

Avnet Virtex-5 FXT Evaluation Board TEMAC Web Server Design

**Version 1.0
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1 Introduction

This document describes a simple Web Server design implemented and tested on the Avnet Virtex-5 FXT evaluation board.

2 Reference Design Requirements

This reference design will require the following software and hardware setups.

2.1 Software

The software requirements for this reference design are:

- Windows XP
- Xilinx ISE 10.1 with Service Pack 2
- Xilinx EDK 10.1 with Service Pack 2

2.2 Hardware

The hardware setup for this reference design is:

- Computer with 1 GB RAM and 1 GB virtual memory (recommended)
- Avnet Virtex-5 FXT evaluation board
- Straight through RS232 cable
- Ethernet cable
- Power supply
- JTAG programming cable (USB or PC4)

3 Web Server Design Block Diagram

The following figure shows a high-level block diagram of the Web Server design. The design consists of:

- PowerPC processor
- 16KB of BRAM
- 64MB of DDR SDRAM
- TEMAC Core
- RS232 Port
- LED
- 8-Position DIP Switch
- Interrupt Controller

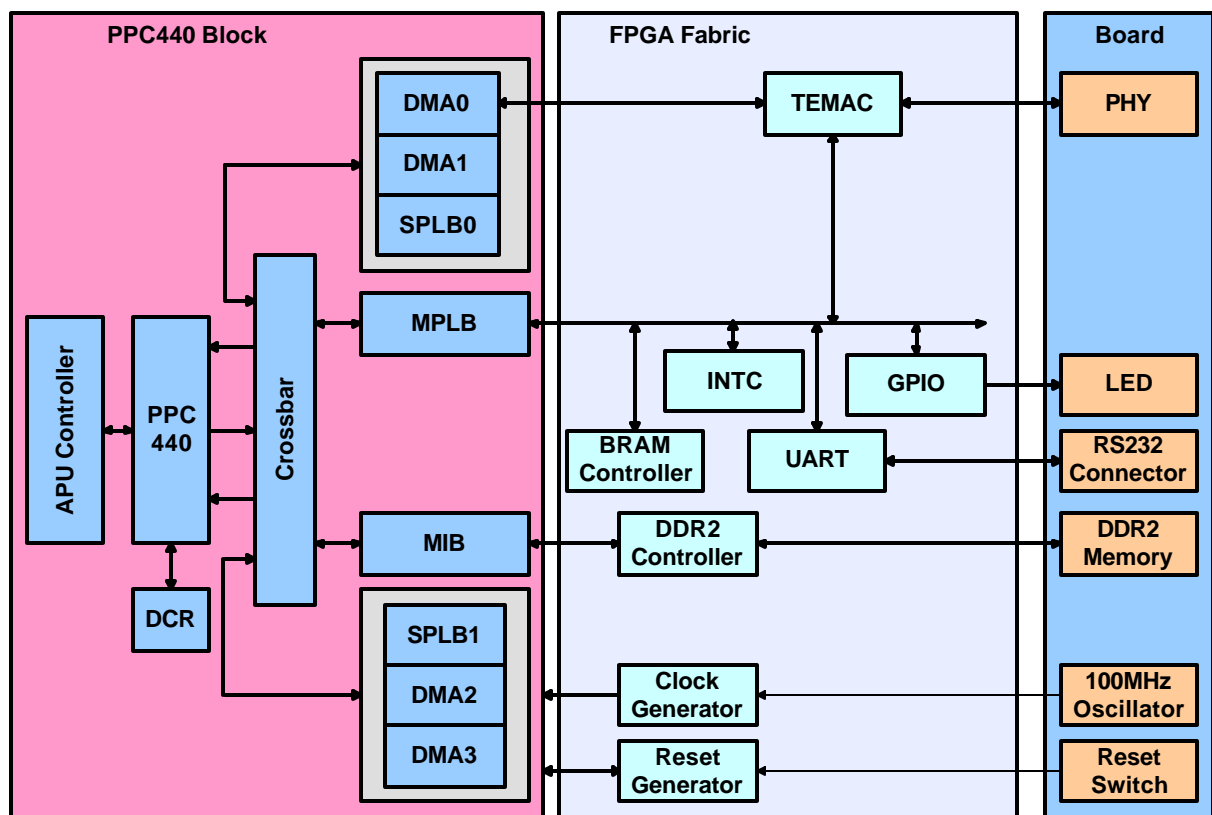


Figure 1 – Reference Design Block Diagram

4 Web Server Software

The Web Server software source code is located in the **/apps/src** folder of the project directory.

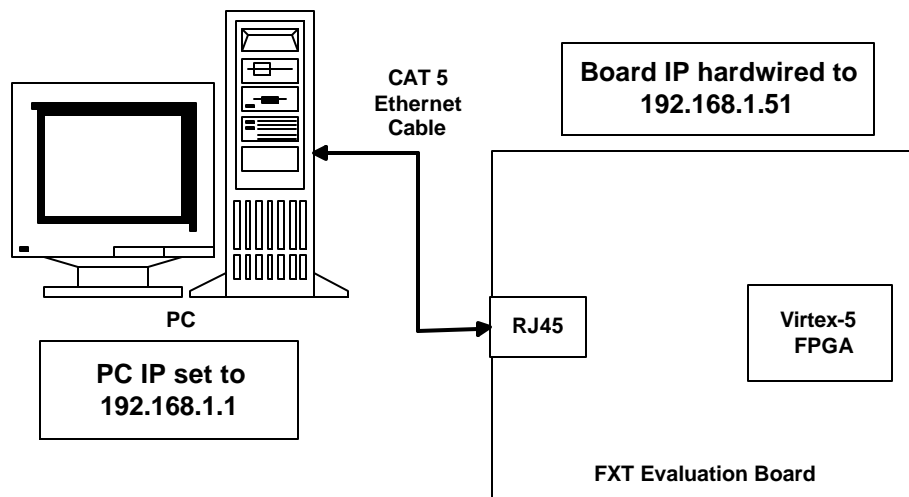
5 Setting Up the Board

The following figure shows the location of various connectors and jumpers on the Avnet Virtex-5 FXT evaluation board. Perform the following steps to setup the board for running the application software.

1. Verify the Power switch, **SW7**, is in the **OFF** position.
2. Install a jumper on JP3 pins 2-3
3. Install a jumper on JP2 pins 2-3
4. Install a jumper on JP1 pins 1-2
5. Install a jumper on JP5 pins 2-3 (FPGA JTAG mode)
6. Connect the power supply to the J11 connector on the FXT evaluation board and also plug it into the AC outlet.
7. Connect the USB JTAG cable to J9 and the USB port of the PC.
8. Connect a straight through RS232 cable to the board DB-9 connector (P1) and the serial port of the PC. Alternatively, you can use an RS232-USB adapter and connect this adapter to the DB-9 connector and the USB port of the PC. In this case, you must install the RS232-USB driver for the adapter.
9. Slide the power switch to the **ON** position
10. Connect an Ethernet cable to J1 and the Ethernet port of the PC (the Ethernet cable must be connected directly to the PC or via a hub).

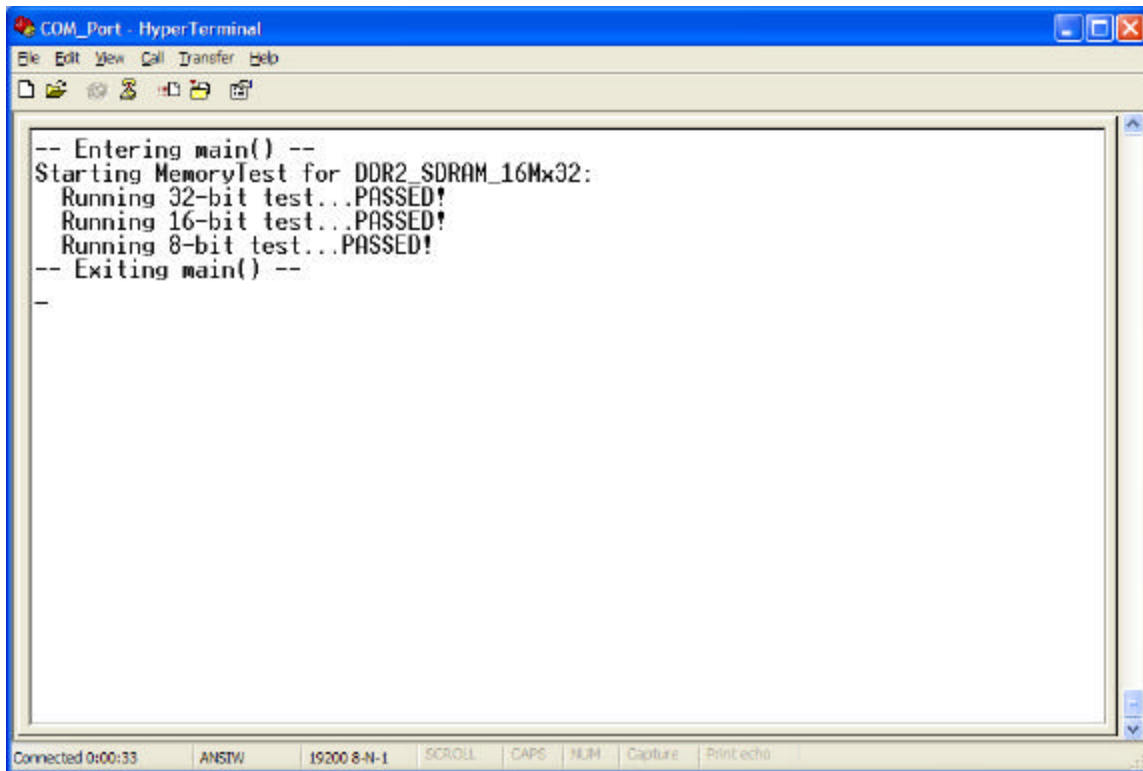
6 PC Setup

1. Use the Control Panel to configure the host PC with an IP address of **192.168.1.1**, with a subnet mask of **255.255.255.0**.



7 Implementing the Design

- Open the Web Server design in XPS and select **Software > Build All User Applications** to compile the software.
- Select **Device Configuration > Update Bitstream** from the XPS GUI to build the design.
- Start a Hyper Terminal session and set the serial port parameters to 19200 baud rate, 8 bits, 1 stop bit, no parity and no flow control.
- Select **Device Configuration > Download Bitstream** from the XPS GUI to download the **Memory Test** design to the board. The memory test program will run on the board and you should see the following on the Hyper Terminal.



```
-- Entering main() --
Starting MemoryTest for DDR2_SDRAM_16Mx32:
Running 32-bit test...PASSED!
Running 16-bit test...PASSED!
Running 8-bit test...PASSED!
-- Exiting main() --
-

```

Connected 0:00:33 | AN51W | 19200 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo

- Select **Debug > Launch XMD** from the XPS GUI to download the software to the external DDR2 SDRAM and run the program. The XMD command window will appear and it should look similar to the window shown in the following figure.

```

C:\EDK_92\bin\nt\xbash.exe
section, .boot: 0x00116130-0x0011613f
section, .boot: 0xffffffff-0xffffffff
section, .rodata: 0x00023bc8-0x00024c7e
section, .sdata2: 0x00024c80-0x00024c7f
section, .sbss2: 0x00024c80-0x00024c7f
section, .data: 0x00024c80-0x000251db
section, .got: 0x000251dc-0x000251db
section, .got1: 0x000251dc-0x000251db
section, .got2: 0x000251dc-0x000251f7
section, .ctors: 0x000251f8-0x000251ff
section, .dtors: 0x00025200-0x00025207
section, .fixup: 0x00025208-0x00025207
section, .eh_frame: 0x00025208-0x0002525b
section, .jcr: 0x0002525c-0x0002525f
section, .gcc_except_table: 0x00025260-0x0002525f
section, .sdata: 0x00025260-0x000252a7
section, .sbss: 0x000252a8-0x00025397
section, .bss: 0x000253c0-0x0011612f
section, .stack: 0x00116140-0x0013613f
section, .heap: 0x00136140-0x0015613f
Setting PC with Program Start Address 0xffffffff
Info:Processor started. Type "stop" to stop processor
RUNNING> XMD%

```

- You should see the following on the Hyper Terminal.

```

COM_1 - HyperTerminal
File Edit View Call Transfer Help
-- Entering main() --
Starting MemoryTest for DDR_SDRAM_8Mx32:
Running 32-bit test...PASSED!
Running 16-bit test...PASSED!
Running 8-bit test...PASSED!
-- Exiting main() --

-----lwIP test WebServer -----
Open up your favorite browser and type:
http://192.168.1.51

Board IP: 192.168.1.51
Netmask : 255.255.255.0
Gateway : 192.168.1.1
auto-negotiated link speed: 10
Memory File System initialized
-

```

- Use the Control Panel to configure the host PC with an IP address of **192.168.1.1**, with a subnet mask of **255.255.255.0**.
- Open an HTML browser and point to the URL: <http://192.168.1.51>, where **192.168.1.51** is the IP address of the board.
 - a) The Web Server demo should appear in your browser as shown in the following figure. Click on **“Toggle LEDs”** to turn ON or OFF the on-board LEDs.
 - b) Change the DIP Switch settings and click on **“Update Status”**. You should see the new value of the DIP Switch settings being displayed on the web page.

