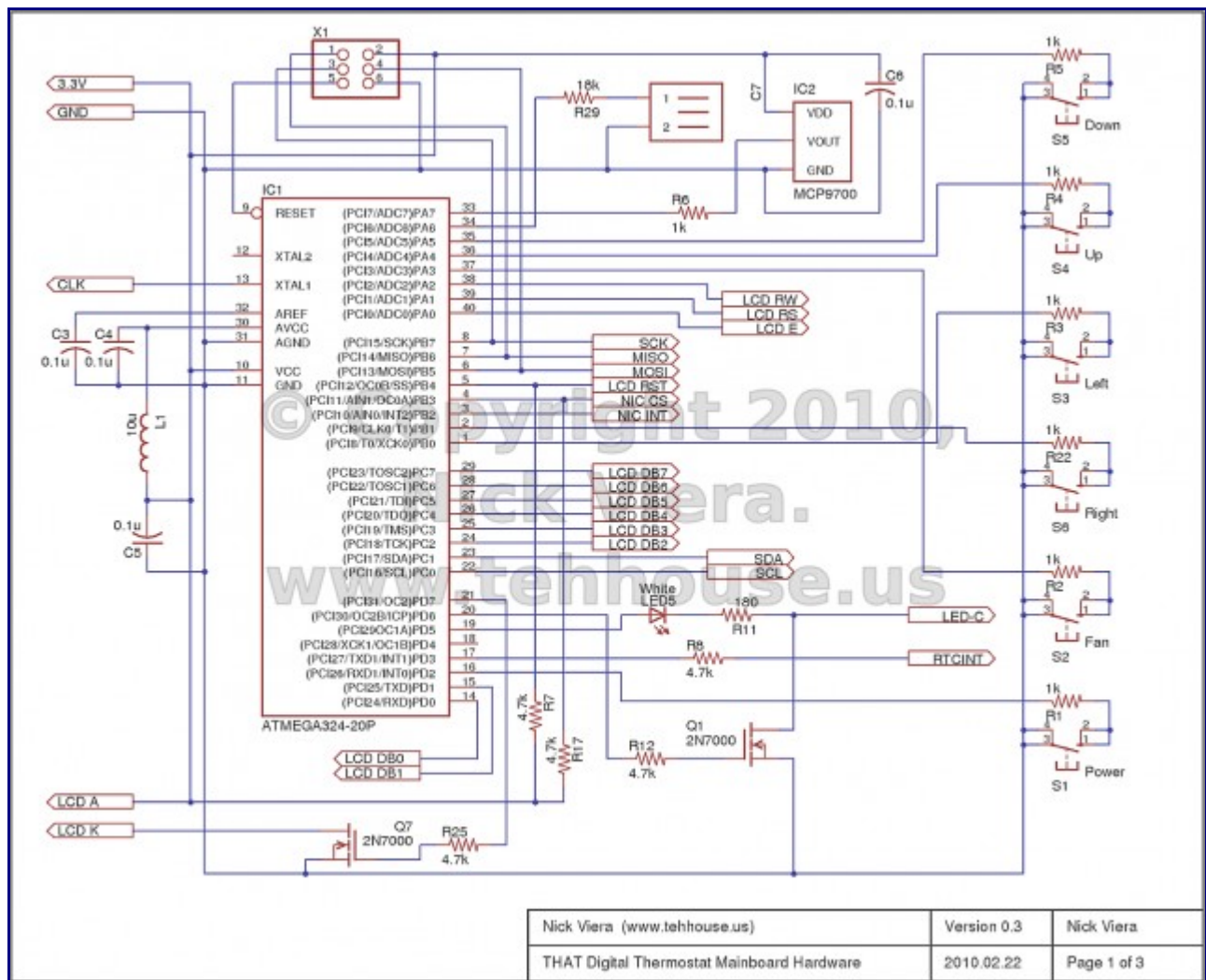# Mainboard 0.3 – MCU

2010-04-19 20:04:14 by Nick

The latest version of my mainboard prototype is hardware version 0.3. The schematic for this hardware is large so I've split it up into 3 separate schematics, titled "i2c", "lcd", and "mcu".

The mcu schematic contains the microcontroller, the temperature and humidity sensors, the pushbutton switches, and other components and connections which didn't explicitly fit into the i2c or lcd schematics.

The mcu schematic is shown below. Note that the arrow-shapes which have text in them are not physical components, but rather symbols meant to link the wiring between the mcu, i2c, and lcd schematics. More notes are listed below the schematic.

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Notes:

- Q1 and Q7 are MOSFETs which are used to dim the LEDs and LCD backlight, respectively. The gates of these MOSFETs are controlled by hardware PWM signals generated by the microcontroller. The PWM has 8-bit resolution, providing 256 brightness steps.
- X1 is the Atmel In-System Programming (ISP) header. It is used for writing the firmware to the microcontroller, without having to remove or disconnect the microcontroller or any part of the circuit.
- L1 and C4 form a low-pass filter. This filter is used to help prevent high-frequency noise (created by the digital circuitry) from entering the microcontroller's Analog to Digital Converter (ADC).
- The switches are debounced in software, using a hardware timer in the microcontroller. After a switch is pressed, the timer is started and all switch-pin interrupts are disabled. During this time all

bouncing or presses of the switches are ignored. After the timer expires, switch-pin interrupts are re-enabled.