

ECE 480 Design Team 3 Progress Report 2

Power-over-Ethernet for Wireless Home Automation
Sponsored by Texas Instruments

David DeLuca
Sasang Balachandran
Hassan Abdullahi
Karthik Hemmanur

Dr. Jian Ren - Facilitator

Friday, November 20th, 2009

Sponsor Feedback

On November 13th, the team presented our design ideas to our project sponsor Texas Instruments. In this we discussed our progress after our first demonstration and asked for feedback on our design methods. The team had the DC-DC converter, PoE, and an IP camera functional. Hence, the PoE part of the project was demonstrated successfully. The team received feedback from Jim Reinhart and Reed Hinkel. Both Jim and Reed were extremely positive and they were pleased with our interpretation of the design. This green light to our conceptual design was exactly what the team was looking for. This was also a transition step for the team to accelerate the software design. The team by now has a solid picture of the hardware design. The team also came to a decision upon the sensors we would use for the final project demonstration. This final demo was going to integrate a temperature sensor, a pressure sensor, and a PoE camera.

Jim and Reed suggested that we focus more on implementing the core ideas for the design rather than worrying about embedded details. Our TI contacts also inquired on whether we can provide them with a detailed schematic of our planned connections between parts. We are hoping to provide them with such a document within the next week or so. Upon doing so, if we receive further confirmation that we are continuing down the correct path, we can move forward to other aspects of the project. This includes but is not limited to the rigorous amount of coding required for the sensors to communicate with the main board and interoperability of the microcontroller and the web server.

Current Status of Project

The team as of today has implemented the PoE, and is able to obtain the desired voltage and power levels at the PD side. The power supply was received on 2nd November, 2009 and the

team set-up the power supply for use. This was a major step into the design implementation, as we were using equipment in the laboratory to obtain 48V DC supply till now. The team also received the PoE camera that would run entirely with just an Ethernet cable. The team also implemented a DC-DC converter to obtain a 3.3V power output to be used on the MCU and the WSoC. The team was successful in this implementation as well. As of now, the team has made a strong amount of progress towards the final design, and has met all the requirements and deadlines successfully.

Coding the WSoC and the MCU

Currently, the team is planning on moving ahead with software implementation of the project. We will also focus on the circuit design of the sensors for the final demo. For the next couple of weeks Sasang and David are going to working with the CC2430 and the MCU so as to get an idea of how I/O operations take place. The team will also be focusing on the web-server and the GUI interface that would allow easy access to the data received. This is a major transformation for the team, as the emphasis till now was on hardware implementation. The team is also allocating good amount of lag time so as to troubleshoot and work around issues that might prop out in the next stage of the project.

Planning for the final demo

The team has also discussed ideas for final demo with our facilitator, Dr. Ren and also our sponsors. The team plans to implement an analog pressure sensor, and a digital temperature sensor, and display the measurements on the web server. The team has made a decision to host the web server on the MCU. Also, the team has decided to host all the power sourcing and powered device equipment in one box for the demo instead of two different, as it would

physically be in a final product based on the proposed design.

Budget

Item	Supplier	Quantity	Cost/ea.	Total
PSE Module (TPS2384)	Texas Instruments	2	--	--
PoE PD Module (TPS2375)	Texas Instruments	2	--	--
ZigBee Transceiver (CC2430)	Texas Instruments	2	--	--
microcontroller (LM-3S8962)	Texas Instruments	2	--	--
48V Linear Power Supply	MSU ECE Shop	1	\$53.12	\$53.12
CC2430 Debugger (SmartRF04EB)	Texas Instruments	2	--	--
DC-DC Regular (LM2594HV)	MSU ECE Shop	6	\$4.28	\$25.68
PoE-Capable IP Security Camera	MSU ECE Shop	1	\$108.24	\$108.24
Digital Temperature IC (DS1621)	MSU ECE Shop	3	\$4.61	\$13.83
3V AA Lithium Battery	MSU ECE Shop	4	\$5.00	\$20.00
Schottky Diode (MBR150)	MSU ECE Shop	4	\$0.43	\$1.72
180 μ H Inductor	MSU ECE Shop	4	\$2.99	\$11.96
12000 pF Capacitor	MSU ECE Shop	4	\$0.36	\$1.44
0.22 μ F Capacitor	MSU ECE Shop	4	\$0.91	\$3.64
10000 pF Capacitor	MSU ECE Shop	4	\$0.42	\$1.68
	Total Cost			\$258.59