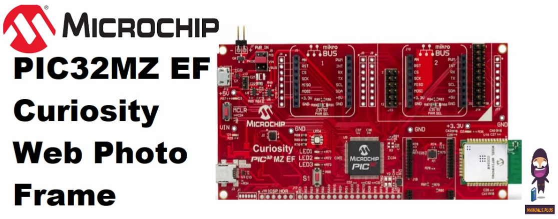
Manuals+ — User Manuals Simplified.



MICROCHIP PIC32MZ EF Curiosity Web Photo Frame Instruction Manual

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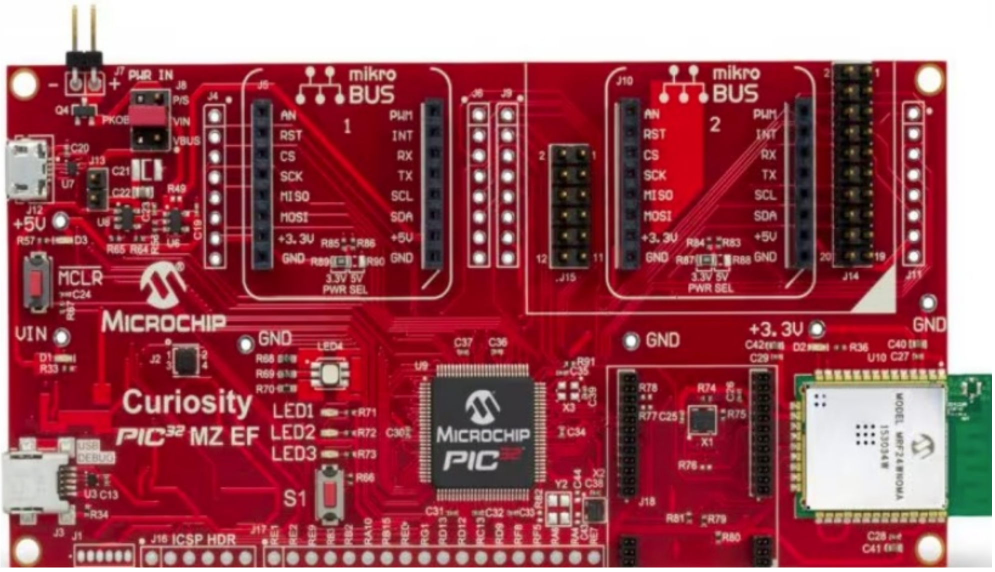


Specifications

- PIC32MZ EF Curiosity Development Board
- Contains PIC32MZ2048EFM100 MCU
- Two microbus headers
- Ethernet Header
- MRF24WN0MA wireless module

Product Usage Instructions

Required Tools and Applications

You will need Microchip development tools to run the demo.

Building the Application

1. Download the web_photoframe project to your local PC.
2. Open the project in MPLAB X IDE (File > Open Project).
3. Select the Configuration as ‘pic32mz_ef_curiosity’.
4. Clean and Build the project.

Configuring the Hardware

1. Mount the SD Click board (microSD click) on the mikroBUS interface J5.
2. Copy the index.htm and images folder to the microSD card.
3. Plug the microSD card into the microSD click board slot (J5).
4. Plug the LAN8740 PHY Daughter board into the J18 header of the curiosity board.

Frequently Asked Questions

Q: Can I use a different microcontroller with this demo?

A: No, this demo is specifically designed for the PIC32MZ2048EFM100 MCU on the PIC32MZ EF Curiosity board.

Q: How do I view the images on a web browser?

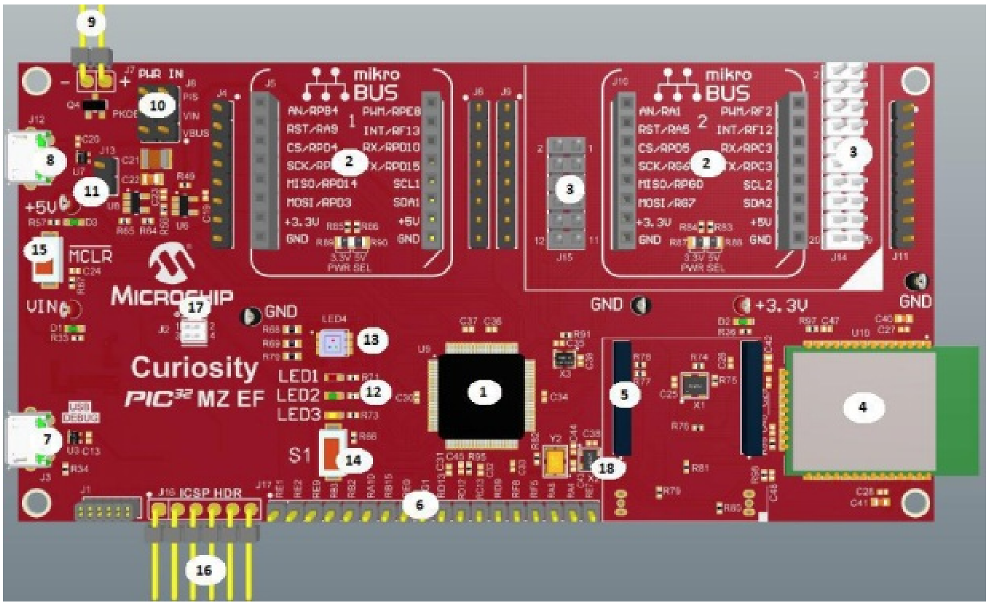
A: Once the hardware is configured and the application is built, access the device's IP address on a web browser to view the images as a slideshow.

Introduction

- This application demonstrates a web photo frame application on the PIC32MZ EF Curiosity development board. The images stored on the SDCARD with a FAT file system can be viewed on a web browser over the Ethernet and Wifi interfaces as a slideshow.
- The PIC32MZ EF Curiosity Development Board contains PIC32MZ2048EFM100 MCU along with two mikroBus headers, an Ethernet Header, and an MRF24WN0MA wireless module that enables you to implement a web photo frame.

To implement the web photo frame functionality:

- A microSD click is mounted on the mikroBUS header J5.
- The images required for the demo are stored in a microSD card plugged into the microSD click board.
- LAN8740 PHY daughter board mounted on the Ethernet Header.
- The on-board MRF24WN0MA module is configured to operate in SoftAP mode.



1. PIC32MZ2048EFM100 32-bit microcontroller (U9).
2. Two mikroBUS sockets to expand functionality using MikroElectronika Click adapter boards (J5, J10).
3. X32 header for audio I/O using Microchip audio daughter boards (J14, J15).
4. MRF24WN0MA, 2.4 GHz IEEE 802.11n compliant wireless module (U10).
5. Header for flexible Ethernet PHY options using Microchip PHY daughter boards (J18).
6. GPIO expansion header (J17).
7. Debug USB connector for programming/debugging (J3).
8. Target USB connector for PIC32 USB connectivity (Device/Host mode) (J12).
9. Header for external 5V input (J7).

10. Jumper to select power source: Debug USB connector, target USB connector, and external +5V input (J8).
11. Jumper to drive VBUS in Host mode (J13).
12. Three user LEDs (LED1, LED2, and LED3).
13. RGB LED (LED4).
14. User button (S1).
15. Reset Button (MCLR).
16. ICSP header for the external debugger, such as MPLAB® REAL ICE™ or MPLAB ICD 3 (J16).
17. Jumper to select on-board debugger or external debugger (J2).
18. 24 MHz crystal oscillator (X2).

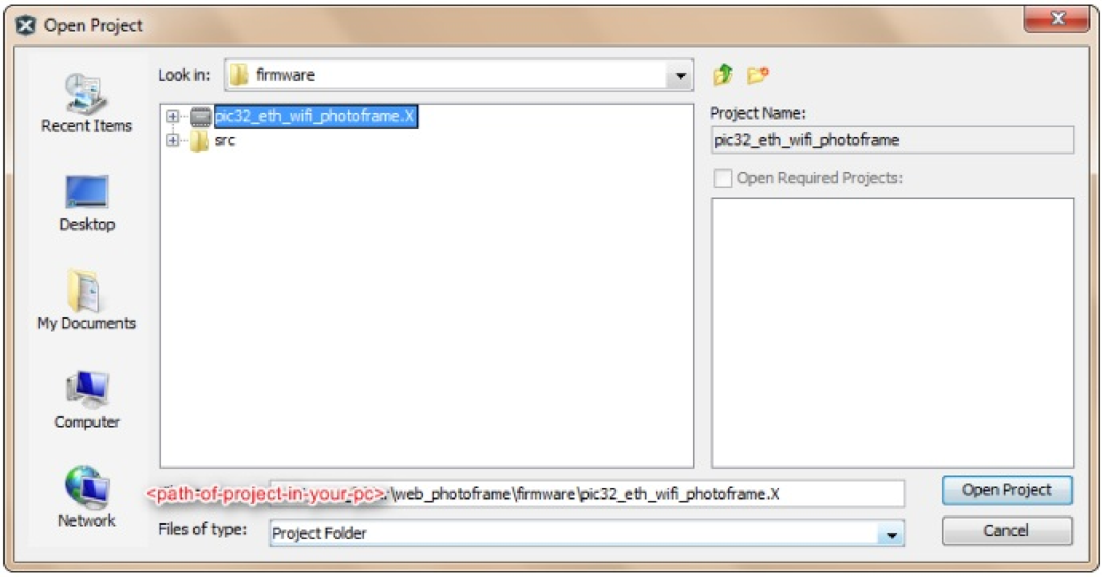
Required Tools and Applications

Microchip Tools and Applications

- You will need the following Microchip development tools to run the USB MSD Multiple LUNs demo.
- PIC32MZ EF Curiosity Development Board (DM320104), available from **Microchip Direct**
- Download and install the latest version of **MPLAB® X Integrated Development Environment (IDE)**
- Download and install the latest version of **MPLAB® XC32 Compiler**
- Optionally Download and install the latest version of **MPLAB® Harmony Integrated Software Framework**.
- **Note** Using MPLAB® Harmony Integrated Software Framework you will be able to extend the functionality of this project by adding new modules, software frameworks, and libraries to your project.

Building the Application

- Download the web_photoframe project to your local PC.
- To build this project, you must open (In MPLAB X, File > Open Project) the pic32_eth_wifi_photoframe.X project (from <path-of-project-in-your-pc>/web_photoframe/firmware) in MPLAB X IDE, as shown below.



Look in: firmware

pic32_eth_wifi_photoframe.X
src

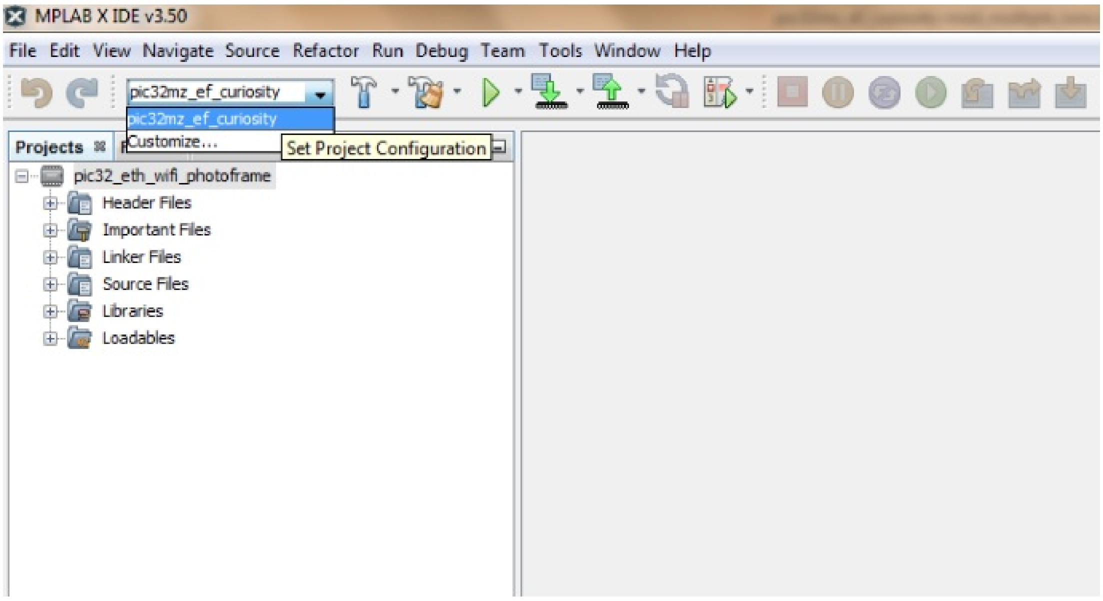
Project Name: pic32_eth_wifi_photoframe

☐ Open Required Projects:

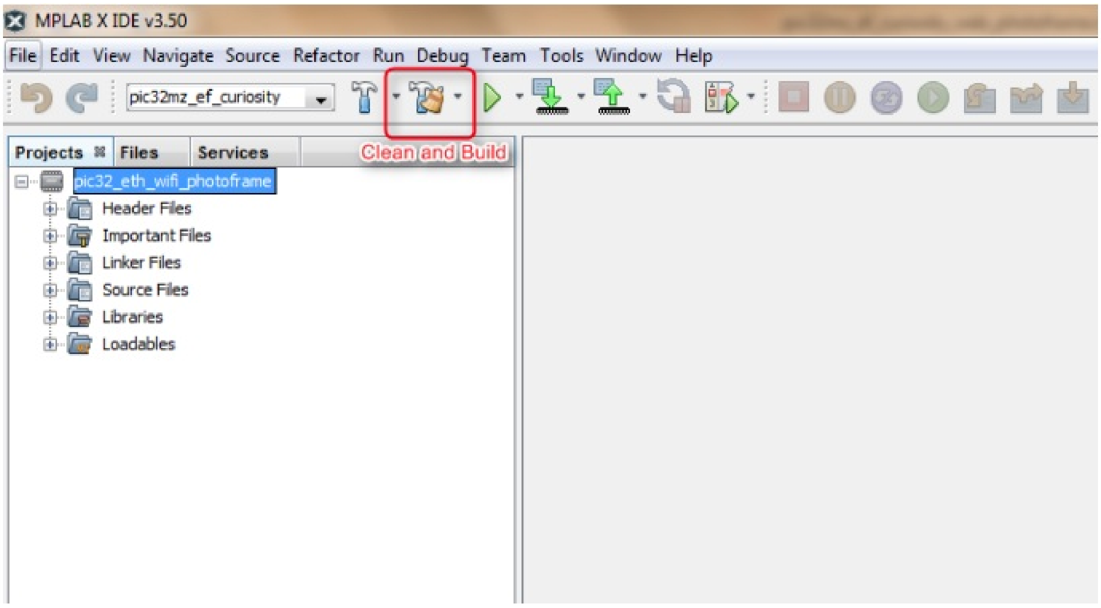
<path-of-project-in-your-pc>\web_photoframe\firmware\pic32_eth_wifi_photoframe.X

Files of type: Project Folder

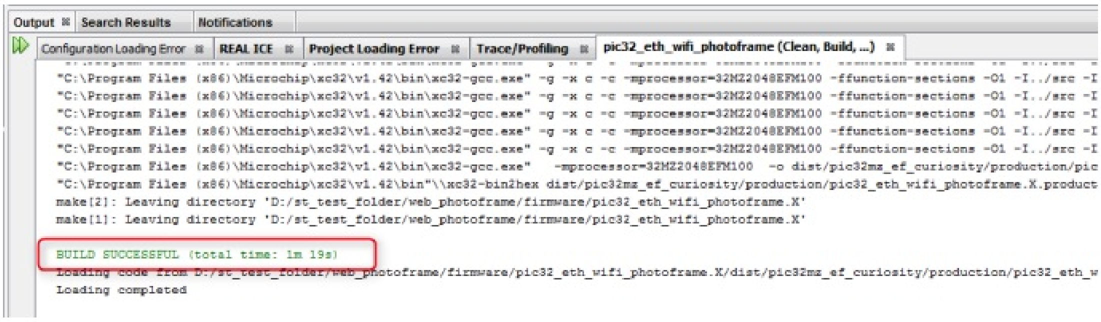
- Select the Configuration as pic32mz_ef_curiosity from the drop-down list as shown below. As the demo is available for a single configuration, there are no other configuration options.



- The other configurations will not work under standalone mode. However, if you want to work on this project for other configurations listed, you can migrate this project into a Harmony project, and then build for other configurations.
- Please follow the instructions provided in Migrating from the standalone Harmony project to the standard Harmony project
- The ‘pic32mz_ef_curiosity’ configuration sets up MPLAB X IDE to build and run the demonstration application on the PIC32MZ EF Curiosity Development Board, with the PIC32MZ2048EFM100 microcontroller.
- Clean and Build the project



- Check the build log, at the bottom of the MPLAB X IDE



```
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe" -g -x c -c -mprocessor=32MZ2048EFM100 -ffunction-sections -O1 -I../src -I
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe" -g -x c -c -mprocessor=32MZ2048EFM100 -ffunction-sections -O1 -I../src -I
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe" -g -x c -c -mprocessor=32MZ2048EFM100 -ffunction-sections -O1 -I../src -I
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe" -g -x c -c -mprocessor=32MZ2048EFM100 -ffunction-sections -O1 -I../src -I
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe" -g -x c -c -mprocessor=32MZ2048EFM100 -ffunction-sections -O1 -I../src -I
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin\xc32-gcc.exe"   -mprocessor=32MZ2048EFM100  -o dist/pic32mz_ef_curiosity/production/pic
"C:\Program Files (x86)\Microchip\xc32\v1.42\bin"\\xc32-bin2hex dist/pic32mz_ef_curiosity/production/pic32_eth_wifi_photoframe.X.product
make[2]: Leaving directory 'D:/st_test_folder/web_photoframe/firmware/pic32_eth_wifi_photoframe.X'
make[1]: Leaving directory 'D:/st_test_folder/web_photoframe/firmware/pic32_eth_wifi_photoframe.X'

BUILD SUCCESSFUL (total time: 1m 19s)
Loading code from D:/st_test_folder/web_photoframe/firmware/pic32_eth_wifi_photoframe.X/dist/pic32mz_ef_curiosity/production/pic32_eth_w
Loading completed
```

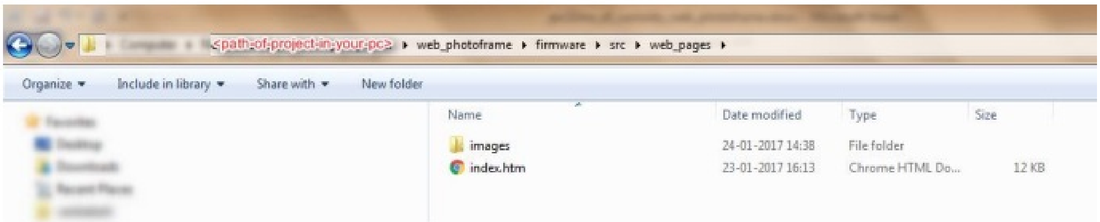
- **Note** Often a project won’t compile if you are on a Windows machine due to a limitation in the path length.
- Windows OS has a max path length of 260 characters, so file paths are sometimes truncated when attempting

to compile which leads to files not being found by the compiler.

- Try putting the project in the topmost directory, usually “C: /”. For more information please see the **MSDN article from Microsoft**.

Configuring the Hardware

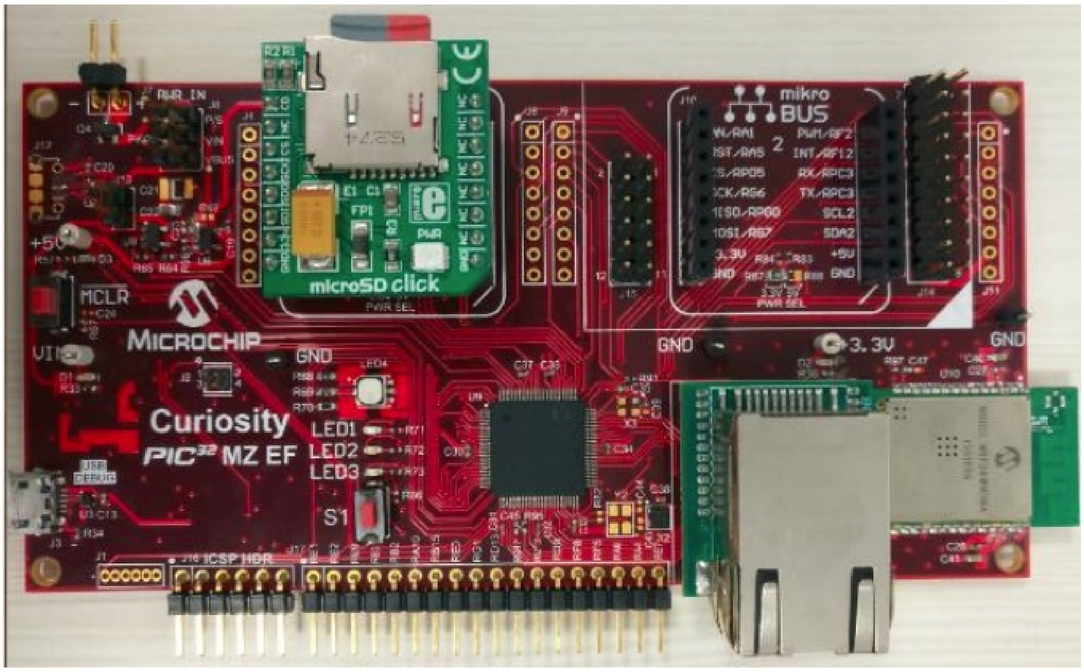
- Mount the SD Click board, “microSD click” from MikroElektronika **(http://www.mikroe.com/click/microsd/)** on the mikroBUS interface J5.
- Copy the index.htm and the images folder from the project location to the microSD card which will be used for the application.



<path-of-project-in-your-pc> ▸ web_photoframe ▸ firmware ▸ src ▸ web_pages ▸

Name	Date modified	Type	Size
images	24-01-2017 14:38	File folder	
index.htm	23-01-2017 16:13	Chrome HTML Do...	12 KB

- Plug the microSD card into the microSD click board slot(J5).
- Plug a LAN8740 PHY Daughter board into the J18 header of the curiosity board.
- Please refer to the graphic below for the above-mentioned connections.

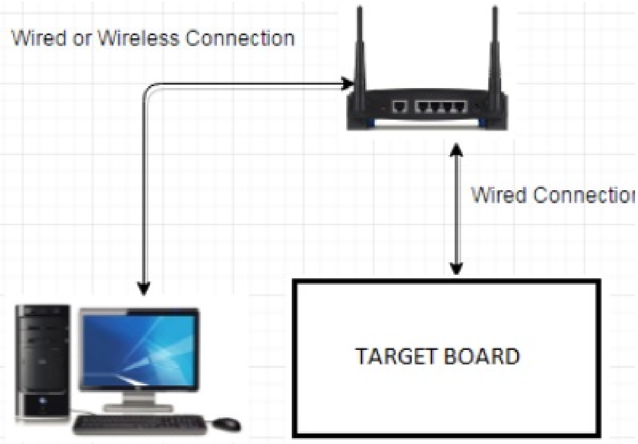


- Power the PIC32MZ EF Curiosity Development Board from a Host PC through a Type-A male to a micro-B USB cable connected to a Micro-B port (J3).
- The cable is not included in the kit. Ensure that a jumper is placed in the J8 header (between 4 & 3) to select the supply from the debug USB connector.

- Connect the PIC32MZ EF Curiosity Development Board to the Host PC as a USB Device through a second Type-A male to micro-B USB cable connected to the Micro-B port (J12).

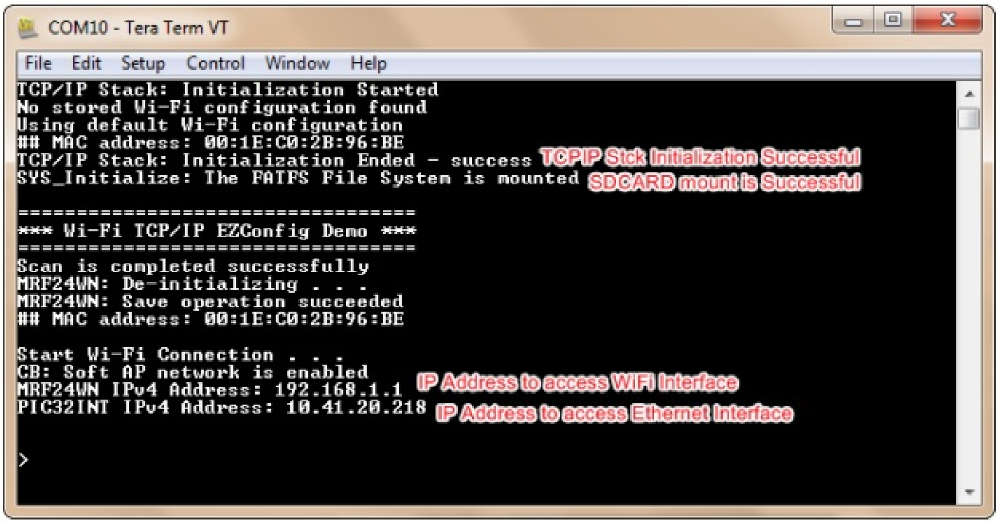
Running the Demo

- For the purpose of this demo, both the Target board and the Host PC should be on the same network.
- The host PC can be connected to a router via an Ethernet cable or WiFi. The Target board should be connected to the router via an Ethernet cable. Please refer to the connection diagram shown below.



- The microSD card should be loaded with index.htm and the images folder with .jpg images. The index.htm and the images folder can be found at location, <install-dir>/apps/tcpip/web_photoframe/firmware/src/web_pages.

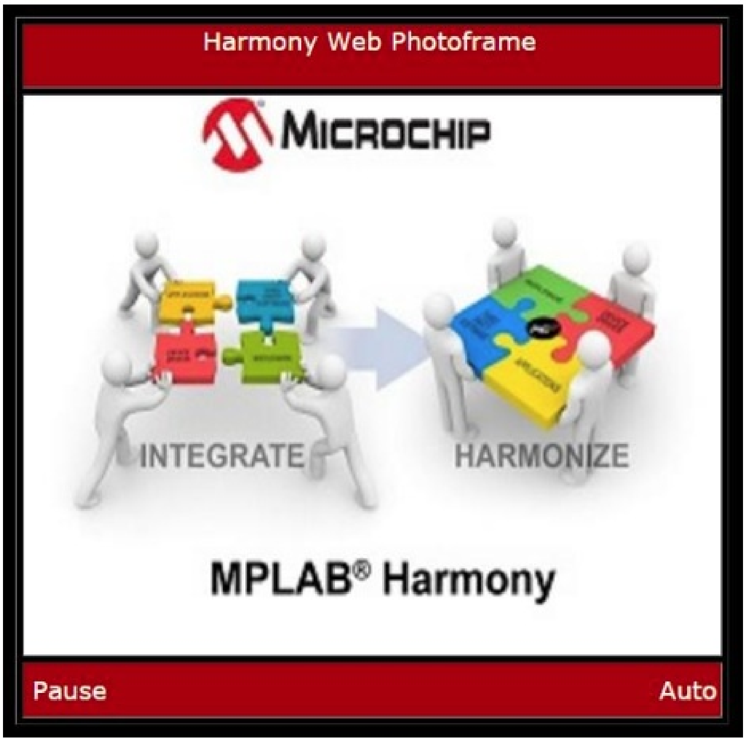
1. Load the demonstration project into MPLAB X IDE.
2. Connect the USB debugger port onboard the starter kit to a USB port on the development computer using the USB cable provided in the kit.
3. A USB cable needs to be connected to the micro-B USB connector on the bottom of the starter kit in use. When the demonstration runs, it will create a USB CDC device on the USB bus.
    - The demonstration can be executed once you have connected to this device through a standard terminal program, set the baud rate to 921,600 baud, and a valid IP address has been received by the device.
4. Build, download, and run the demonstration project on the board.
5. Connect to the board through a standard terminal program.



```
TCP/IP Stack: Initialization Started
No stored Wi-Fi configuration found
Using default Wi-Fi configuration
## MAC address: 00:1E:C0:2B:96:BE
TCP/IP Stack: Initialization Ended - success
SYS_Initialize: The FATFS File System is mounted

==================================
*** Wi-Fi TCP/IP EZConfig Demo ***
==================================
Scan is completed successfully
MRF24WN: De-initializing . . .
MRF24WN: Save operation succeeded
## MAC address: 00:1E:C0:2B:96:BE

Start Wi-Fi Connection . . .
CB: Soft AP network is enabled
MRF24WN IPv4 Address: 192.168.1.1
PIC32INT IPv4 Address: 10.41.20.218


>
```

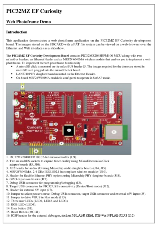
TCPIP Stck Initialization Successful
SDCARD mount is Successful
IP Address to access WIFI Interface
IP Address to access Ethernet Interface

6. In the above screenshot, we can see that the board scans for local Access Points and outputs the results to the serial console. After the scan results, the MRF24WN goes into SoftAP mode.
7. To run the demonstration on an Ethernet Interface, open a web browser on the host PC and type the IP address for the Ethernet Interface (PIC32INT IPv4 Address) from the output of the serial terminal.
8. The web browser will load the application web page hosted by the SDCARD. And the .jpg images stored in the SDCARD will be displayed on the web page in a scrolling fashion. Press the “Pause” button to pause the slideshow.



9. To run the demonstration on a WiFi Interface, from the host PC, connect to the MCHPSoftAP access point, which is the SoftAP network started by the demonstration. Then, bring up a web page by entering the IP address of the SoftAP network into the browser. This is the IP address displayed in step 6 (e.g., 192.168.1.1). The application web page will be displayed with a slideshow of the images.

Documents / Resources

	**MICHROCHIP PIC32MZ EF Curiosity Web Photo Frame** [pdf] Instruction Manual PIC32MZ EF Curiosity Web Photo Frame, PIC32MZ EF, Curiosity Web Photo Frame, Web Photo Frame, Photo Frame, Frame

References

- **Naming Files, Paths, and Namespaces - Win32 apps | Microsoft Learn**
- **User Manual**