



MPLAB® Harmony Setup for Software Development on PIC32CX_BZ2/WBZ45x

This document will show users how to **install MPLAB® Harmony Configurator (MHC)** and **how-to setup the MPLAB Harmony framework** for software development on PIC32CX_BZ2/WBZ45x module

MHC includes tool called the MPLAB Harmony 3 Content Manager that is used to download and update the Harmony 3 framework on local machine. Users should install MHC before downloading and setting up the framework

MHC is a GUI for the MPLAB Harmony framework. It dramatically simplifies 32-bit (SAM and PIC32) core and peripheral configuration. It also allows users to enable and configure any of the specific Harmony framework libraries (e.g., device drivers, middleware, USB, system services etc.)

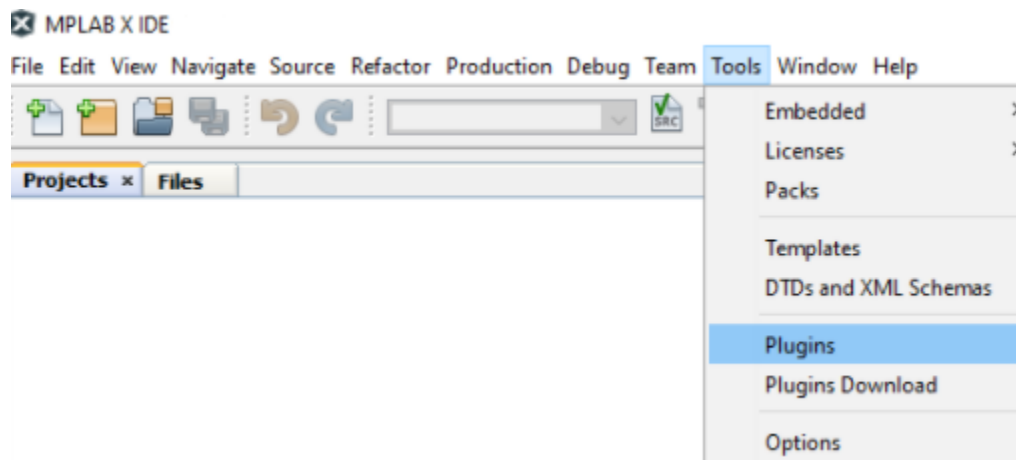
MHC is available as a plugin extension to the MPLAB® IDE

Users must install the following tools to use MHC with MPLAB®X IDE

- MPLAB X IDE
- XC32 C compiler

1. Install MPLAB Harmony Configurator (MHC)

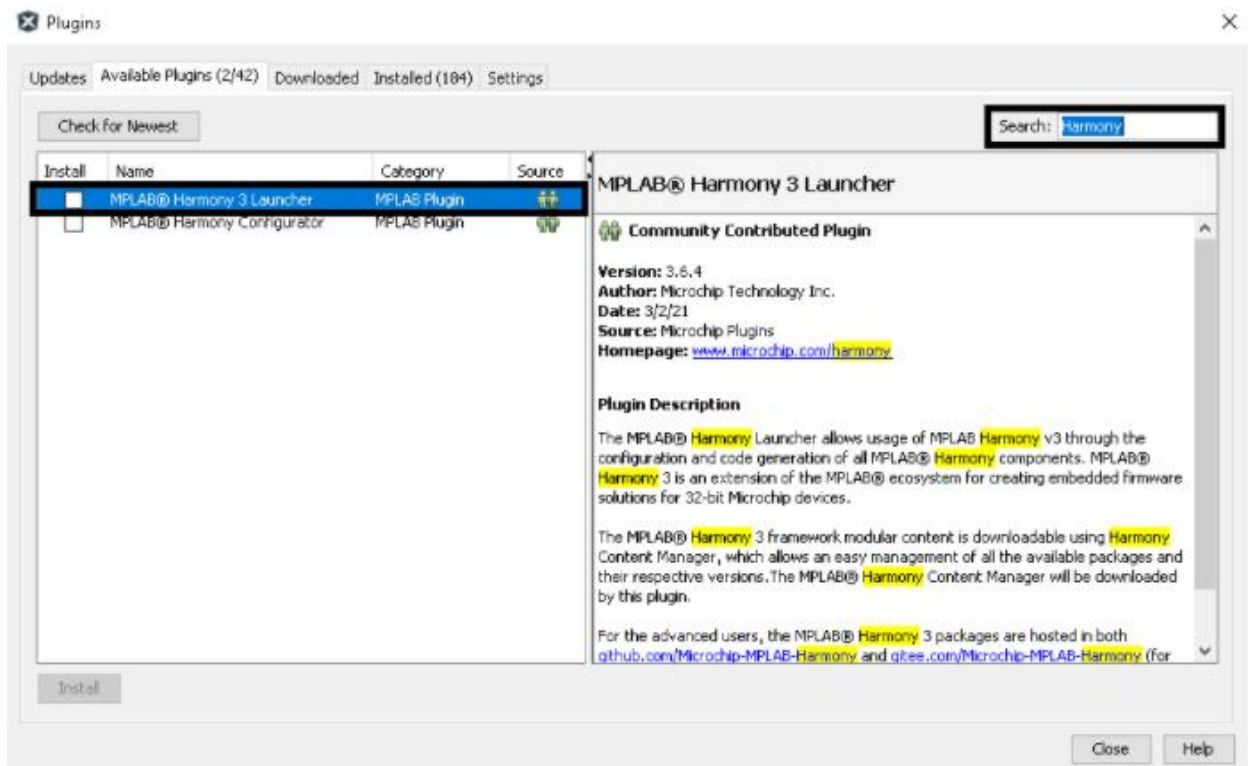
1.1 Open the MPLAB X IDE and select Tools > Plugins



1.2 The Plugins window will open. Click on the **Available Plugins** tab, check the MPLAB® Harmony 3 Launcher box, and click the install button

Note: Users should not select MPLAB® Harmony Configurator as this is a different plugin used with previous version of Harmony (version 2)

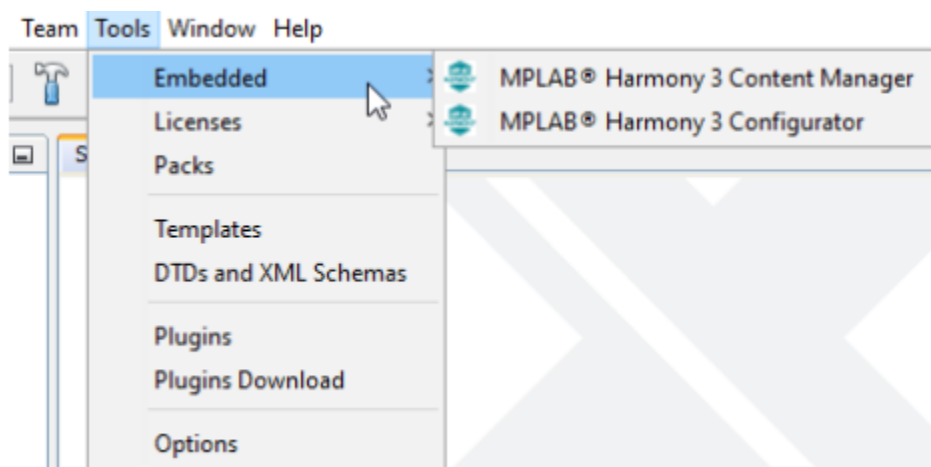




1.3 Click **Next**, accept the license terms, and click **install**

1.4 Click **Finish** to restart the IDE

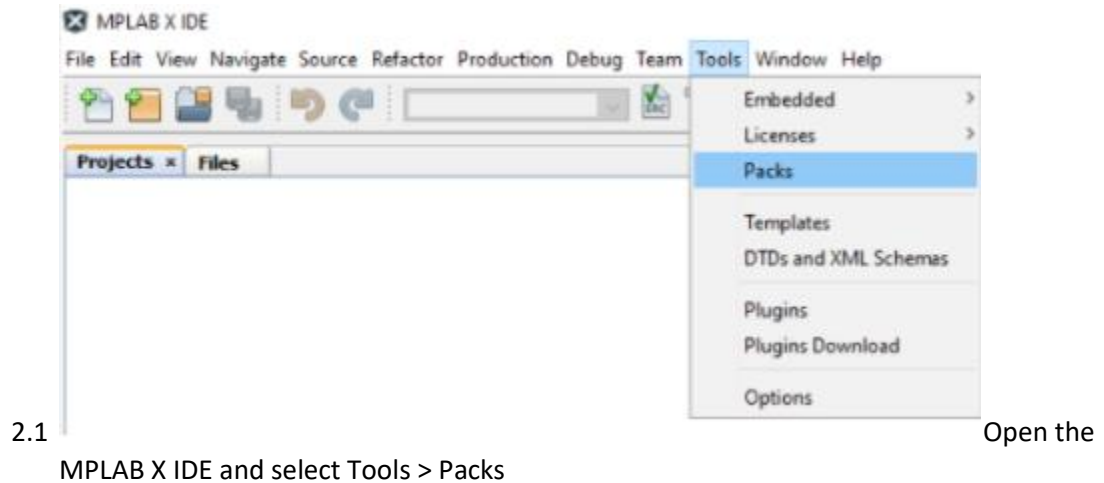
1.5 Select **Tools > Embedded** to verify that MHC and the content manager are displayed in the list



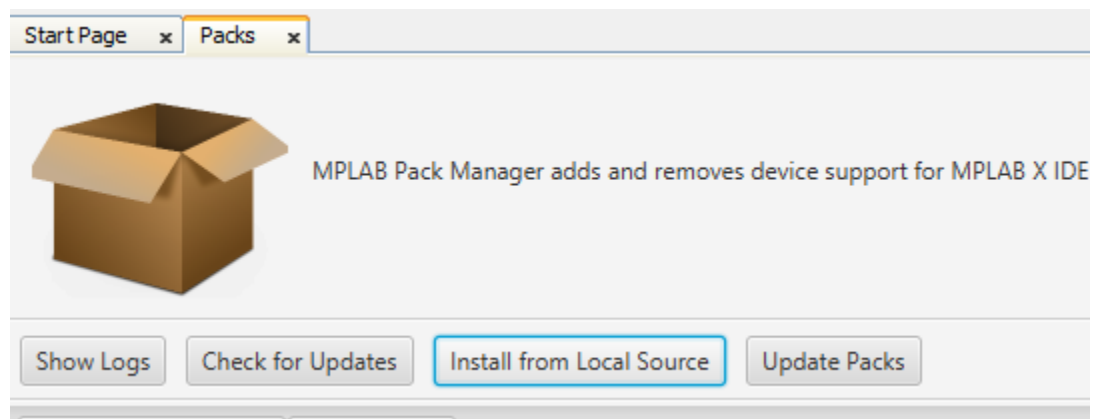


2. Install PIC32CX-BZ Device Family Pack (DFP) from local source

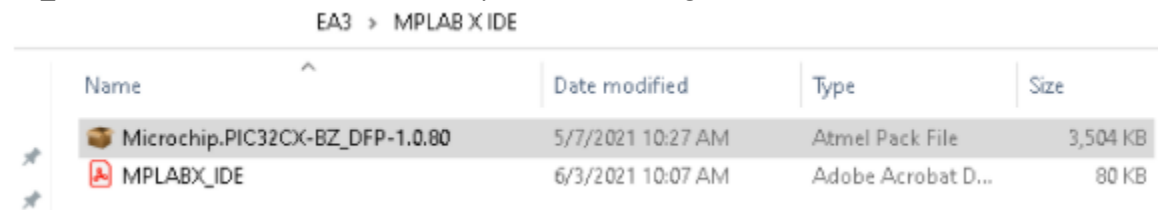
Device Family Packs are device description files (.PIC files for PIC® devices, .ATDF files for AVR® and SAM devices), which contain SFR names, memory regions, programming information. Device-dependent source code files (i.e. peripheral header files) are being moved to DFPs. XC8 (AVR target) and XC32 (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.



2.2 Click “Install from Local Source”

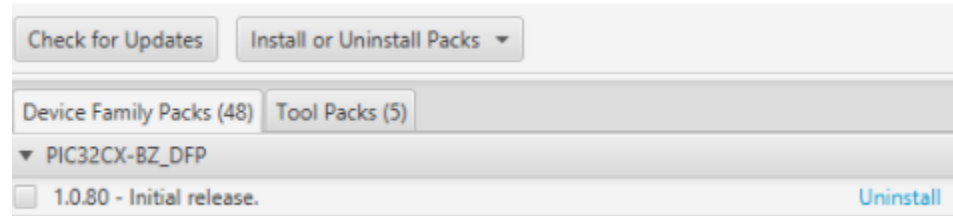


2.3 Locate (EAx\MPLAB X IDE) and select the device family pack **Microchip.PIC32CX-BZ_DFP-1.0.xx** in MPLAB X IDE directory of the EA Package





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



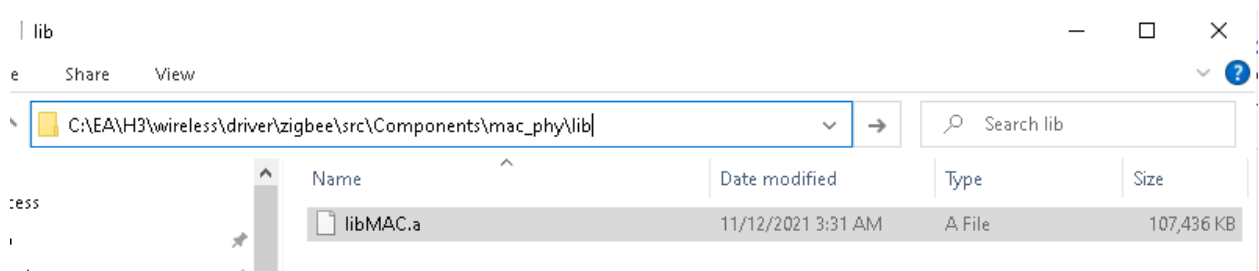
- 2.5 **Restart** MPLAB X IDE

3. Clone the repository “EA” – using command – “git clone <https://github.com/MicrochipTech/EA.git>”

Note: Users must clone this repository in the root directory(maximum 1 level deep), C:/folder_name (folder_name cannot exceed 4 characters for example C:/mchp)

4. copy "clk_pic32cx_bz" folder located in EA directory to "EA\H3\csp\peripheral" folder. A prompt will appear warning "plib_clk.c.ftl" is available in destination folder Select "Replace the file in the destination".

5. Download "libMAC.a" file from the [link](#) and copy the file to the following directory “EA\H3\wireless\driver\zigbee\src\Components\mac_phy\lib” folder



6. Copy the “H3” folder located in EA directory to C:\ drive, users must copy the H3 folder to the root directory like C:\H3





7. Setup the MPLAB Harmony Framework

MPLAB Harmony Framework provides flexible and interoperable software modules to simplify the software development. It includes peripheral libraries, Drivers and services, Reusable middleware

Tools and Harmony 3 Package versions for software development on PIC32CX_BZ2/WBZ45x – The EA package has been tested with the below versions

Table 1:

Package	Version	Location
MPLAB X IDE	5.50	IDE folder
XC32	3.01	Compiler folder
Harmony 3 Plugin	3.6.4	MPLAB X IDE > Tools > Plugins
csp	3.10.0	MPLAB® Harmony3 Content Manager
core	3.10.0	MPLAB® Harmony3 Content Manager
mhc	3.8.0	MPLAB® Harmony3 Content Manager
dev_packs	3.10.0	MPLAB® Harmony3 Content Manager
bsp	3.10.0	MPLAB® Harmony3 Content Manager
CMSIS-FreeRTOS	10.3.1	MPLAB® Harmony3 Content Manager
crypto	3.7.2	MPLAB® Harmony3 Content

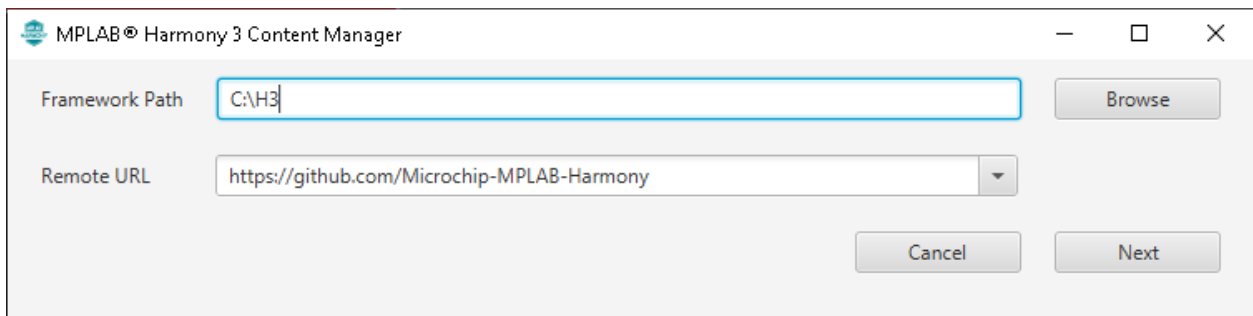




		Manager
wolfssl	4.7.0	MPLAB® Harmony3 Content Manager
wireless	211211	EA\H3
PIC32CX-BZ_DFP	1.0.80	EA\MPLAB X IDE
Wireless_system_pic32cxbz_wbz		EA\H3\

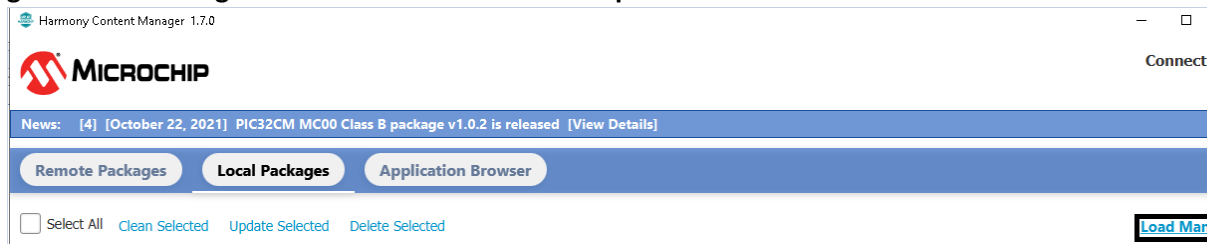
7.1 Open MPLAB X IDE and select **Tools > Embedded > Harmony 3 Content Manager**

7.2 Select **Framework Path** as **C:\H3**, enter **Remote URL** as is: <https://github.com/Microchip-MPLAB-Harmony> and click **Next**



7.3 A new window – Harmony 3 Content Manager pops-up

- go to **Local Packages** and select “Load Manifest” option



- Browse to
“C:\H3\wireless_apps_pic32cxbz2_wbz45\apps\ble\building_blocks\peripheral\profiles_services\trp_uart” location and select “ok”



Load Manifest

This will checkout/update/download the listed packages and versions mentioned in the manifest of Harmony project

Select Project directory to load manifest file automatically :

C:\H3\wireless_apps_pic32cxbz2_wbz45\apps\ble\building_blocks\peripheral\profiles_services\trp_uart

Browse

Selected Manifest File :

C:\H3\wireless_apps_pic32cxbz2_wbz45\apps\ble\building_blocks\peripheral\profiles_services\trp_uart\firmware\src\config\d

Module Name	Download	Clean	Update	Checkout
csp-v3.10.0	✓			✓
core-v3.10.0	✓			✓
zlib-v1.2.11	✓			✓
dev_packs-v3.10.0	✓			✓
wolfssl-v4.7.0	✓			✓
bsp-v3.10.0	✓			✓
CMSIS-FreeRTOS-v10.3.1	✓			✓

OK

Cancel

- Accept all licenses and Select "Close"



License Window

You must agree to the following software licenses to download the selected packages.

Select a license to view:

zlib (Accepted)

Microchip Device Family Pack License (Accepted)

exFAT license (Accepted)

FatFS license (Accepted)

CMSIS License (Accepted)

MIT license (Accepted)

The selected license applies to the following packages:

zlib

ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.11 is a general purpose data compression library. All the code is thread safe. The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).

All functions of the compression library are documented in the file `zlib.h` (volunteer to write man pages welcome, contact zlib@gzip.org). A usage example of the library is given in the file `test/example.c` which also tests that the library is working correctly. Another example is given in the file `test/minigzip.c`. The compression library itself is composed of all source files in the root directory.

I have read and understood the terms and conditions

☒ Accept License

Previous

Next

☒ Accept All Licenses

Close

■ Harmony 3 Components will begin downloading

Harmony Content Manager 1.7.0



News:

[4] [October 22, 2021] PIC32CM MC00 Class B package v1.0.2 is released [View]

Global Download Status

50%

Remote Packages

Local Packages

Application Browser

☐ Select All [Clean Selected](#) [Update Selected](#) [Delete Selected](#)

[Load Man](#)

Harmony Core

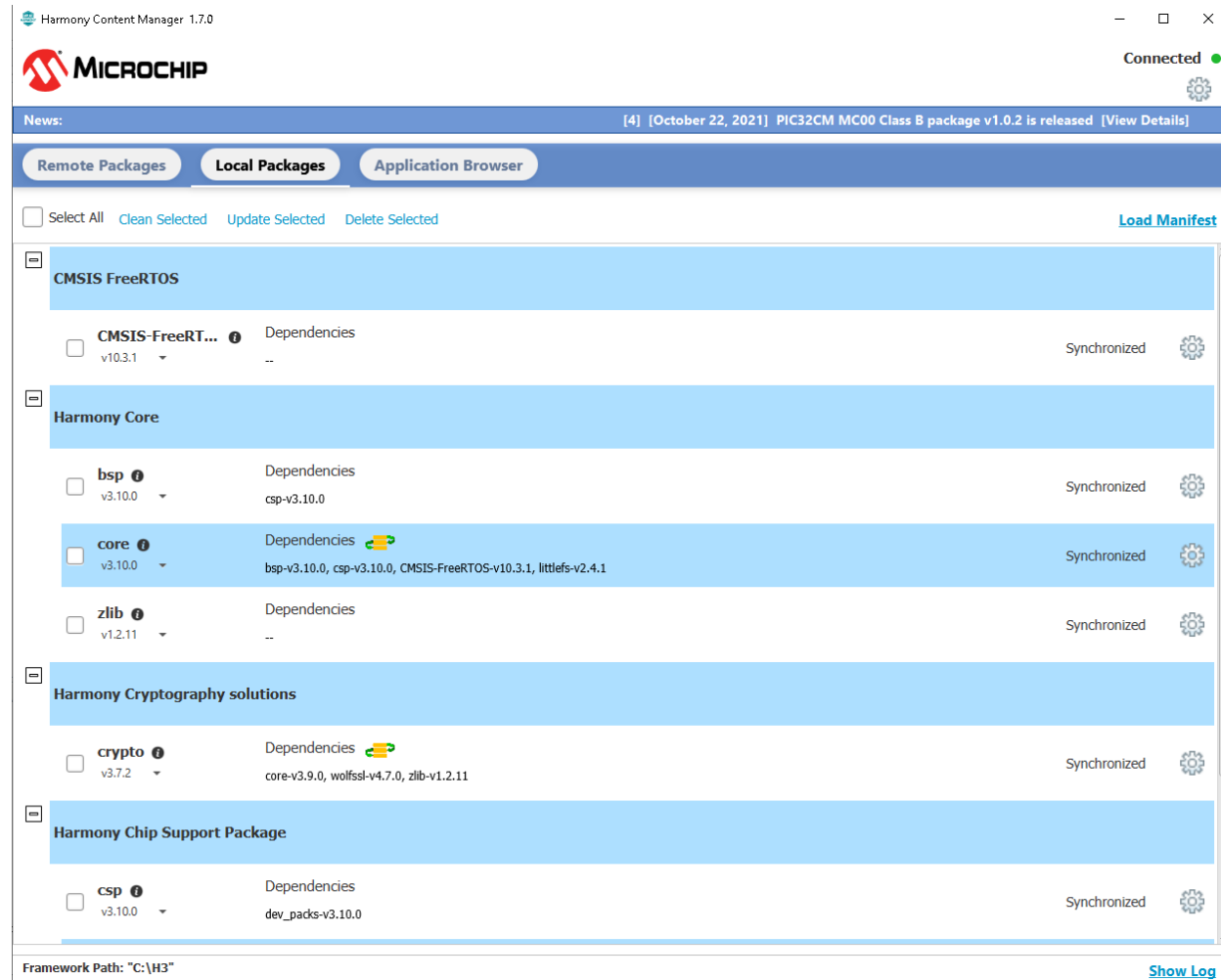
☐ bsp v3.10.0

Dependencies csp-v3.10.0

Synchronized

■ After downloading is Local Packages will display the downloaded H3 components





Caution: Users should not update/download any components based of remote packages, EA package is tested with only the versions mentioned in Table 1

8. How to open, build and program an existing application example

Pre-requisites: Complete all the steps mentioned in previous sections 1-6

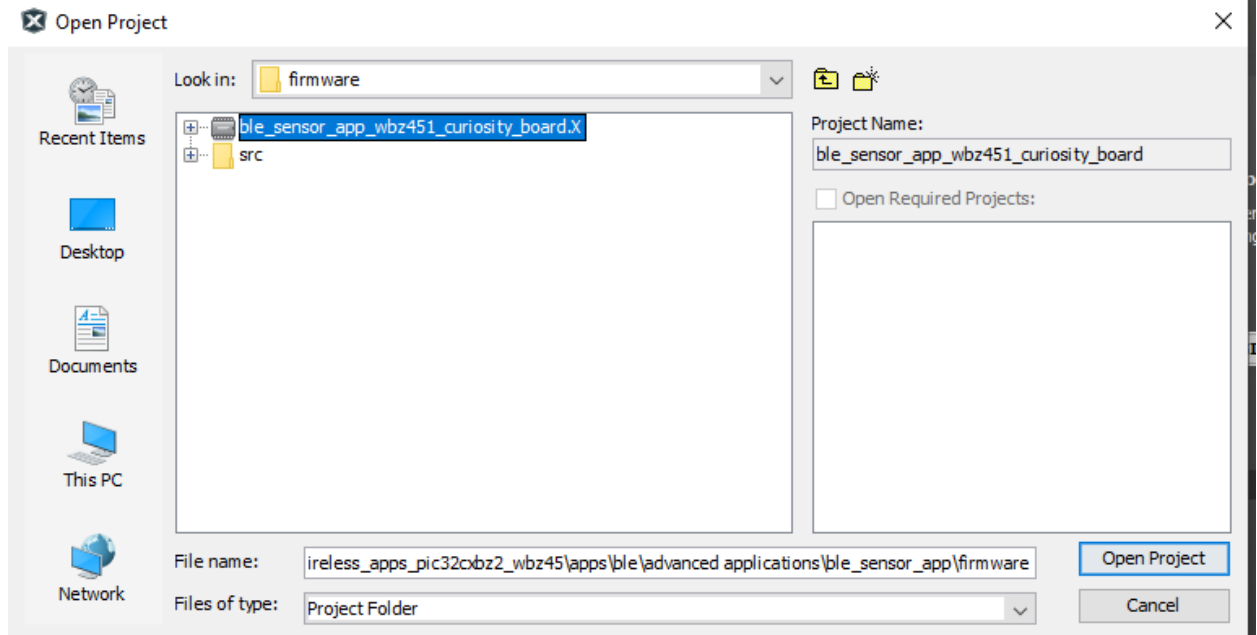
8.1 Connect Curiosity Board to the PC using usb cable

8.2 Open MPLAB IDE

8.3 Select **File > Open Project**

8.4 Select the project from C:\H3\wireless_apps_pic32cxb2_wbz45\apps\ble\advanced applications\ble_sensor_app\firmware



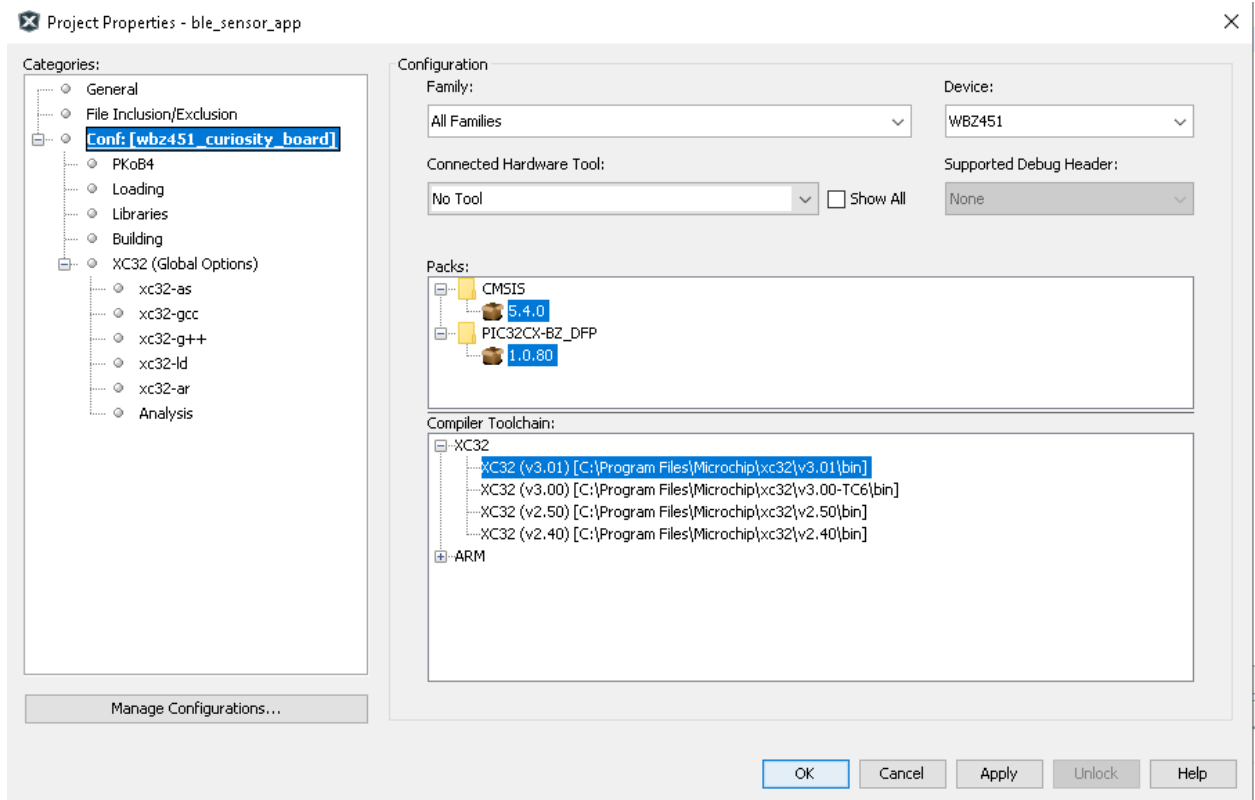


Information related to the workings of the application example are available in `readme.md` file available in the `ble_sensor_app` folder or `Getting Started.html`

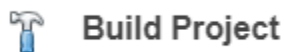
8.5 Open Project Properties

- 8.5.1 Select WBZ451 Curiosity Board as hardware tool for programming
- 8.5.2 Ensure DFP v1.0.xx is selected and CMSIS v5.4.0
Note: DFP version should match the version mentioned in table 1
- 8.5.3 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





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



8.7 Plug the Curiosity Development board to PC using usb cable

8.8 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



