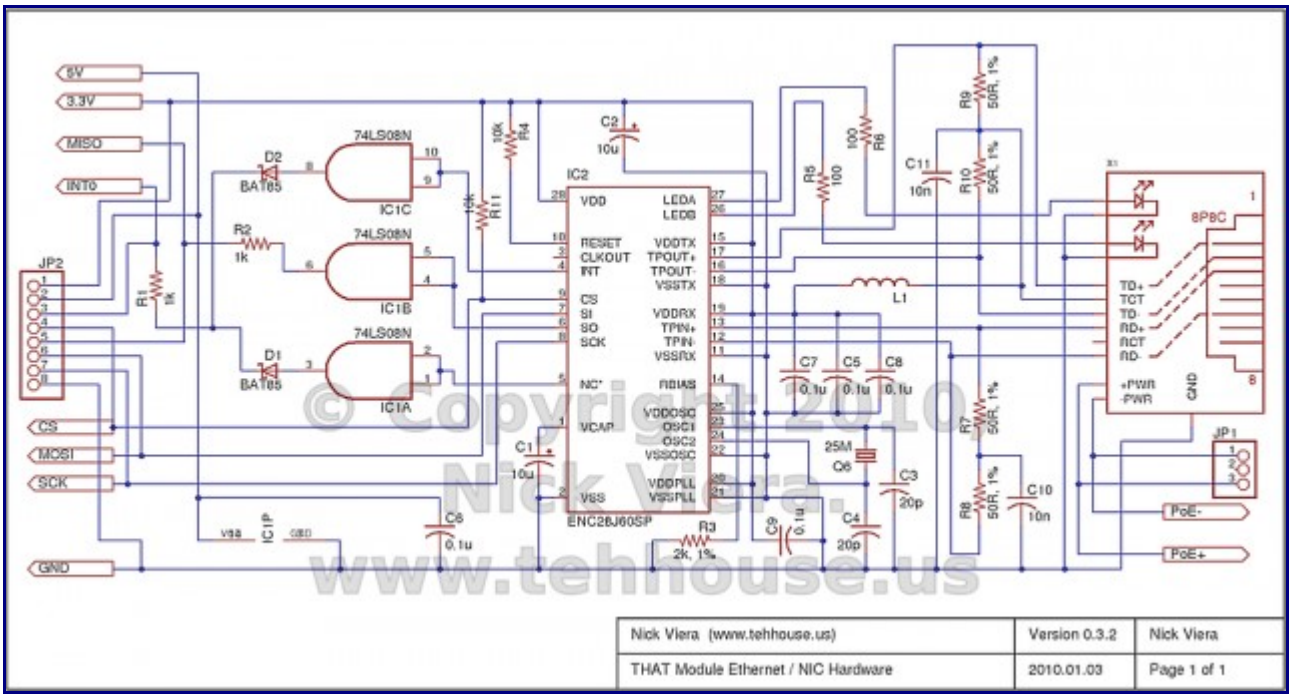
Ethernet Controller 0.3.2

2010-04-04 18:04:37 by Nick

I modified my initial Ethernet Controller board (aka Network Interface Card) to create the current version 0.3.2. This NIC version is currently being used as I continue development of my Digital Thermostat Module

Schematic

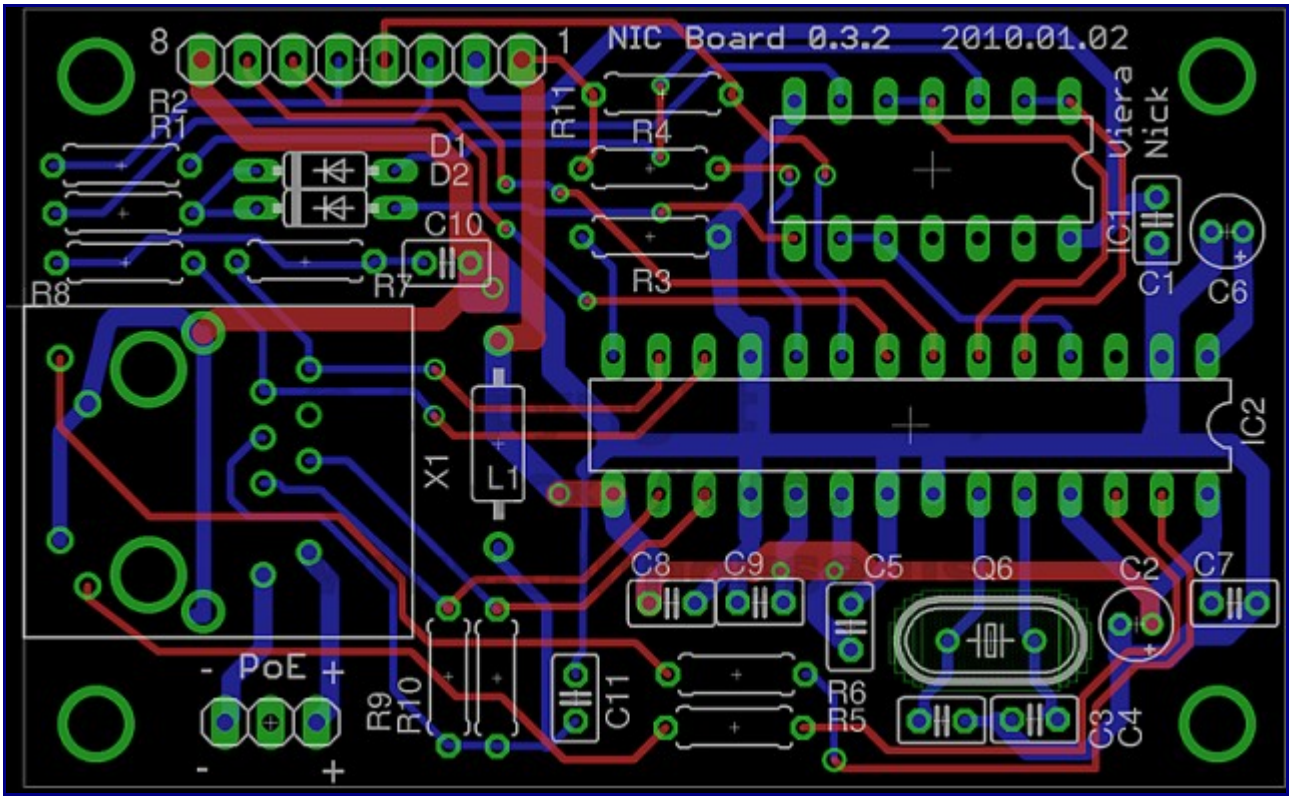
This version is almost identical to the previous one. The main exception being that I added standard (2.54mm pitch) pin headers to the schematic for the external connections to/from the board. The schematic is shown below.



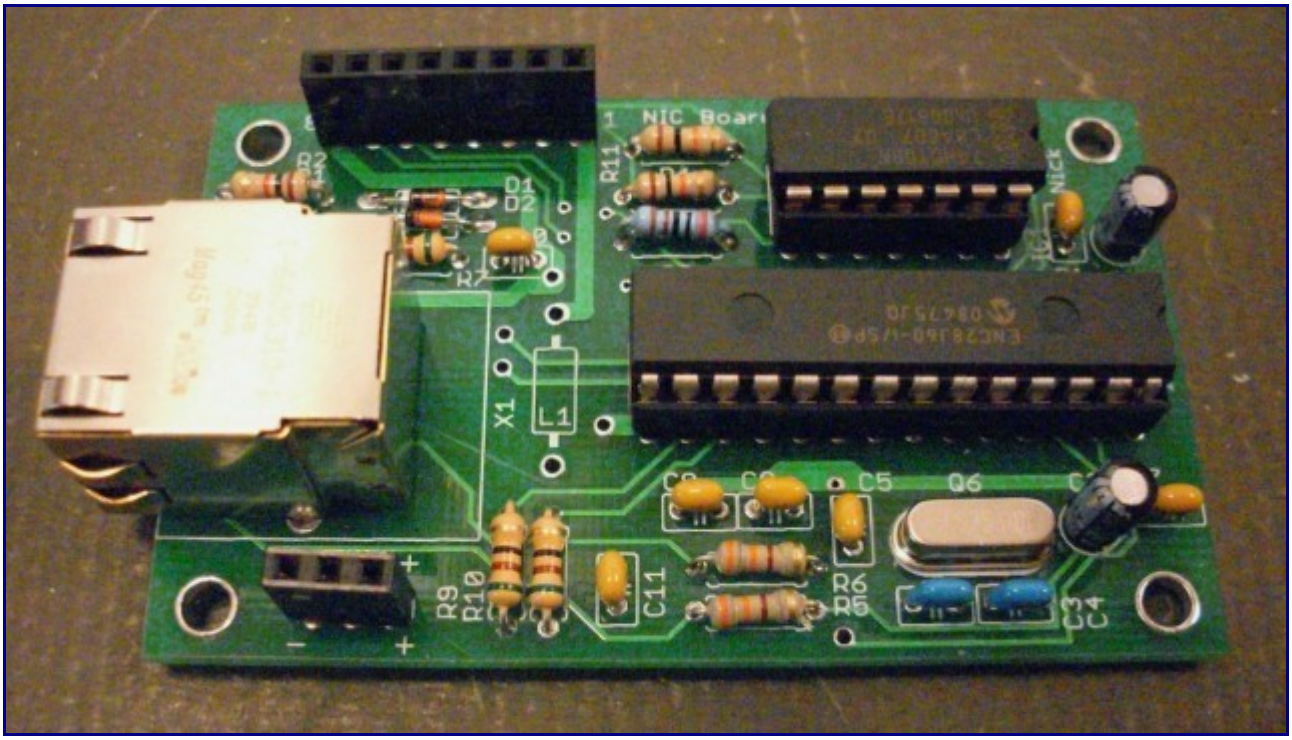
One note worth mentioning here is the component used for the inductor, L1. The datasheet for the ENC28J60 ethernet IC barely mentions anything about the part requirements for L1. However, It does suggest that L1 must be rated to carry at least 80mA of current. I ended up using a 10uH, 228mA inductor from API Delevan, Inc. (Digikey Part number: DN42077-ND). The ethernet controller has been found to work correctly with this inductor. With that said, it is somewhat overkill for this application, and cheaper options exist.

Printed Circuit Board

Using the Eagle layout editor by CadSoft, I designed a Printed Circuit Board layout for this version of the ethernet controller and had several prototypes produced by BatchPCB. The PCBs are standard, 2-layer boards with through-hole components. They measure 70.1 x 43.2 mm. The PCB design layout is shown below.



The boards arrived and I stuffed them with the appropiate parts (which are listed in the original Ethernet Controller Design post). The top side of the board after being stuffed (except for part L1) is shown below.



Connectors

The small, 3-pin female header is for the Power Over Ethernet (PoE), and it connects to the PoE input header on my Power Supply board. The Large, 8-pin header is for data and power for the Ethernet Controller. It is designed to connect to the mainboard of a THAT module, in this case my Digital Thermostat Module.

I chose the pinout of the 8-pin data header myself. I defined it so that the constant power signals (VCC) are near one end, with ground at the opposite end. The data lines then are oriented so that the higher-frequency data lines are close to ground, while the lower-frequency lines are closer to VCC. I expect that

this will reduce radiated electrical noise somewhat, but am not convinced that it makes much of a difference in this application since the wires are long and the distance between them is large.

The pinout of the 8-pin data header is as follows:

- Pin 1: 3.3 Volts (VCC2)
- Pin 2: 5 Volts (VCC1)
- Pin 3: Interrupt Signal
- Pin 4: Ethernet Chip Select Signal (CS)
- Pin 5: Serial Peripheral Interface Slave Out (MISO)
- Pin 6: Serial Peripheral Interface Slave In (MOSI)
- Pin 7: Serial Peripheral Interface Clock (SCK)
- Pin 8: Ground
