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posted by maintenance on Thu, 03/21/2013 - 10:51

PIC32: Ethernet Starter Kit communicates with PC via TCP connection

Introduction

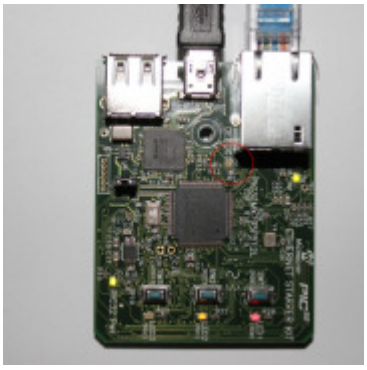
In this article I will mainly introduce how to program the Ethernet starter kit as TCP client, and how this TCP client sets up a TCP connection with the C# TCP server running on a PC. In this whole process the TCP handshaking, MAC address, DHCP etc will be involved.

Please make sure that you have already read PIC32 Ethernet Starter Kit TCP Client.

Also, there will be source code available for both MPLAB and C#.

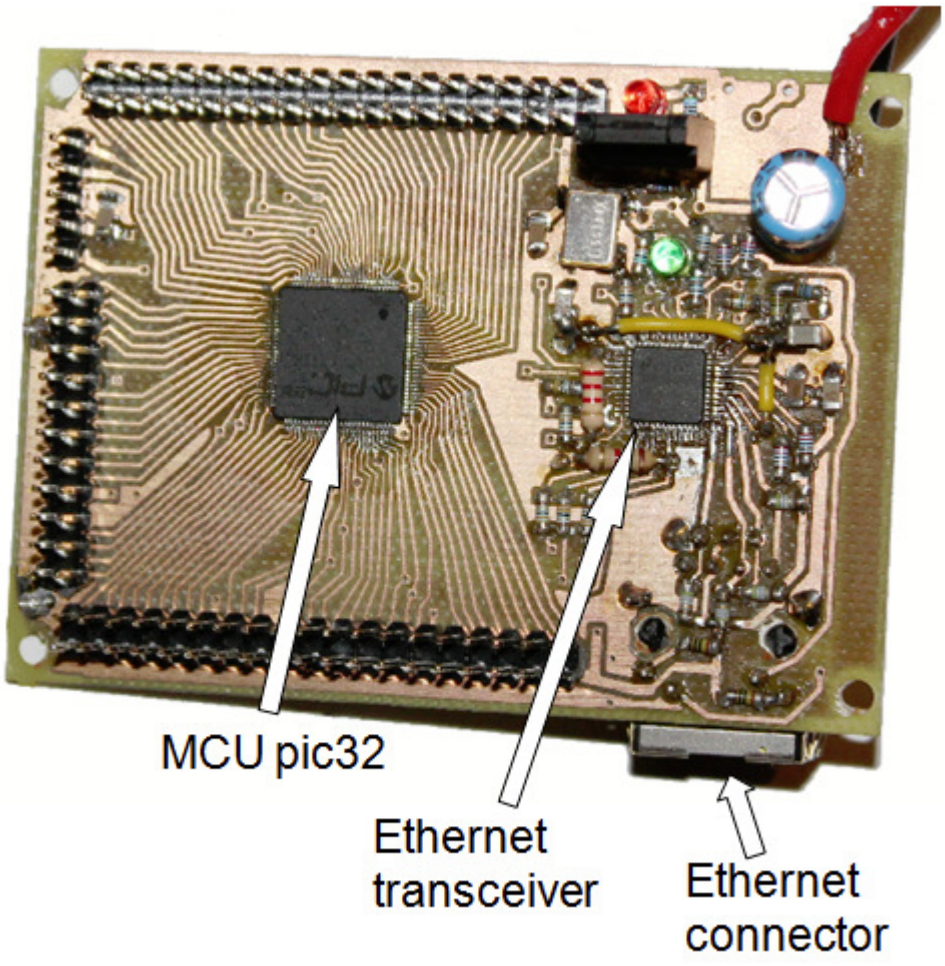
The board you need

PIC32 Ethernet Starter Kit from Microchip: link

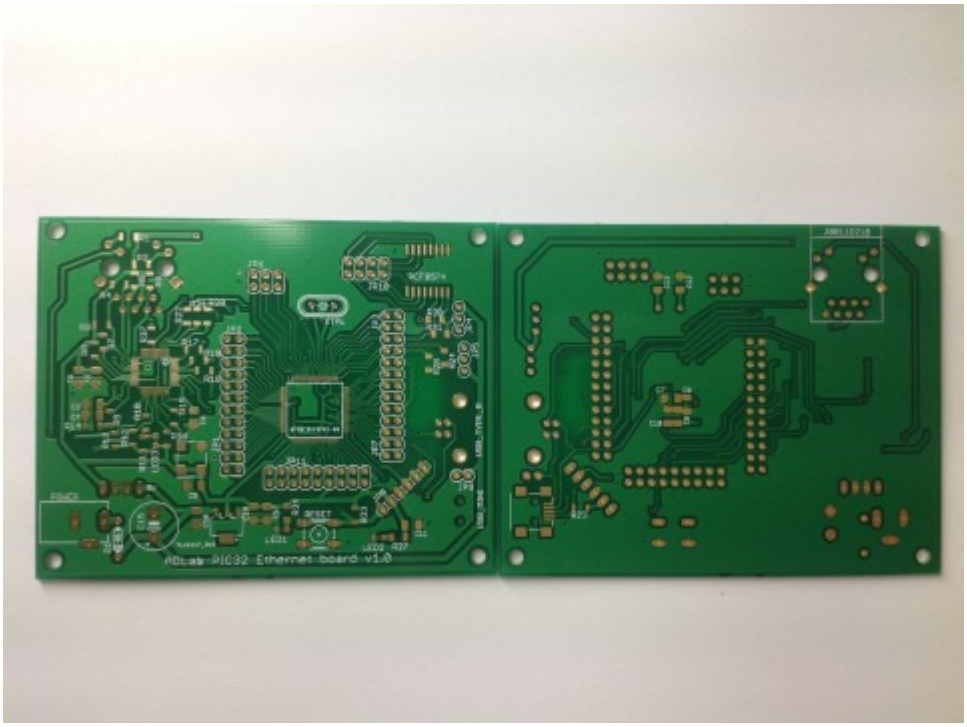


(Click to enlarge)

Or you can build one by your self, the schematic can be found on this page.



ADLab PIC32 Ethernet board v1.0



(Click to enlarge)

Software

Part I : Software with MPLAB IDE

Before building a project, some Microchip libraries need to be installed in your computer, e.g. Microchip Libraries for Applications v2013-02-15 Windows.

I use MPLAB IDE v8.86 and C32 compiler to build up my TCP Client Project. The needed TCPIP stack is in this default path:

c-files:

C:\Microchip Solutions v2012-10-15\Microchip\TCPIP Stack

h-files:

C:\Microchip Solutions v2012-10-15\Microchip\Include\TCPIP Stack

In the PIC32 Ethernet Starter Kit TCP Client from another article or in the source code (I will post later) you can find out which files are included in the project.

Part II: Software with C#

The C# should impliment the following steps:

1) Create a TCP Listener and listen to a certain port number, e.g. 2000
2) Accept the incomming TCP Client/Robot and assign a socket for it
3) Keep connecting and transfer data
To verify if the connection is successfully established, you can make use of Wireshark sniffing the internet traffic.

Demo video

PIC32 as TCP Client + PC as TCP server

How to use the source code?

Unzip the files firstly and change the ip address and port number in the following files:

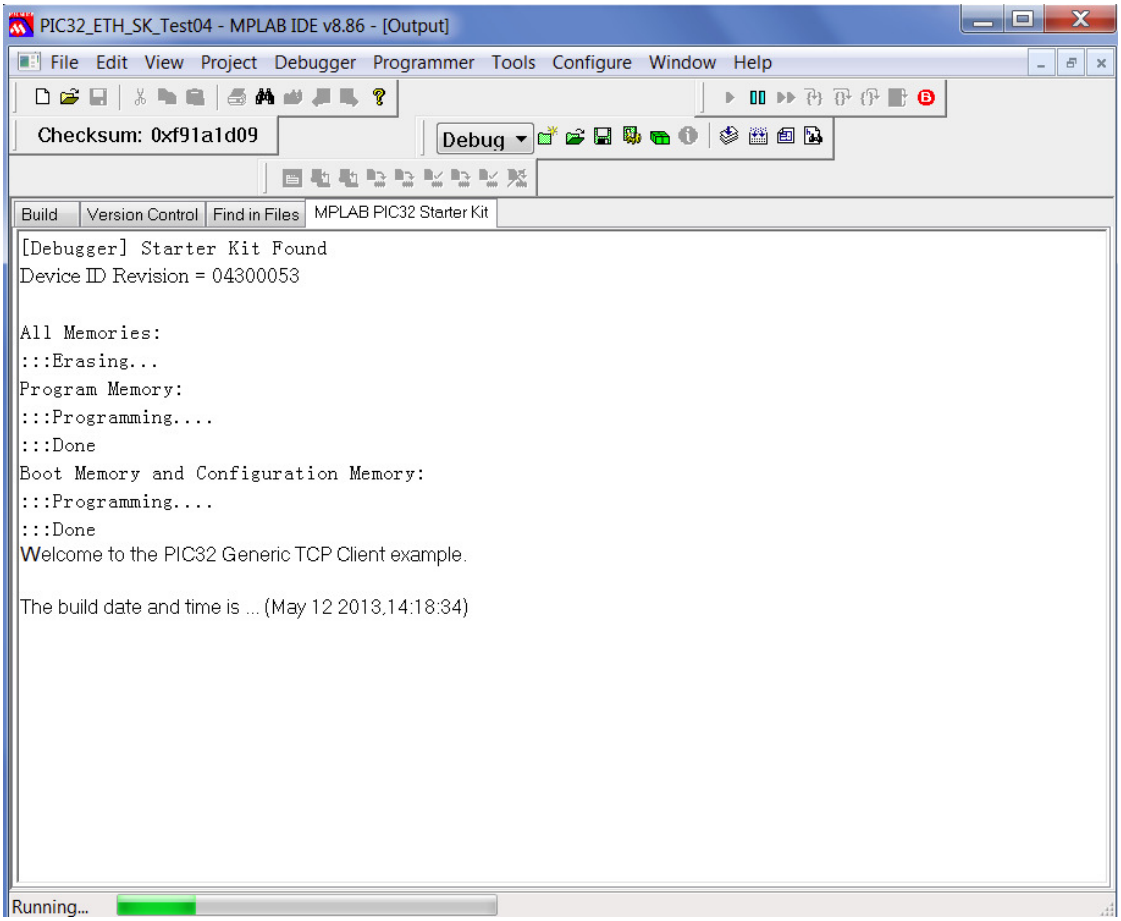
PIC32_ETH_SK_Test04:

- TCP Server's ip address and port number in GenericTCPClient.c
- TCP Client's ip in TCPIPConfig.h, which might not be necessary since DHCP is enabled

C# TCPServer:

- TCP port number in Server.cs, more specifically, *tlsClient = new TcpListener(3000);*
- TCP Server's ip by changing *IPAddress ipAddr = IPAddress.Parse("192.168.0.195");* in Form1.cs file
- *this.tcpListener = new TcpListener(IPAddress.Parse("192.168.0.195"), 2000);* is for the local webpase

After this, follow the demo video to run the code on both PC and PIC and press SW2-button on the board when seeing the following picture on the screen to start the TCP handshaking.



Files for download

Source code:

PIC32_ETH_SK_Test04.zip

C# TCPServer.zip

PCB Eagle files:

ADLab PIC32 Ethernet board v1.0 PIC32_ESK.zip

(We have 12 boards fabricated, you can contact us if you want one).

Tags:
microchip
PIC32
Ethernet

Starter
Kit
TCP
client

Comments

PIC32 Ethernet Starter Kit without on board debugger.

Permalink On **Mon, 11/25/2013 - 22:33**

Hello all,

We are trying to use the PIC32 Ethernet Starter Kit PN#: DM320004 board for a school project as a robot controller, just to make clear, this is not a homework. We redesigned the board to add some relays and easily access the A/D ports. Since we are not going to use it as a USB host, we removed the following parts from the original dev kit design "http://ww1.microchip.com/downloads/en/DeviceDoc/61166A.pdf":

U3-TPS20X1B Current-Limited Switch (page 26)
U6-TPS20X1B Current-Limited Switch (page 24)
U4-MCP1253 Charge Pump (page 24)

Also, we decided to program the PIC32MX795F512L with a PICkit3 via the 6 pin J 6 programming header, rather than using the on board debugger, so we removed U1-PIC32MX440F512H debugger (page 25) and associated parts. Please see redesigned schematic "http://home.comcast.net/~printzis/PIC32%20Controller-15%20SCH.pdf""

Our setup is as follows:

PIC32 Ethernet Starter Kit PN#: DM320004
Product Version: MPLAB X IDE v1.90
Java: 1.7.0_17; Java HotSpot(TM) Client VM 23.7-b01
System: Windows 7 version 6.1 running on x86; Cp1252; en_US (mplab)

Project: XC32-PIC32_ETH_SK_ETH795.mcp
Hardware: SKDE PIC32
Compiler: XC32(v1.21)

So far so good, we can program the "PIC32 Ethernet Starter Kit" using the on board debugger and able to see and modify the web page "http://mchpboard"

Subsequently we try to program our redesign board utilizing the same setup as above except we use the PICkit3 since our board does not have an on board debugger.

We observe the following:
1) MPLAB X IDE v1.90 completed the programming with no errors.
2) 2)The LED_SPEED in on.
3) U8 pin 25 measured 50MHz, as expected since we are using a 50MHz oscillator.
4) The switch ports RD6, RD7 and RD13 are high.
5) Unfortunately, we can not see the web page "http://mchpboard"

Thanks for any assistance you can give us, we all don't have any clue including our professor.

By **Joe Prince (not verified)**

-

Permalink On **Tue, 11/26/2013 - 11:02**

hi Joe,

You can check your schematic firstly. I uploaded the **PCB Eagle files** so that you can compare it with your schematic. You can find the schematic here http://analogdigitallab.org/blogs/pic32-ethernet-starter-kit-communicates-pc-tcp-connection. (Sorry i don't have enough time to go through the schematic and datasheet momently, i'll do later if necessary.)

Some **tips** that might be useful for you and your redesigned board:

1) Check the connection between pins that should be connected
2) Test if your PIC32 can function correctly,like making a blinking LED, making sure that you can program the PIC32
3)You can start with a simpler code for Ethernet functions, like Ping, or TCP. I have also tried the web page "http://mchpboard", but only with the Ethernet Starter Kit from Microchip. I have only tried TCP and UDP on my self-made board, it works.

4) I have also encountered some problems when testing the self-made pcb. I posted something here(http://analogdigitallab.org/forum/self-made-pic32mx795f512l-ethernet-boardcannot-configure-dp83848-phy)

5) My '**Debug note**' for self-made pic32 ehternet board Debug Result.docx

Something important:

With the PICkit3 you can also debug. When using PIC32 Ethernet Starter Kit PN#: DM320004 board and the source code from Microchip itself, you may need to use Debug to allow some predefined functions. For example, when trying the web page "http://mchpboard" I used Debug, otherwise it won't work. So you might need to change the Debug configuration from onboard debug(DM320004) to PICKit3 debug.

I'm not sure if the source code is pre-built by Microchip, it might only recognize the DM320004 onboard Debug, e.g.: in the source code they use #define DM320004 or something similar. For PICkit3 you might also reconfigure the debug.

By the way, I used **MPLAB IDE v8.86 and C32** compiler to build up my TCP Client Project, because at that time the most code is written for C32. And the only project for XC32 didn't work for me. I used **PIC32MX795F512L, DP83848 PHY** (Texas Instrument), **RMII mode and 50 Mhz** oscillatorfor school project.

So my suggestion is:

Try tips 1) 2) 3) and
measure the data between PIC32 and DP83848C with an oscilloscope to see if there are some Ethernet traffics. (when I doing this, i only found the clock and no data traffic because the pic32 was not soldered correctly).

6) You can always come back to me for further help.

By **Haolin Li**

Thank you so much for the

Permalink On **Mon, 12/02/2013 - 22:20**

Thank you so much for the info.
One step closer, the board and web page runs almost fine now, there was a clod junction on the "EREF_CLK". There is a new problem, the board runs for a couple minutes and then it stops unless I place a small heatsink on top of the PIC 32 but the temperature on top of the case is only 110F same as the demo board. The only difference is that the demo board is a multilayer and my board is a double sided, any ideas?

By **Joe Prince (not verified)**

It's strange. The pic32 is

Permalink On **Wed, 12/04/2013 - 14:06**

It's strange. The pic32 is stable(much stabler than ENC28J60 which crashes after a few minutes). The board I used is also two-layer PCB.

I assume the code is the same used for DM320004 and your self-redesigned board. So no software problem.

Then it's possible the self-designed board is not soldered well, there might be some short-circuits. Normally, when touching the top of pic32 with fingers, you won't feet the heat. You can check if there's a short-circuit. Another way is to measure the current and compare with that of DM320004.

By **Haolin Li**

error on pic32ehternet starter kit

Permalink On **Thu, 12/18/2014 - 03:53**

i try using your program with pic32 ethernet starter kit an got the following error when compiling, please i need help, i want to learn to create my own server

By **Nikolas (not verified)**

error on pic32ehternet starter kit

Permalink On **Thu, 12/18/2014 - 03:55**

I try using your program with pic32 ethernet starter kit an got the following error when compiling, please i need help, i want to learn to create my own server

In file included from TCPIP Stack\ETHPIC32IntMac.c:50:
TCPIP Stack\/../Header/TCPIP Stack/ETHPIC32ExtPhy.h:186: error: syntax error before "eEthMacPauseType"
TCPIP Stack\ETHPIC32IntMac.c: In function `MACInit':
TCPIP Stack\ETHPIC32IntMac.c:173: error: `eEthMacPauseType' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:173: error: (Each undeclared identifier is reported only once
TCPIP Stack\ETHPIC32IntMac.c:173: error: for each function it appears in.)
TCPIP Stack\ETHPIC32IntMac.c:173: error: syntax error before "pauseType"
TCPIP Stack\ETHPIC32IntMac.c:210: error: `pauseType' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:210: error: `ETH_MAC_PAUSE_CPBL_MASK' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:210: error: `ETH_MAC_PAUSE_TYPE_NONE' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:254: error: `ETH_BUFF_FLAG_RX_STICKY' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:254: warning: passing arg 1 of `EthRxBuffersAppend' from incompatible pointer type
TCPIP Stack\ETHPIC32IntMac.c: In function `MACGetHeader':
TCPIP Stack\ETHPIC32IntMac.c:620: error: syntax error before '*' token
TCPIP Stack\ETHPIC32IntMac.c:657: error: `pRxPktStat' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c: In function `_LinkReconfigure':
TCPIP Stack\ETHPIC32IntMac.c:1126: error: `eEthMacPauseType' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:1126: error: syntax error before "pauseType"
TCPIP Stack\ETHPIC32IntMac.c:1134: error: `pauseType' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:1137: error: `ETH_OPEN_RMII' undeclared (first use in this function)
TCPIP Stack\ETHPIC32IntMac.c:1137: error: `ETH_OPEN_MII' undeclared (first use in this function)
Halting build on first failure as requested.

By **Nikolas (not verified)**