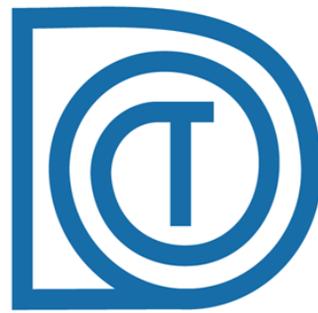


Implementing web server in Olimex LPC2468 with uEZ frame work



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DEEP THOUGHT

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1. Abstract.

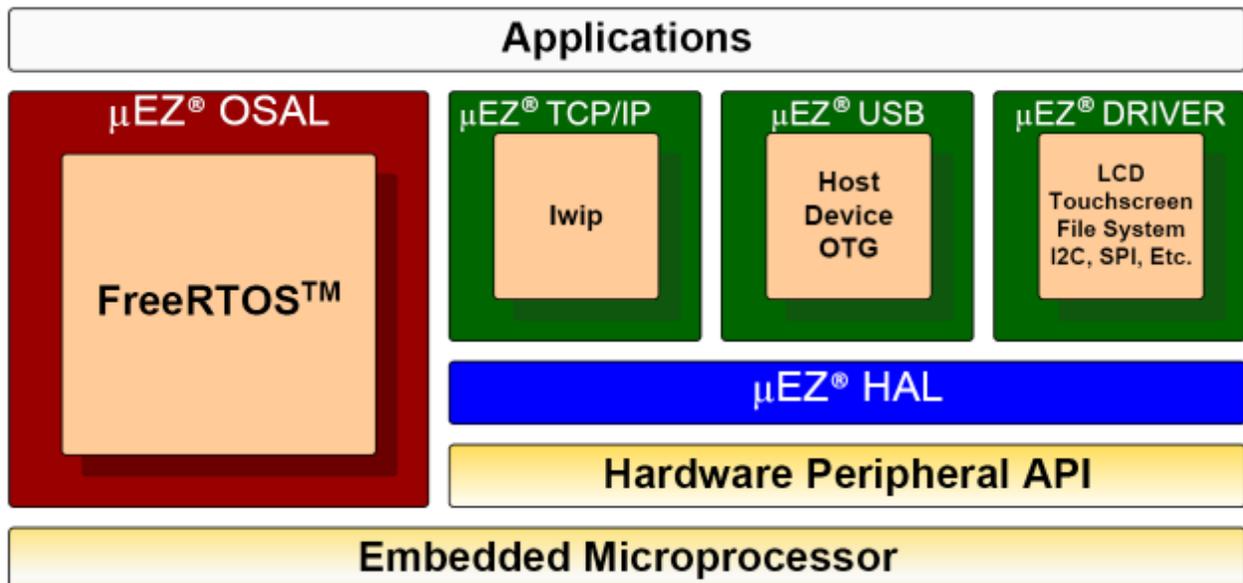
In the modern technological world, most of the embedded devices are equipped with web based data management system. Implementing web servers in Embedded devices will help the end user to control the device from a remote location. Here we implement a simple web server that can be accessed in a local area network. The embedded device we used to accomplish the above task is Olimex-LPCE2468 board. This board is integrated with LPC 2468 ARM 7 processor. The whole project is evolved with the help of uEZ framework (Version 2.04), which is an open source, middleware platform developed by [FDI](#). The backbone of the framework is RTOS. [Crossworks](#) is the development platform for our project. First we upload the Uboot and then binary file for webserver. The binary file for the webserver is placed in the SDRAM and this is accomplished by editing the Section Placement and memory map file.

2. About uEZ frame work

μEZ is an open-source rapid development platform developed by Future Designs.Inc. It is a framework over C language with an underlying RTOS. μEZ is an optional platform that enhances portability of application code to multiple ARM© platforms with high reusability.

uEZ has three primary categories of components that help simplify embedded application development:

- Operating System Abstraction Layer (uEZ OSAL)
- Sub-system drivers (uEZ TCP/IP, uEZ USB, uEZ Driver)
- Hardware Abstraction Layer (uEZ HAL)



μEZ currently supports the NXP processor families and Renesas processor families. The free RTOS and Micrium uC/OS-II are the RTOS families supported by μEZ.

3. Starting with Olimex LPC2478

LPC-E2468 uC Linux development prototype board with LPC2468 USB, Ethernet, SD/MMC in credit card format.



Board specifications are the following

- MCU: LPC2468;
- 16MB SDRAM;
- 128 MB NAN Flash;
- standard JTAG connector with ARM 2×10 pin layout for programming/debugging with ARM-JTAG;
- Ethernet 100MBit;
- 2x USB hosts;
- USB-to-RS232 converter device connected to LPC2468 UART;
- SD/MMC card connector;
- two USER button;
- RESET Button;
- two on board voltage regulators 3V and 5V with up to 800mA current;
- Extension port connector for many of microcontrollers pins;
- single power supply: External power supply, USB or JTAG connector;
- Battery holder and connector for the RTC;
- power supply led;

4. Olimex LPC2478 and uEZ frame work

4.1 Relocation of Code

As per our project requirement, we have to relocate our code to SDRAM. Relocation can be accomplished by modifying its memory map file and section placement file. We have to specify the SDRAM memory location where we are loading our code, in memory map file. We should place all program sections under SDRAM segment by altering its section placement file.

4.2 PHY configuration

The Micrel KS8721BL is the PHY chip on Olimex LPC-E2468 Development Board. The Ethernet pins of the processor is connected to corresponding PHY chip pins so that its Ethernet block interfaces between the off-chip Ethernet PHY(Physical Layer) using RMII(Reduced Media Independent Interface) protocol and the on -chip MIIM(Media Independent Interface Management) serial bus. Since the board is developed for RMII interface, Ethernet registers are configured in RMII mode.

The PHY registers should be configured for establishing a proper ethernet connection. The steps to configure the KS8721BL chip are Auto-negotiation, updating link info, and enabling the duplex mode, speed. These can be achieved by necessary read and write operation of PHY registers.

4.3 Network configuration

IP address imprinted in the uEZ webserver project is 192.168.2.xxx. We should change the IP address based on our network condition. The same procedure is applicable in case of configuring the Gateway address and the subnetmask. In our project we used the IP address as 192.168.1.30, the subnetmask as 255.255.255.0 and the gateway as 192.168.1.1

4.4 Basic web server

After setting up the network connection, we will be able to ping the IP address and can access the dynamic web page by typing its IP address [192.168.1.30] on web browser. We can edit the html code as per our project requirement.



5. Programming u-boot to the board

U-Boot is an open-source, cross-platform boot loader that provides out-of-box support for hundreds of embedded boards and many CPUs, including PowerPC, ARM, XScale, MIPS, Coldfire, NIOS, Microblaze, and x86. The Uboot required for the Olimex LPC-E2468 can be downloaded from official website of [Olimex](#). The source can be compiled with the help of [Cygwin](#) or Linux. Once the source is successfully compiled, the generated hex can be transferred to the Board with the help of Flashmagic tool. Use HyperTerminal to access the Uboot menu. When the Uboot menu becomes active we can start transferring the binary file for webserver in to the SDRAM. This is done with the help of Uboot commands.

The following steps are involved in uploading the hex weserver hex file.

- ❖ use the following u-boot command to load binary file
 - loadb “address”
 - Here we are running our code from SDRAM location (base address-A000 8000).
 - So ,
 - loadb A0008000
- ❖ The next step is to download bin file. Follow the steps below
- ❖ Transfer→Send File
- ❖ Select “Kermit” Mode
- ❖ Browse the binary file
- ❖ The last step is
 - go address.
 - i.e., go A0008000
- ❖ Now our application will started from A0008000...

Now open a web browser from a PC connected to the network and then types the IP address 192.168.1.30 to access the webserver.

6. Summary.

The above work was done by our R&D team as the part of familiarizing ARM7 with uEZ framework. The other features of the Olimex-LPC-E2468 like USB are yet to be explored with uEZ framework. We are working on it. We welcome suggestion and enquiries from all over the world. For further enquiries regarding embedded solutions please reach us on www.dthoughts.com or email us through info@dthoughts.com.

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This White paper is published by:

Deep Thought Systems (P) Ltd,
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