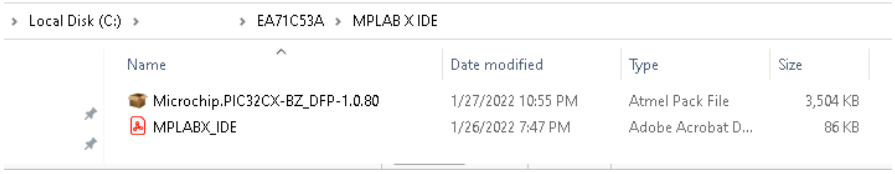


   3.1 Open the MPLAB X IDE and select Tools > Packs

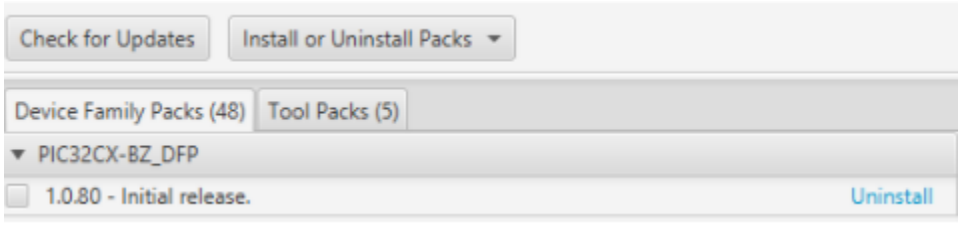
   3.2 Click “Install from Local Source”



3.3 **Locate (EA71C53A\MPLAB X IDE)** and **select** the device family pack **Microchip.PIC32CX-BZ_DFP-1.0.xx** in **MPLAB X IDE** directory

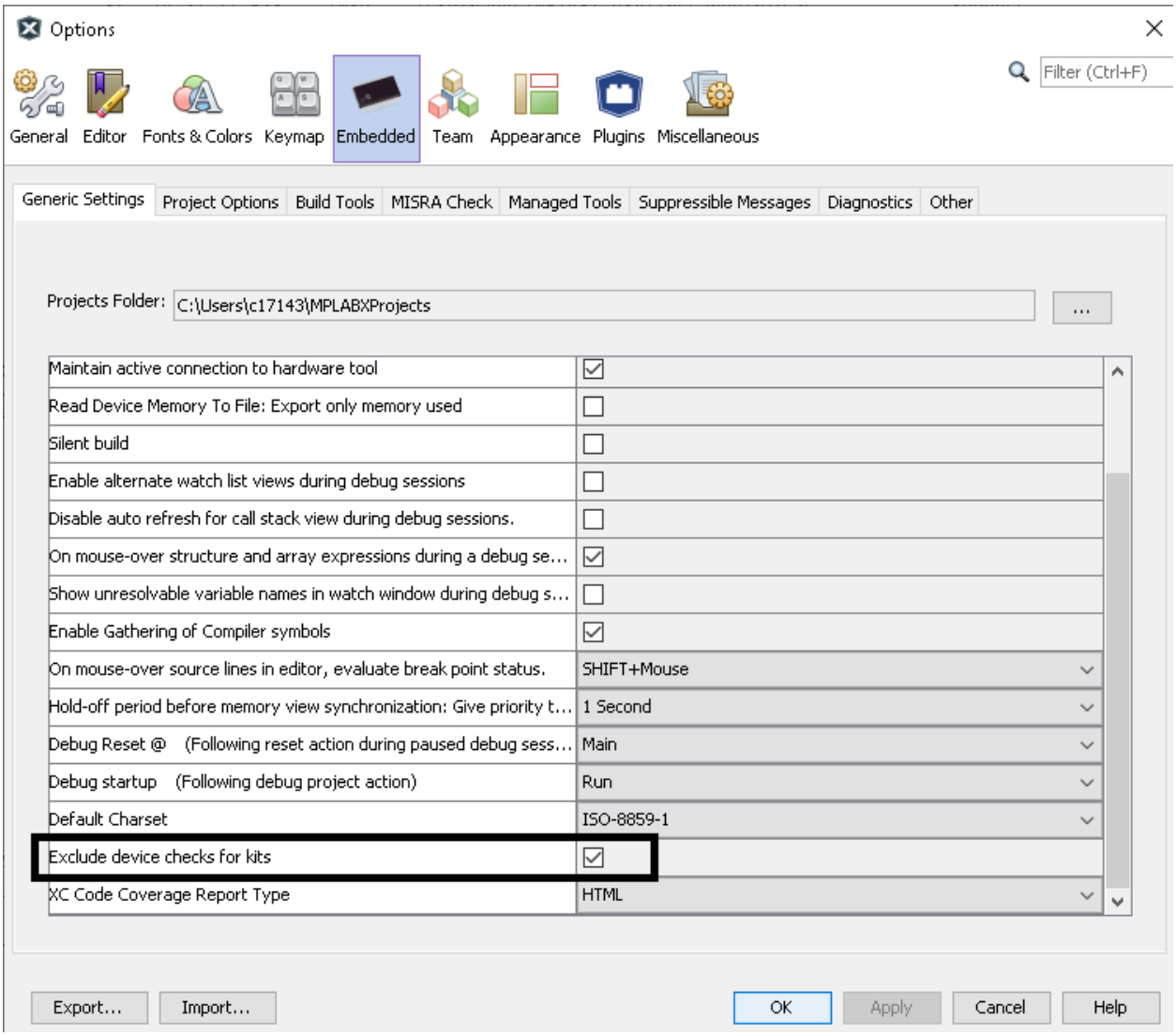


3.4 **Verify** the installation of device family pack by searching in the window – search for “bz” keyword



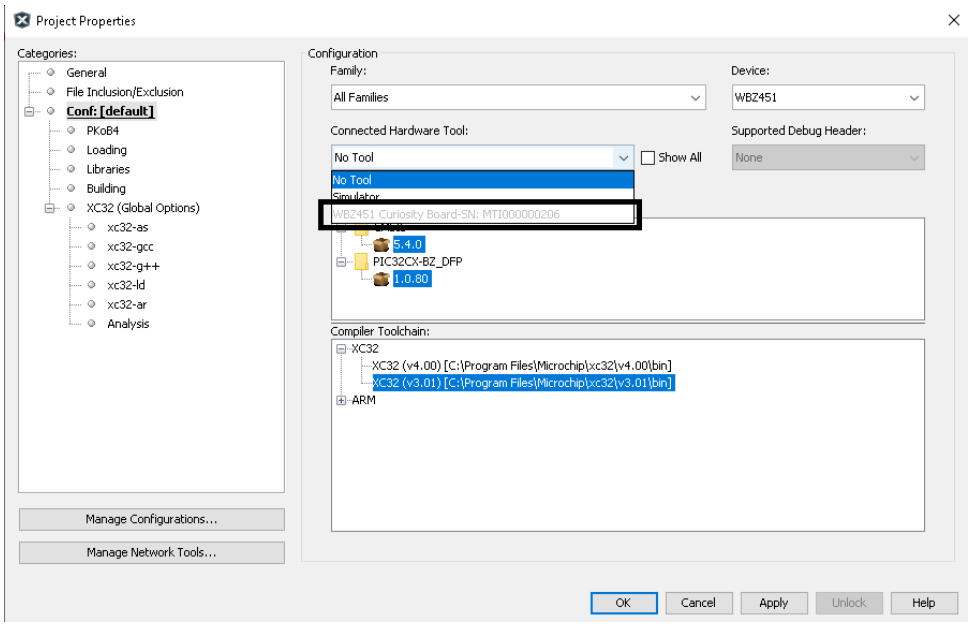
Restart MPLAB X IDE

4. Exclude Device checks for kits (Tools -> Options -> Embedded)

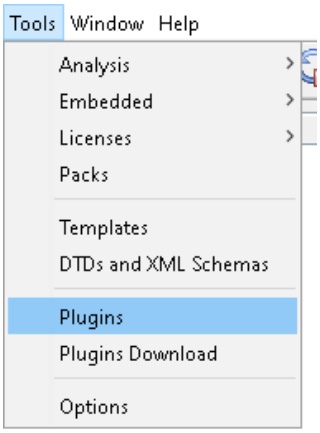


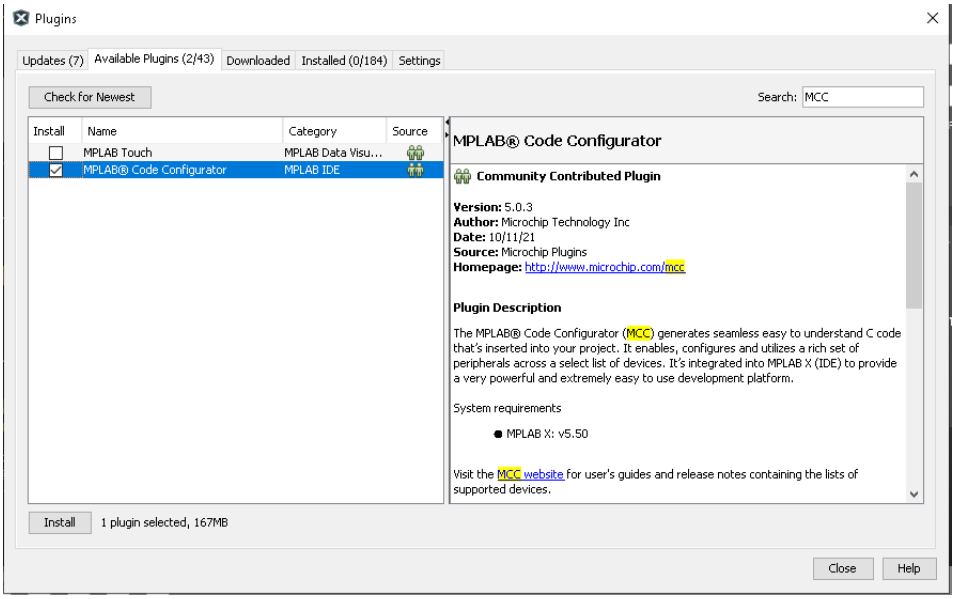
Note: Some preproduction boards might have "PIC32CX1012BZ25048" Soc Name programmed on PKOB4 this, if the device checks for kits is not enabled, user will not be able to choose the PKOB4 to program the WBZ451 module on the Curiosity Board

User cannot select the Kit (It will appear greyed out) in Programming options if "Exclude Device Checks" is not enabled

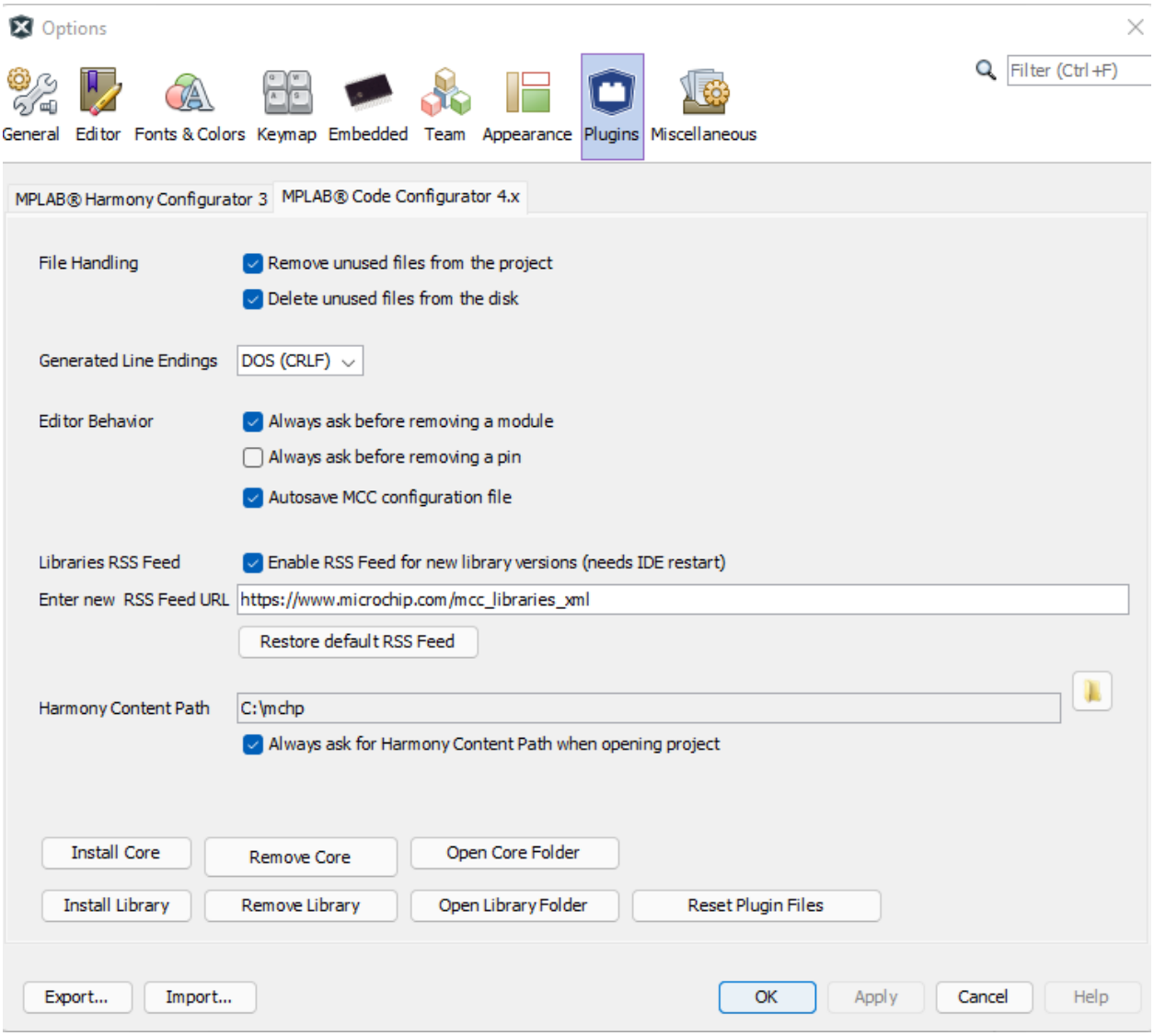


5. Install MCC plugin in the IDE, restart the IDE after installation





6. Configure the Plugin Options
   Several aspects of the operation of the MCC can be managed by using the "Options" panel (see figure below), which can be invoked by clicking Tools → Options → Plugins → MPLAB Code Configurator in the menu bar of the MPLAB X IDE.



Note: "Harmony Content Path" should be in root directory (maximum 1 folder deep and folder name cannot exceed 4 letters)

For example **-> C:\mchp** or **C:\test** are **acceptable** "Harmony Content Path"

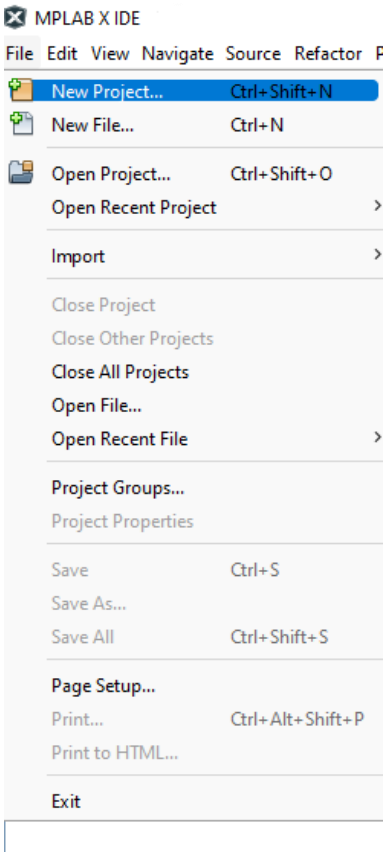
C:\Microchip
C:\test\microchip **are not acceptable** path choices.

This note is added to avoid a known issue of Maximum File path, see here for more information

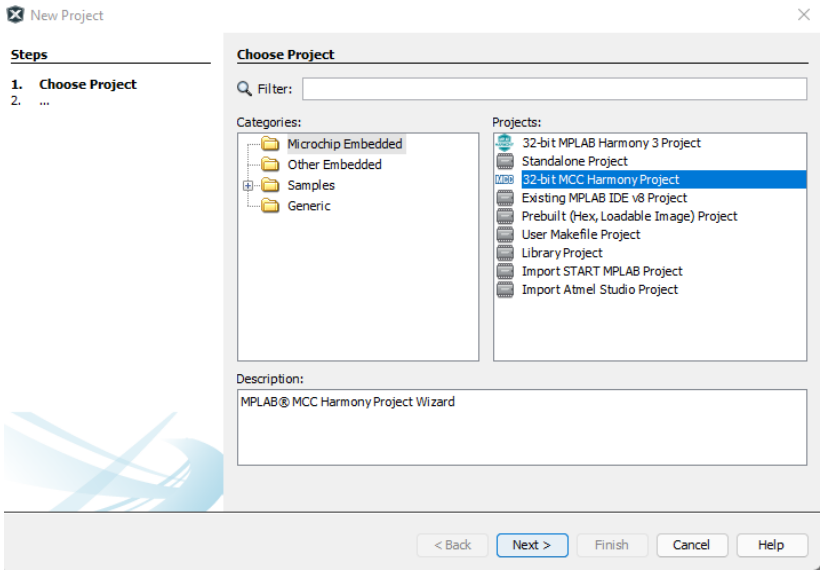
7. Clone the Harmony repositories (required content for SW Development) using MCC Content Manager Wizard

7.1 Create a new “MCC Harmony” project (In order to clone the Harmony repositories user needs to create an empty project and clone the required repositories)

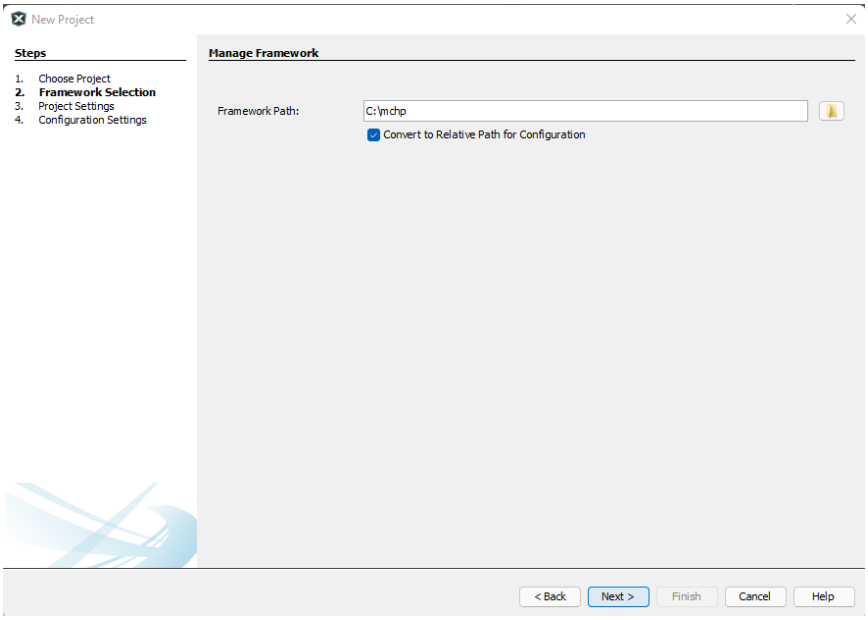
7.1.1 Select “New Project”



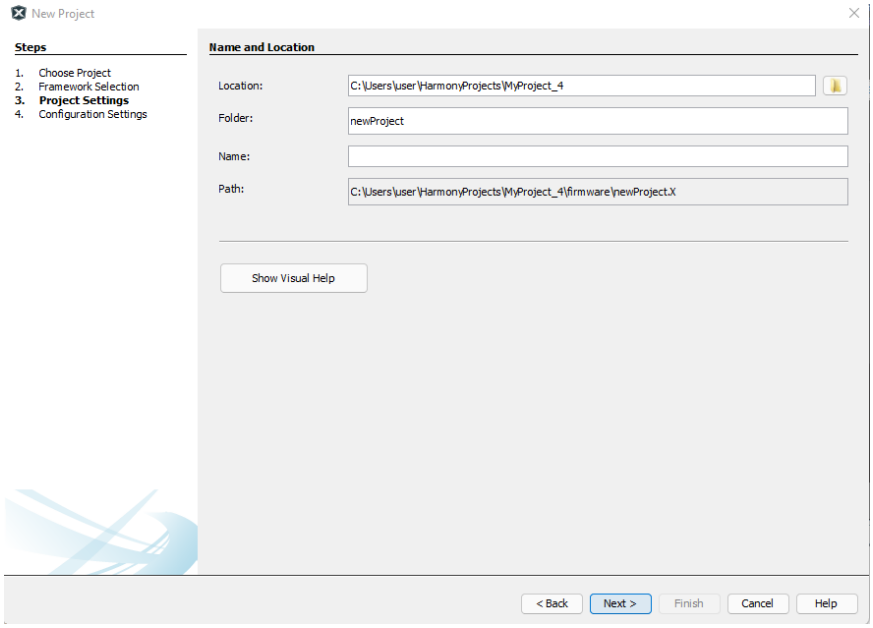
7.1.2 Select “32-bit MCC Harmony Project”



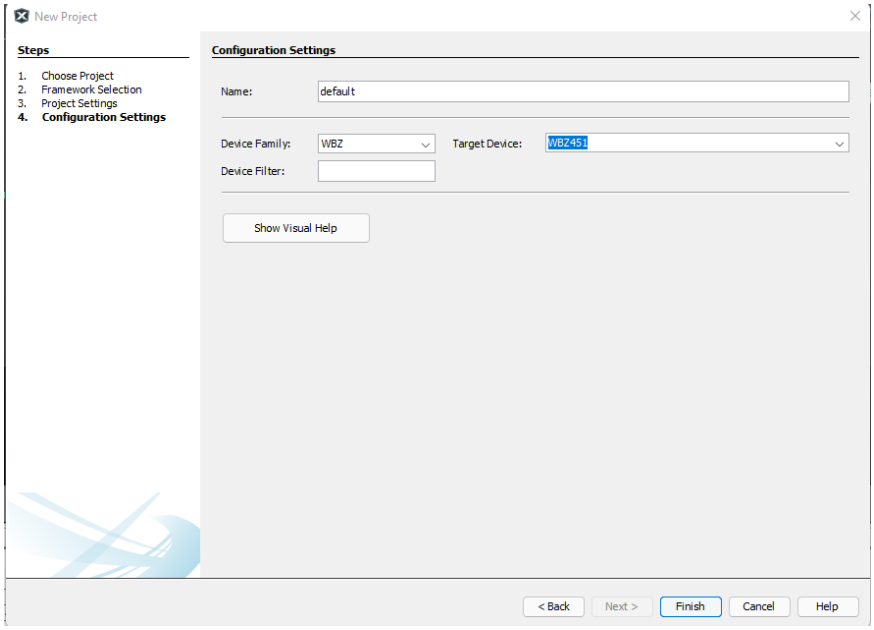
7.1.3 Framework Selection



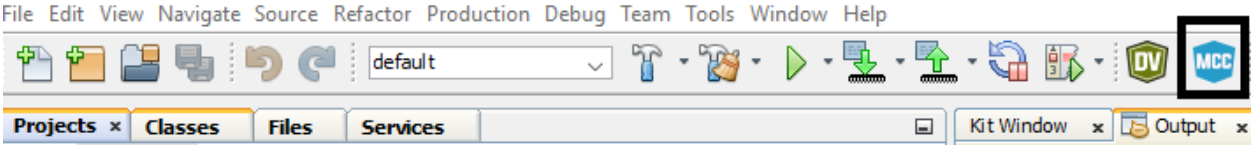
7.1.4 Project Settings



7.1.5 Configuration Settings

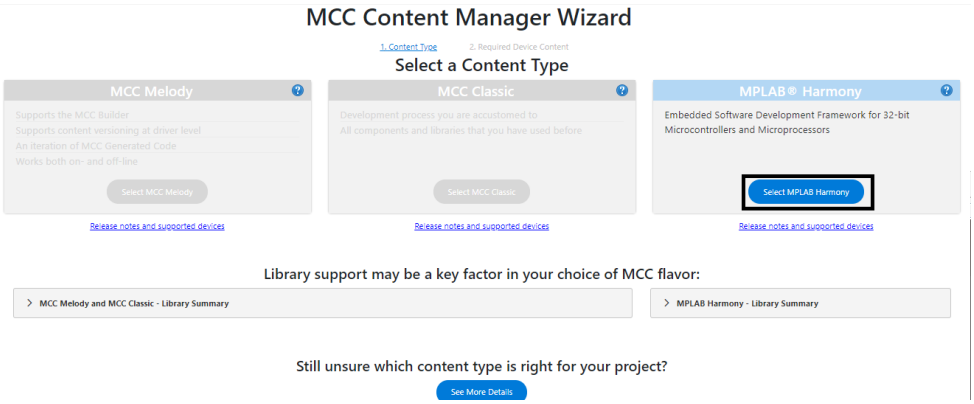


7.2 Open “MPLAB Code Configurator” after creation of project



MCC content manager window will appear in IDE

7.3 Select “MPLAB Harmony” from the content manager window



Select “Optional Content” as shown below

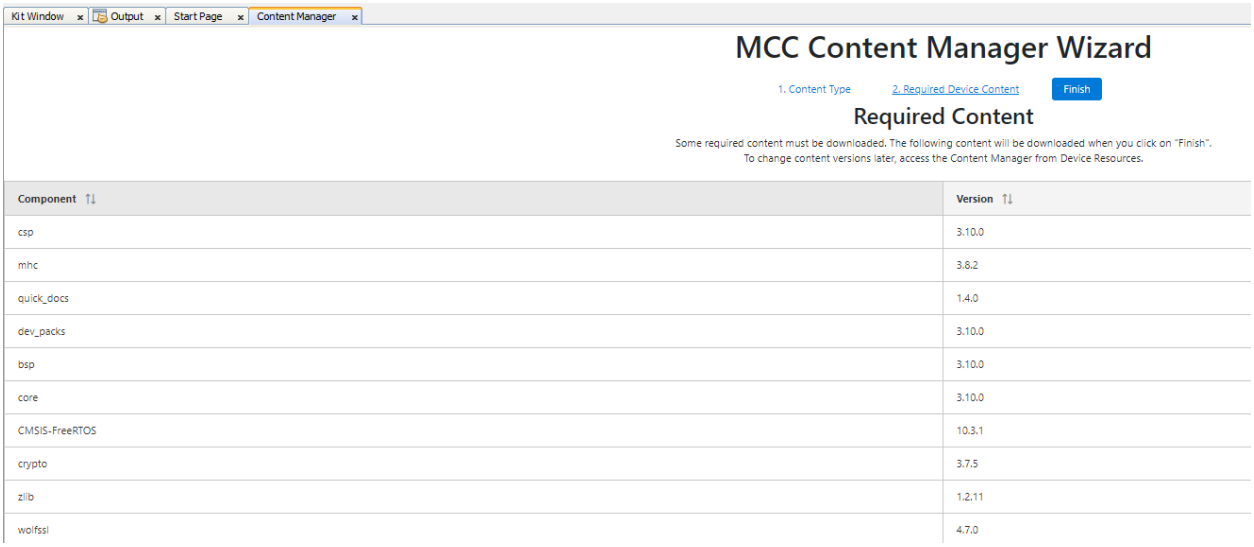
Optional Content

Select optional content to be made available in Device Resources for selection

Optional Content

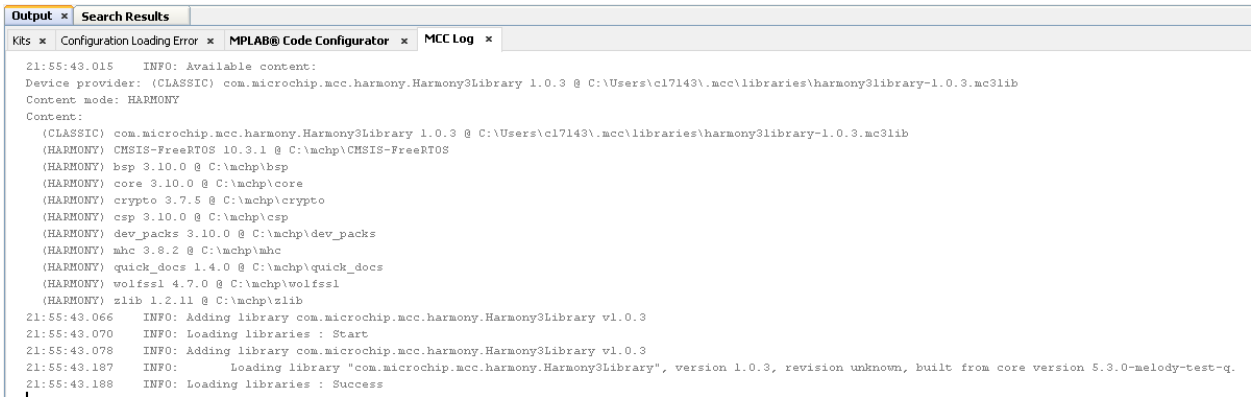
Component	Version	Description
Harmony Bootloader		
Harmony Chip Support Package		
Harmony Networking Stack and Solutions		
Harmony USB solutions		
Harmony Core		
bsp	3.10.0	
core	3.10.0	
zlib	1.2.11	
Harmony Cryptography solutions		
crypto	3.7.5	
crypto_apps_encrypt_decrypt	3.7.1	
crypto_apps_large_hash	3.7.1	
crypto_apps_speed_test	3.7.1	
Harmony Aerospace solutions		
Harmony Graphics (Aria) solutions		
Harmony CryptoAuthLib solutions		
arm Mbed OS		
Harmony Capacitive Touch solutions		
Harmony littlefs solutions		
Harmony AWS solutions		
Harmony WolfSSL solutions		
wolfMQTT	1.7.1	
wolfssh	1.4.1	
wolfssl	4.7.0	
X2C for Harmony		
CMSIS FreeRTOS		
CMSIS-FreeRTOS	10.3.1	

Ensure all components are selected as displayed below (ignore versions for now). Version selection will be done at a later stage



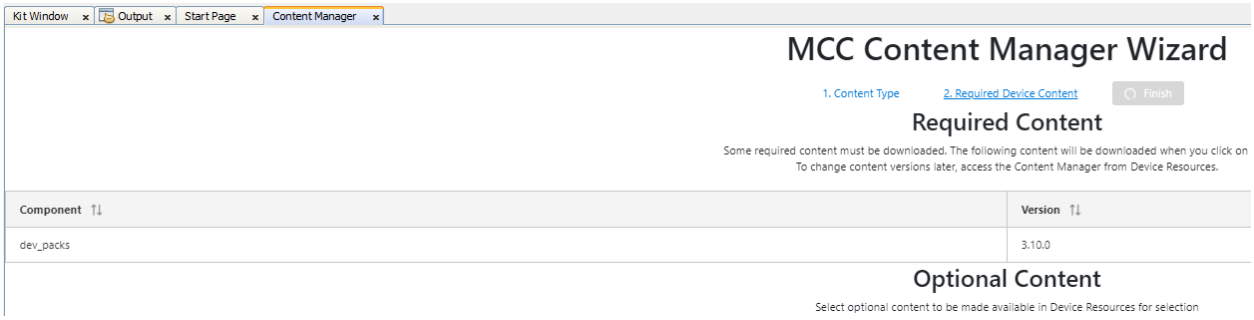
Select “Finish” The downloading of selected components from harmony repositories will take some minutes.

If all the selected components are cloned successfully, MCC logs in IDE will display this information

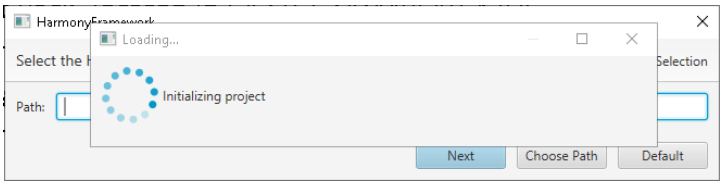


If in the process a failure to download a particular component appears, try redownloading again only the component that failed to download.

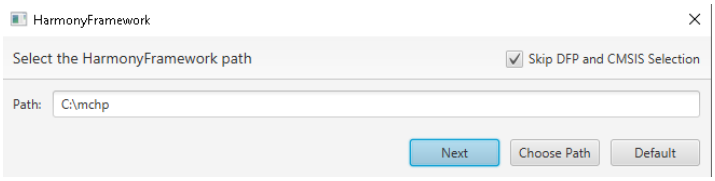
For example, if user received a prompt from MCC saying “dev_packs” was not download, close the MCC reopen MCC again and start from step 3, with the “dev_packs” as the only missing component for downloading and select “Finish”



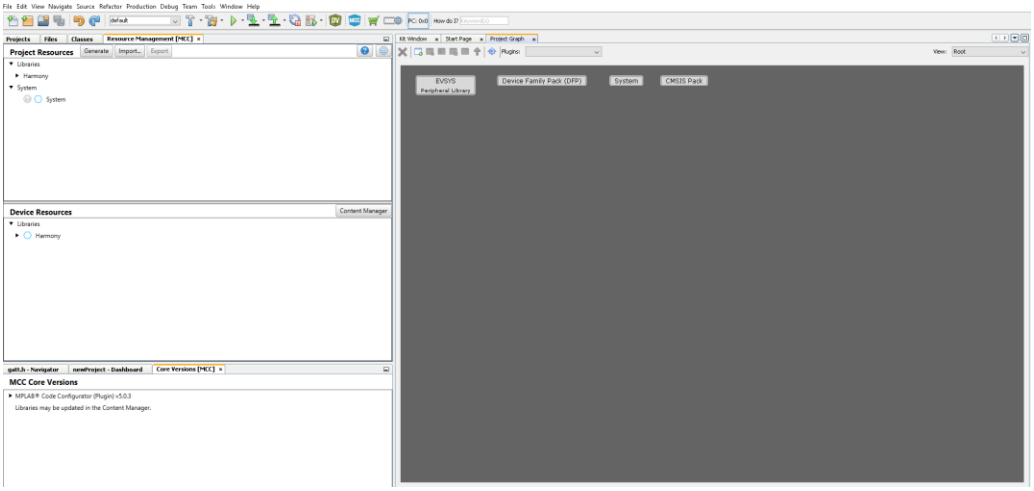
8. Select/Confirm the Harmony Framework Path



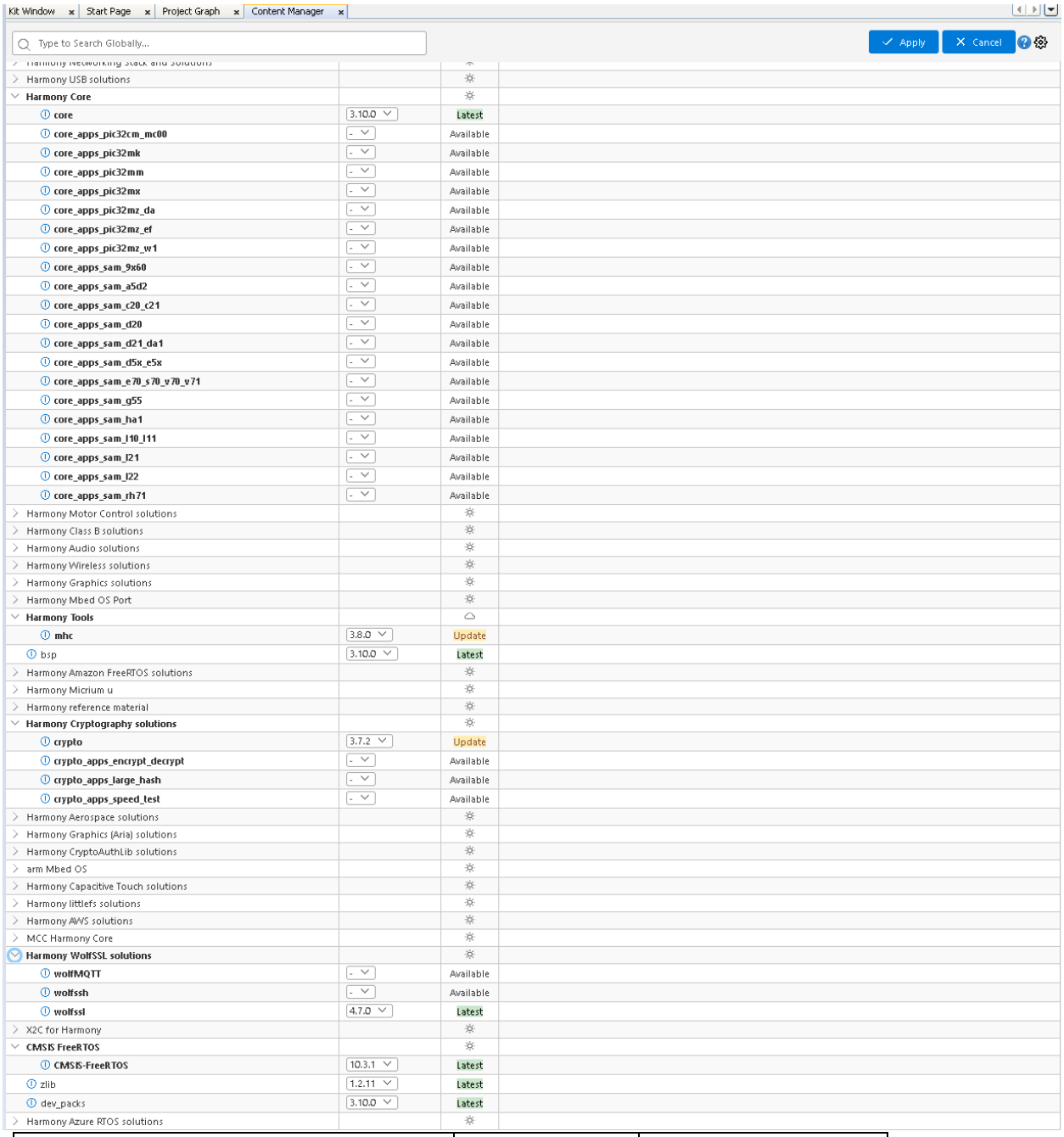
Note: Framework Path selection window appears beneath the Initializing Project pop-up, users should Choose Path as “C:\mchp”



Project Graph Window will appear after choosing the framework path and successful initialization of project



9. Change content versions as mentioned below in the table using the content manager from Device Resources and select “Apply”



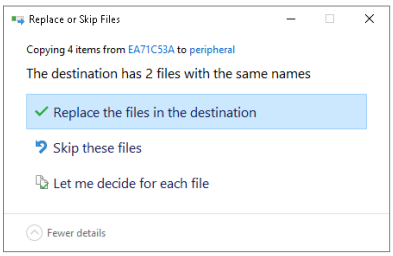
Package	Version	Location
MPLAB X IDE XC32	5.50 3.01	IDE folder Compiler folder
MCC Plugin	5.0.3	MPLAB X IDE > Tools > Plugins

csp	3.10.0	MPLAB® Code Configurator Content Manager
core	3.10.0	MPLAB® Code Configurator Content Manager
mhc	3.8.0	MPLAB® Code Configurator Content Manager
dev_packs	3.10.0	MPLAB® Code Configurator Content Manager
bsp	3.10.0	MPLAB® Code Configurator Content Manager
CMSIS-FreeRTOS	10.3.1	MPLAB® Code Configurator Content Manager
crypto	3.7.2	MPLAB® Code Configurator Content Manager
wolfssl	4.7.0	MPLAB® Code Configurator Content Manager
wireless	211211	EA71C53A\H3
PIC32CX-BZ_DFP	1.0.80	EA71C53A \MPLAB X IDE

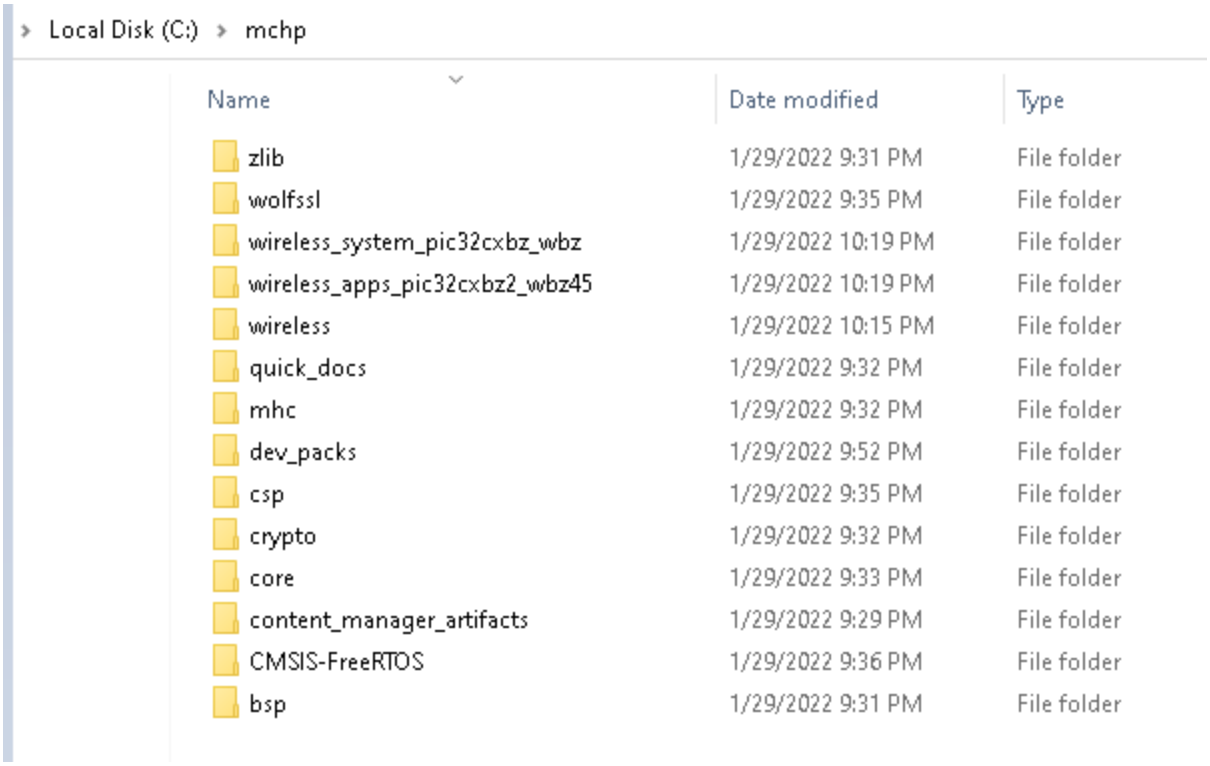
Wireless_system_pic32cxbz_wbz		EA71C53A \H3\

Note: The component versions mentioned above are the versions with which this entire package was tested on by Microchip. User can also choose to get the latest versions (csp, core etc) of components available in Content Manager. Care must be taken that all the components mentioned in the above table are cloned/downloaded using content manager.

10. After successfully checking out the right version of content/components, Harmony Framework needs to be selected again and Project will be reinitialized with the new versions of content
    - Follow instructions mentioned in step 7 -
11. Copy the “clk_pic32cx_bz” folder located in “EA71C53A\” folder to “C:\mchp\csp\peripheral” folder, A prompt will appear warning destination has same file names - Select "Replace the file in the destination".



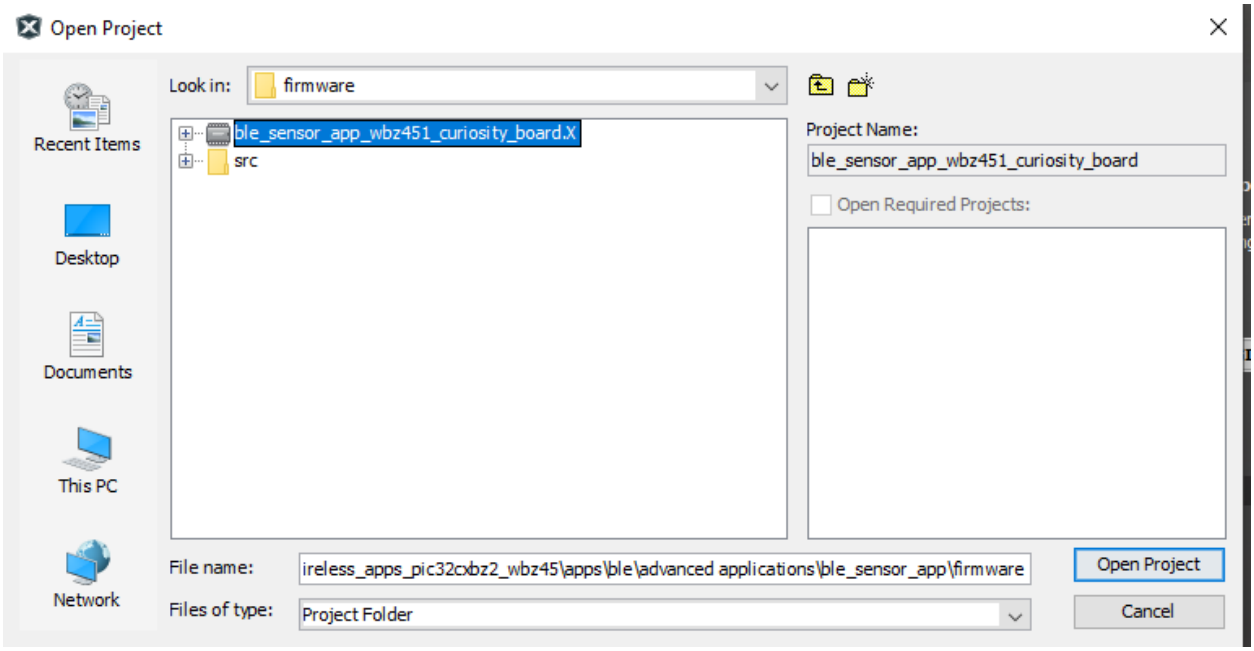
12. Copy the “wireless__” folders (3) located in “EA71C53A\H3” to “C:\mchp”
    Here is an example of how the folder should look like after copying the “wireless__” content



Next Steps

13. Open existing application examples/ develop a new application – visit - mchp\wireless_apps_pic32cxbz2_wbz45\apps\

14. How to open, build and program an existing application example
    Pre-requisites: Complete steps 1-11
    13.1 Connect Curiosity Board to the PC using usb cable
    13.2 Open MPLAB IDE
    13.3 Select **File > Open Project**
    13.4 Select the project from C:\mchp\wireless_apps_pic32cxbz2_wbz45\apps\ble\advanced applications\ble_sensor_app\firmware



Information related to the workings of the application example are available in readme.md file available in the ble_sensor_app folder or Getting Started html

13.5 Open Project Properties

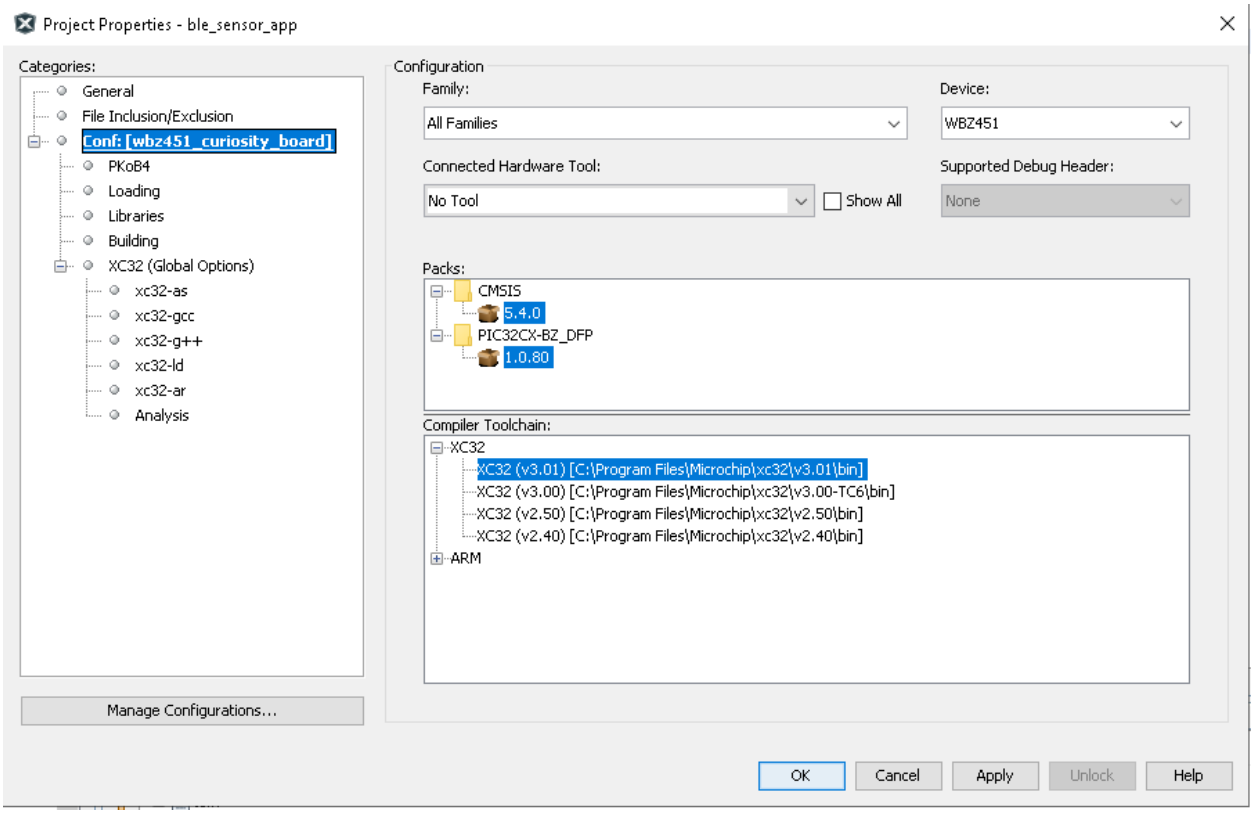
13.5.1 Select WBZ451 Curiosity Board as hardware tool for programming

13.5.2 Ensure DFP v1.0.xx is selected and CMSIS v5.4.0

Note: DFP version should match the version mentioned in table 1

13.5.3 select XC32 v3.01 compiler (in case user has several versions of XC32 compilers installed)

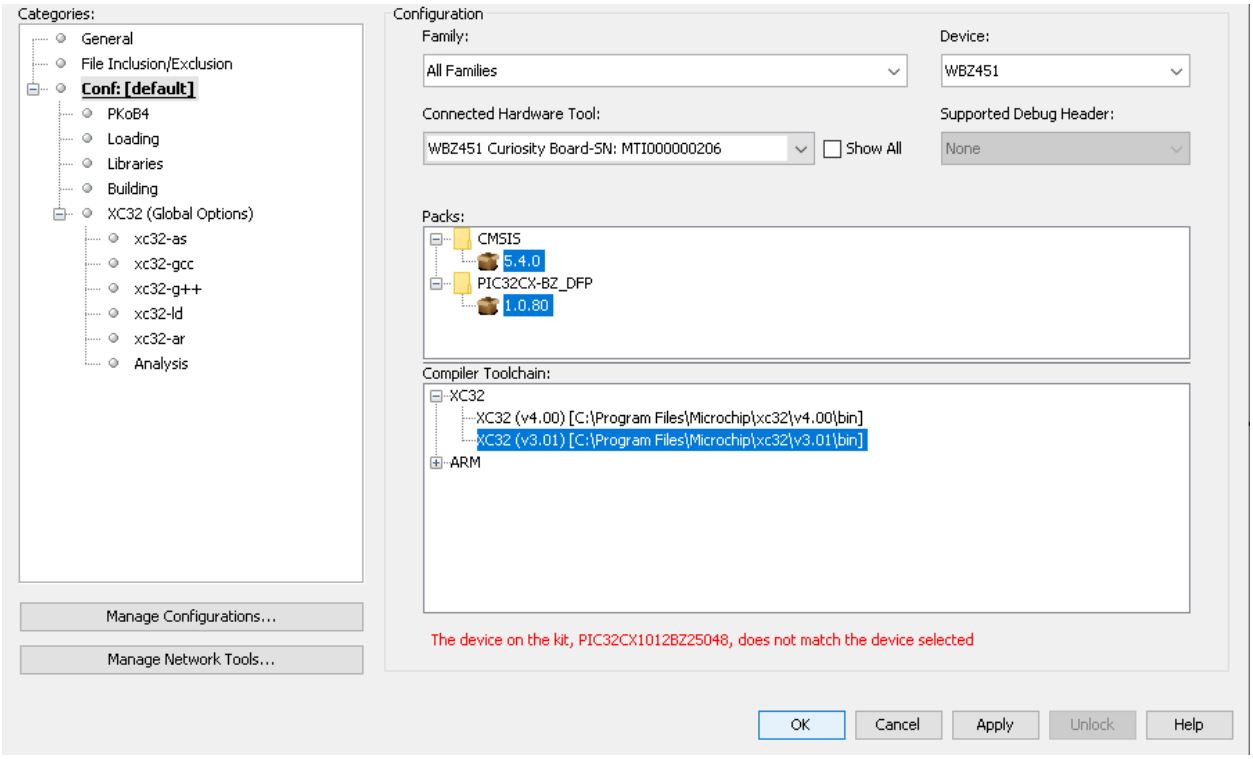
Note: Compiler version should match the version mentioned in table 1



13.6 Select option **Build Project** in IDE to compile the application example

13.7 Plug the Curiosity Development board to PC using usb cable

13.8 Select the “Connected Hardware Tool” in properties and Select “Apply”



Note: The message in red can be ignored as the project built for WBZ451 will directly run on the Curiosity board. WBZ451 is an RF module based of PIC32CX1012BZ25048 Soc

13.9 Select option **Run Project** in IDE to program the target – the onboard debugger will program the example application

Note: A smartphone App might be needed to explore the full feature set of Application examples, users can refer to readme.md (markdown reader recommended) available in respective Application Example folder or Getting Started html points to the instructions of the Application example