*Projects and Stuff*

XTest1

Project Log

Contents

[20130211 3](#_Toc348380673)

# 20130211

I’m a bit late with these notes. Unfortunately, the Project Log was the only file with which I had not used version control, and the previous contents were lost.

At this point I have completed the first PCB order of XTest1. Overall, I am very happy with the results. This is my first rf board, and my first 4-layer board. Once I received the boards and components, the first thing I did was solder in the power and digital portions.

Upon power-on, everything looked pretty good. In the process of assembling the board and performing cursory testing, here are the issues I’ve discovered so far:

The 0.1uF capacitors were 0508, but the pads I placed are 0805

For now I’m using some 0805 caps I had on hand, but If I re-build and re-order this board, I’ll need to change the pads. The circuit is designed to use 0508, since they slightly shorten the path to ground for decoupling.

The header should be SMT (as I already determined in the BOM), not through-hole (as I designed the board), and it should be on the bottom of the board.

For now I’m just making do with through-hole headers.

At some point in the past I accidentally swapped the Slave Select (SS or LE) with the Serial Data (MOSI or SERIN).

I'll have to make a quick fix on the prototype PCB to correct this. I’ll pillar the associated serial resistors upright, and use fine wire to jumper across to the correct pads.

The pad I designed for the on-off switch isn’t wide enough. With enough solder, it works, but it’s not right.

Correct this in a future version

The LEDs displaying attenuation level are in opposite order. MSB should be on the left, like the silkscreen, but it’s on the right.

Reverse the LED order.

No strain relief was provided for the battery connection.

Identify and implement a good way of providing relief.

Something in my design seems to cause failures on pin PC1 when the Brown-out detection is enabled on the AVR microcontroller.

Identify whether this is specific to my design or to the ATMega48PA. I experienced this with two different ATMega48PA microcontrollers on two separate XTest1 boards. If the Brown-out Detection is set to 4.3V, switching the input on PC1 will sometimes cause a brown-out trip, and the AVR will momentarily reset

I checked in software

I checked the schematic

I checked the PCB

Only when that fuse is set does this problem occur

Also, a note about the capacitor selection for the chosen crystal in this design:

According to AVR042: AVR Hardware Design Considerations,

*Calculation for Crystal Load Capacitor Value based on Load Capacitance CL*

The datasheet specifies a load capacitance of 18pF

18 = (36\*36)/(36+36)

18 = (1296)/(72)

Therefore 36pF is the value of the capacitors we need to use.

[Creative Commons License](http://creativecommons.org/licenses/by-sa/3.0/)  
This work is licensed under a [Creative Commons Attribution-ShareAlike 3.0 Unported License](http://creativecommons.org/licenses/by-sa/3.0/).