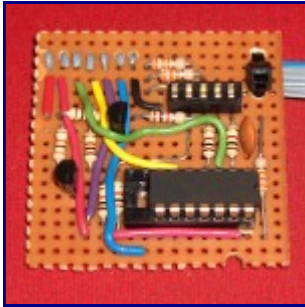# AVR I.S.P. 5-3.3V Level Converter

2010-04-01 10:04:57 by Chris

I am using an AVRUSB500 in-system AVR programmer. This poses a slight problem because my modules use 3.3V logic on the microcontroller side. My options were to pull the microcontroller from the circuit every time I wanted to program it, purchase or build a 3.3V-compatible programmer, or build a 5-3.3V logic converter. I opted for the third option because Nick and I had the parts laying around. The final result can be seen in Fig. 1 (click thumbnail for larger, complete view).

It uses a 74HC08 quad 2-input AND gate powered by the 3.3V supply for the SCK, MOSI, and reset 5-3.3V shift. Two 2N7000 MOSFETs are being used for the MISO 3.3-5V. They are powered by the 5V supply and have pull-down resistors to bring the output close to 3.3V. See Fig. 2 for the complete schematic. It would have made more sense to grab 5V from the USB side instead of the AVR side. My programmer is a kit with a nonstandard connector, however, and has no supply pin. As a result I have both a 3.3V and 5V supply pin on the AVR cable.
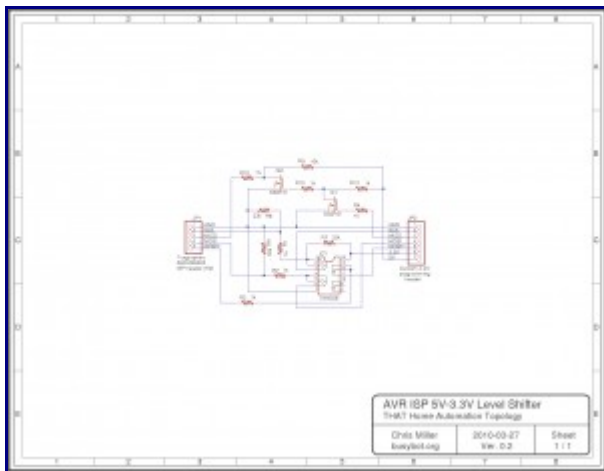
This design is not really part of my project so I won't bother going into much more detail about it. It took a bit of time to build, though, so I thought I might as well document it.