PIC32MZ EF Curiosity

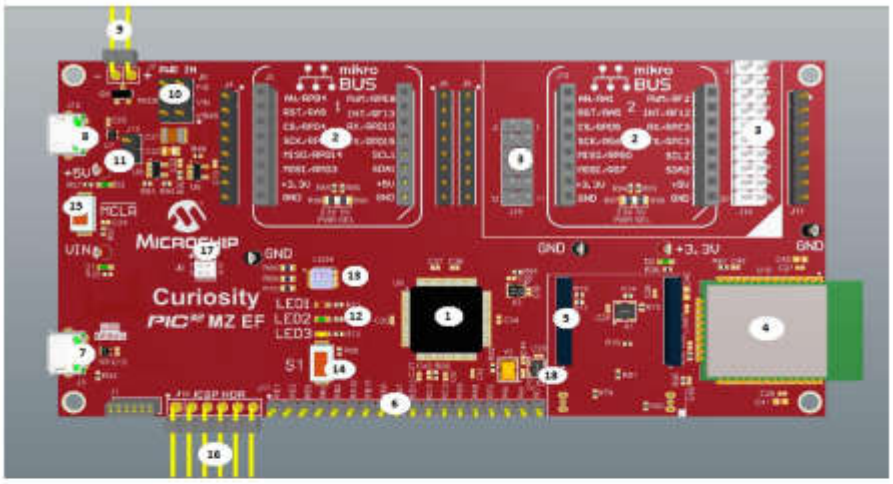
tcpip tcp client server demo

Introduction

This configuration demonstrates creating a TCP client and an TCP server that uses the MPLAB Harmony TCP API. This demonstration is a combination of the TCP/IP Client and TCP/IP Server application.

The **PIC32MZ EF Curiosity Development Board** includes header to mount different Ethernet PHY daughter boards to implement a complete Ethernet node for networking. The demo requires LAN8720A PHY daughter board (Microchip P/N: AC320004-3), which can be bought from www.microchipdirect.com

Curiosity Board



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 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).

LAN8720A

LAN8720A PHY Daughter Board
(Part # AC320004-3)

Required Microchip Tools and Applications

You will need the following Microchip development tools to run tcpip_tcp_client_server demo:

1. PiC32MZ EF Curiosity Development Board (DM320104), available from Microchip Direct
2. Microchip Ethernet PHY daughter card - LAN8720A, available from Microchip Direct
3. Download and install Latest MPLAB® X Integrated Development Environment
4. Download and Install Latest MPLAB® XC32 Compiler
5. Optionally Download and install Latest MPLAB® Harmony Integrated Software Framework.

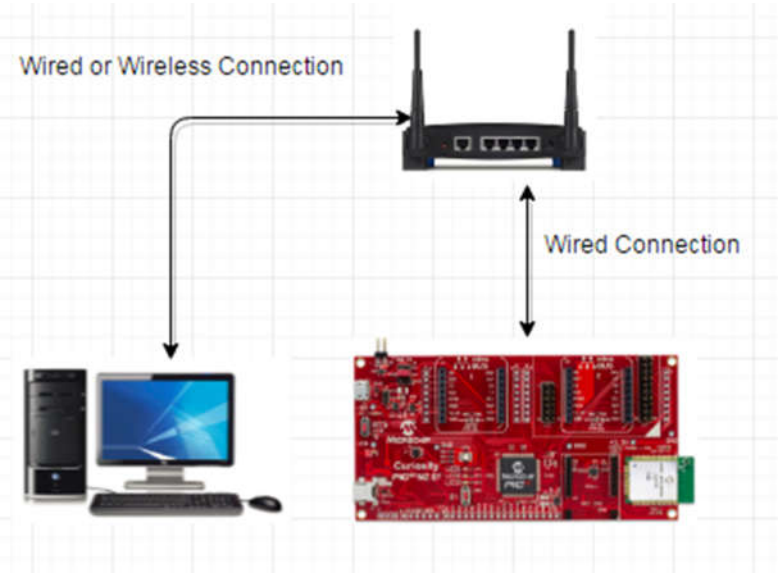
Note:

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.

Note:

For testing the TCPIP server functionality of the Curiosity Board, any third-party application can be used. Some of the applications which we have used are: SocketTest, Hercules. The user can choose any such program of his choice.

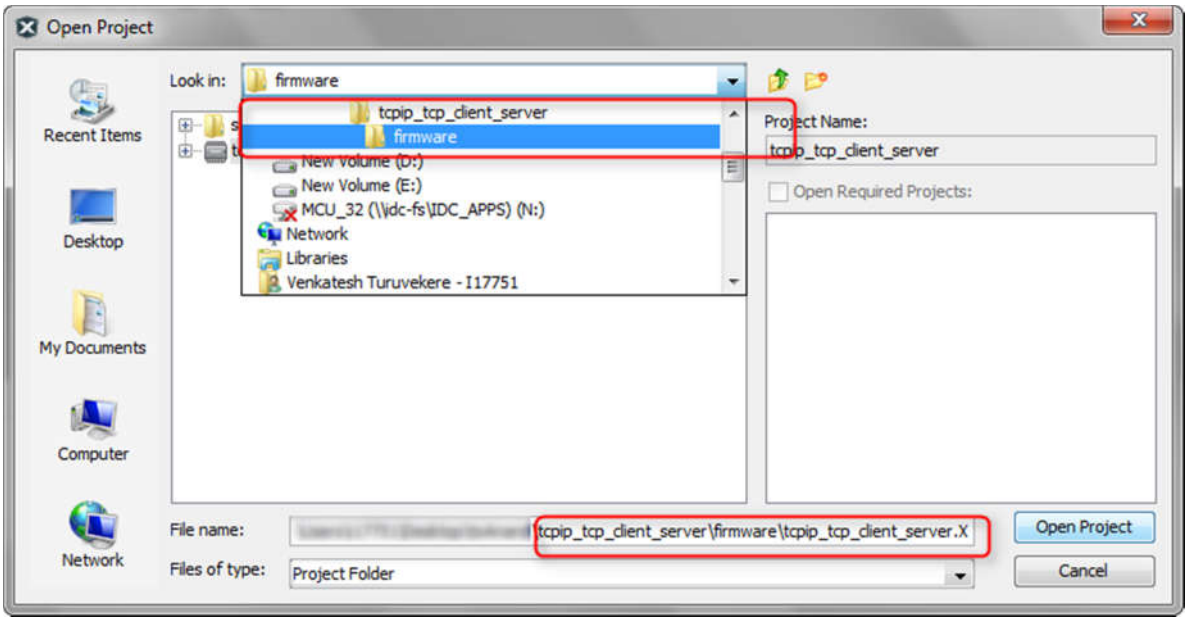
Connection Diagram:



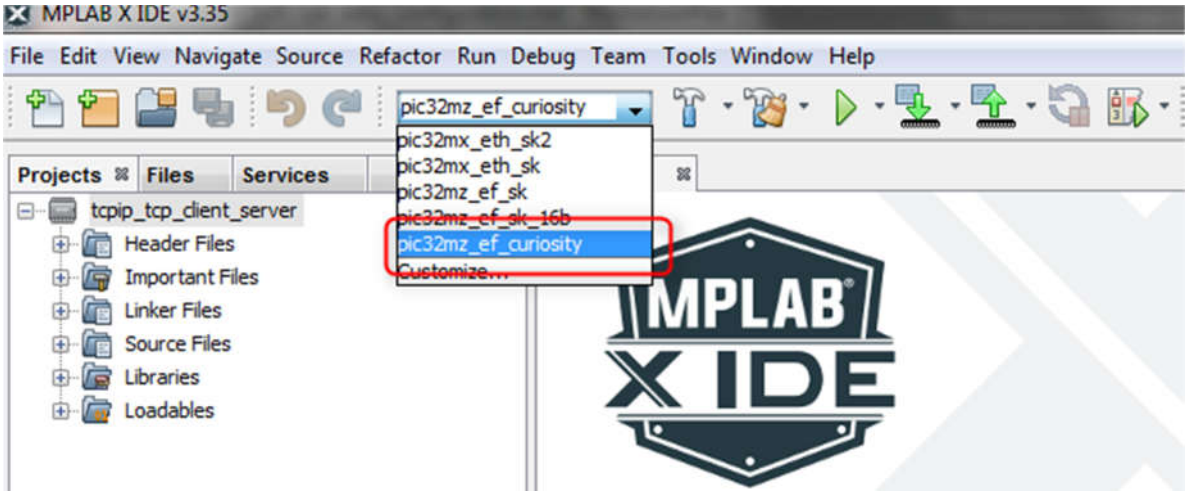
For the purpose of this demo, both the Curiosity board and the Host PC should be in the same network.
The host PC can be connected to the router via an Ethernet cable or WiFi.
The Curiosity board should be connected to the router via an Ethernet cable.

Building the Application

- Download the project to your local PC.
- To build this project, you must open (In MPLAB X, `File>Open Project`) the `tcpip_tcp_client_server.X` project (from `<project_location>/tcpip_client_server/firmware`) in MPLAB X IDE, as shown below.



- On the MPLAB X IDE select the `pic32mz_ef_curiosity` configuration, as shown below.



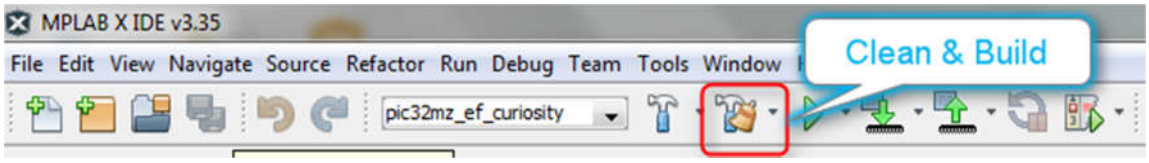
Note:

The other configurations won't work under standalone mode. However if you want to work with 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 standalone Harmony project to standard Harmony project.

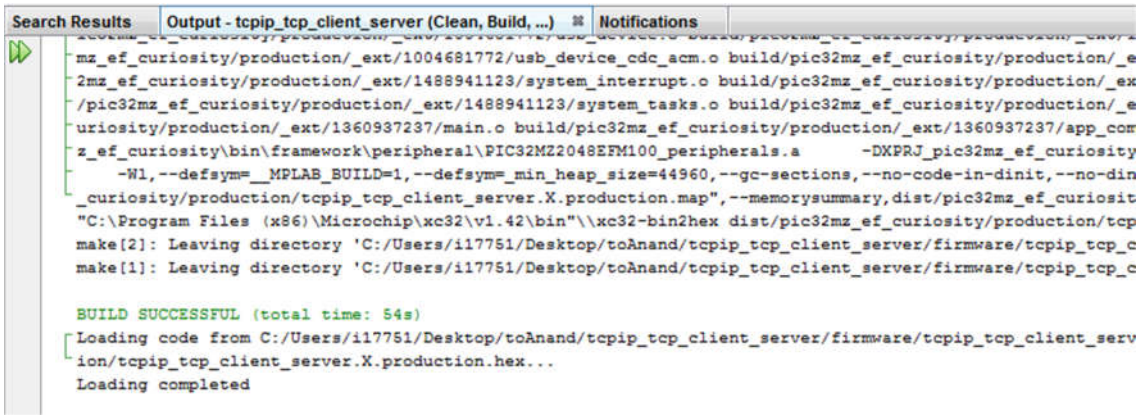
- The `pic32mz_ef_curiosity` configuration sets up MPLAB X IDE to build and run the demonstration application on the PIC32MZ EF Curiosity Development Board, with

the `PIC32MZ2048EFM100` microcontroller. The TCPIP stack is enabled for both client and server functionalities.

- Clean and Build the project.



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



Note:

Often times 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 [MSDN article from Microsoft](#).

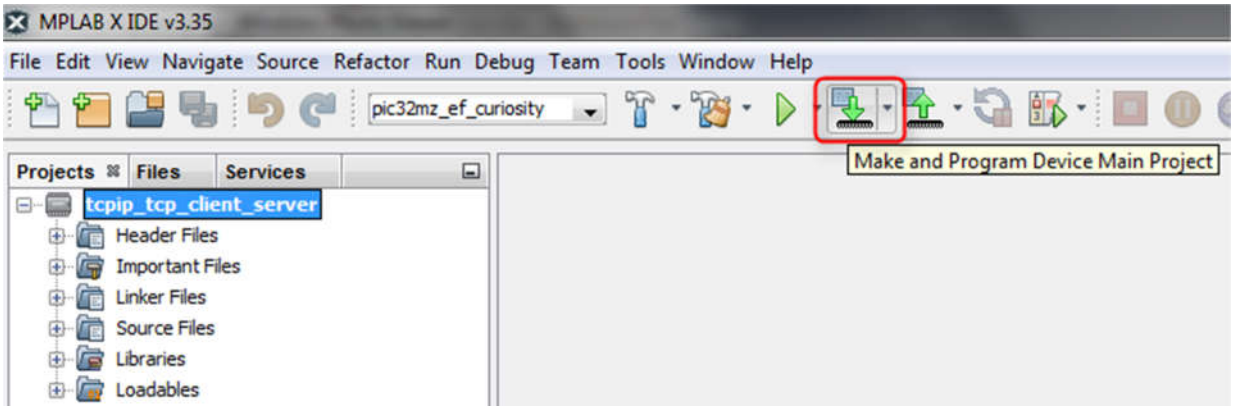
Configuring the Hardware

- Ensure that a jumper is placed on 4-3 on J8 on the **PIC32MZ EF Curiosity Development Board**

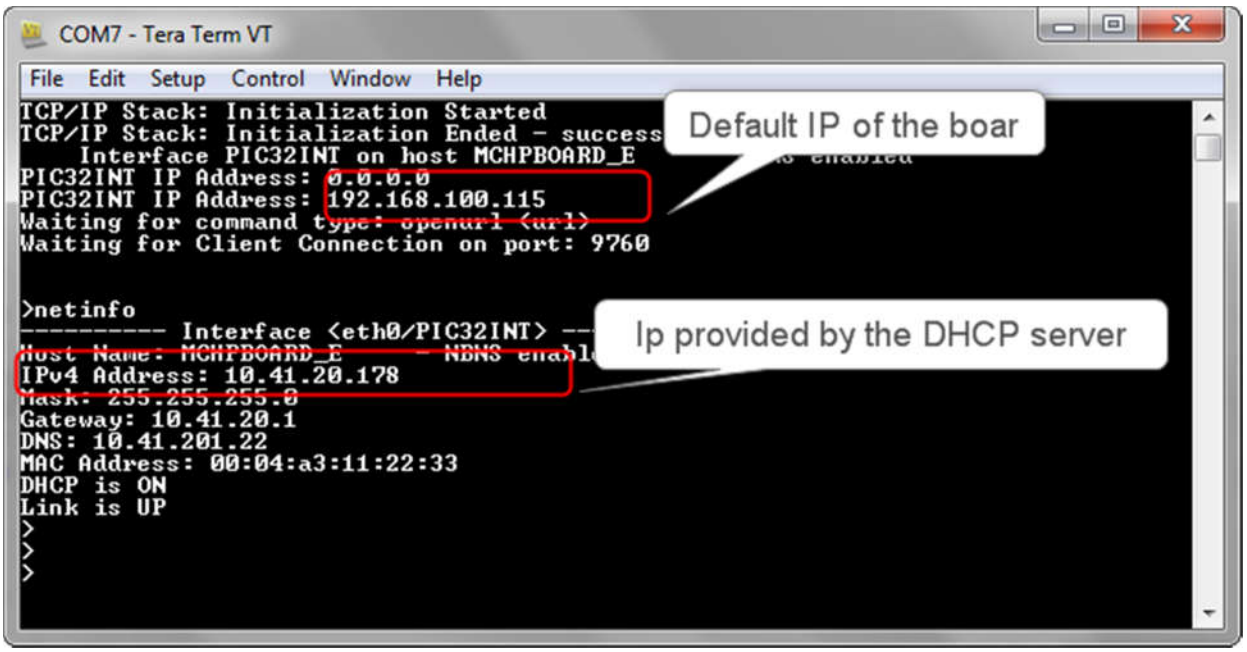
- Ensure that you have a LAN8720A Ethernet PHY installed on the **PIC32MZ EF Curiosity Development Board** (header J18)

Running the Demo

1. Compile and program the target device. While compiling, select the `pic32mz_ef_curiosity` configuration.



2. To use this demonstration, a USB cable needs to be connected to the micro-B USB connector (J12) on the bottom of the Curiosity board. 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 though a standard terminal program, set the baud rate to 9600 baud, and a valid IP address has been received by the device.

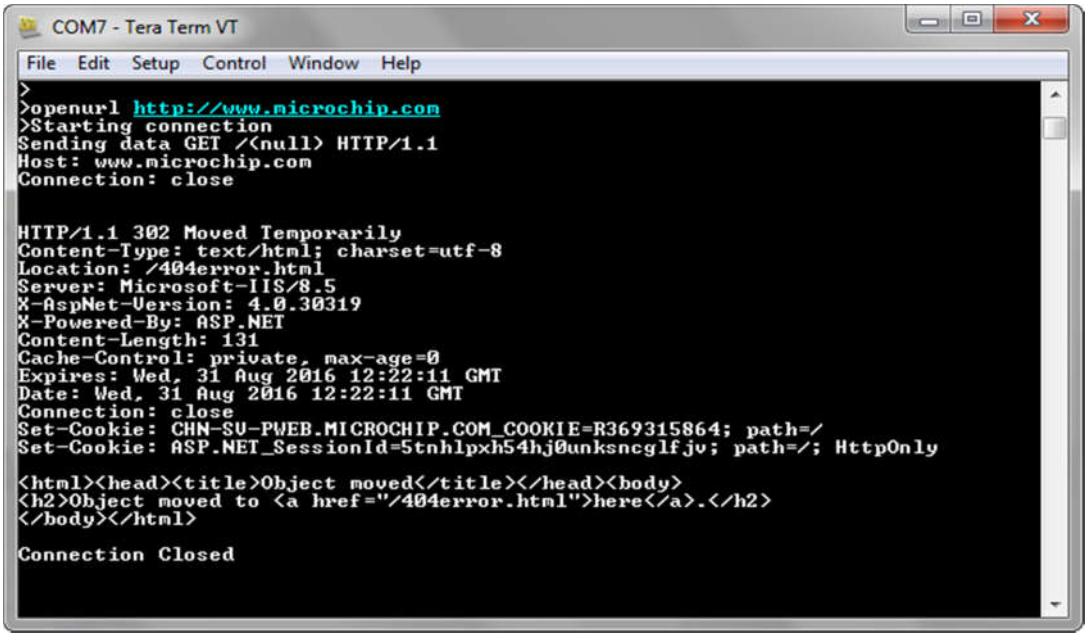


Note:

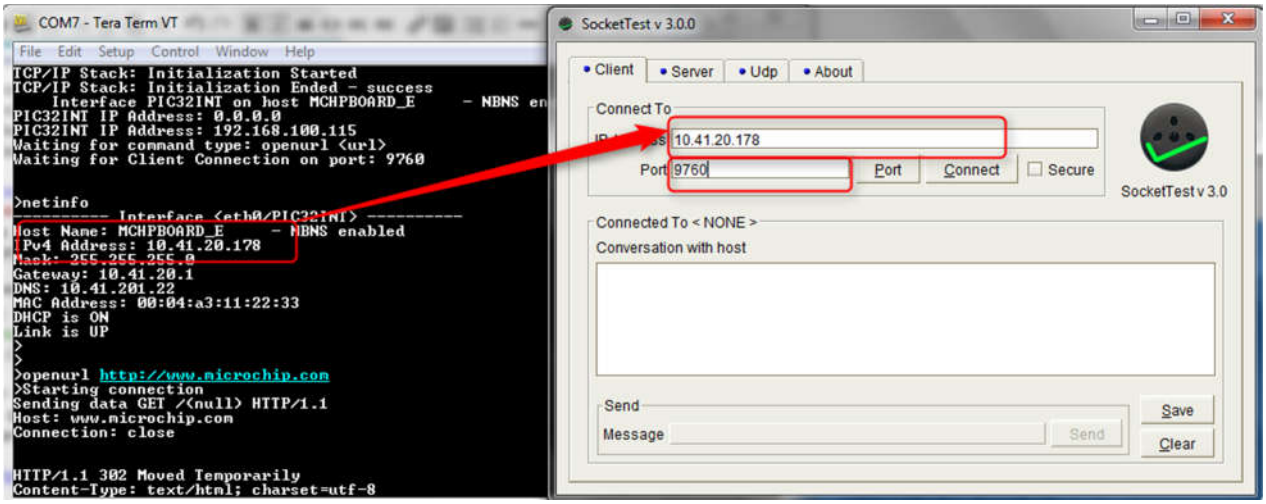
The PC from which the demo is being executed should be connected to the same network as the board.

3. There is only one command available in the demonstration from the serial port: `openurl <url>` - The argument must be a fully formed URL; for instance, **http://www.microchip.com/**

After that one command is input, the demonstration will make a DNS query, and then open a connection to the requested URL and perform a simple HTTP PUT command. The results will be sent to the serial port. Client Test Successful.



4. To test the Server part of the demo. We require a program which acts as a tcpip client. In this demo we use a program SocketTest. Open the SocketTest software and do the configuration as shown below:



Press the **Connect** Button on the SocketTest software after doing the configuration. The serial terminal indicates that the connection has been established.

Type any message in the Message box of the SocketTest program, and press the Send button. The Server running on the Curiosity development board will echo back the message to the SocketTest program.