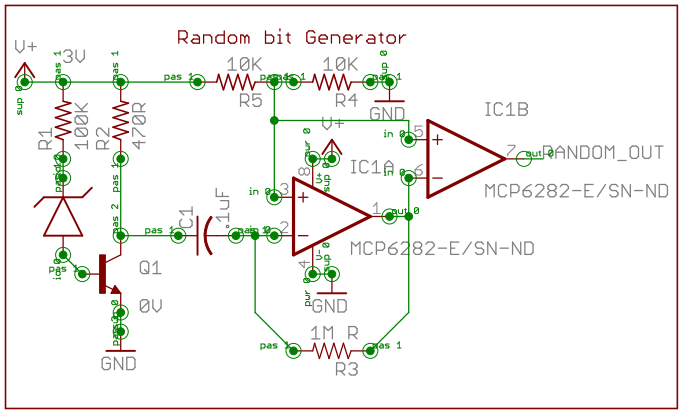

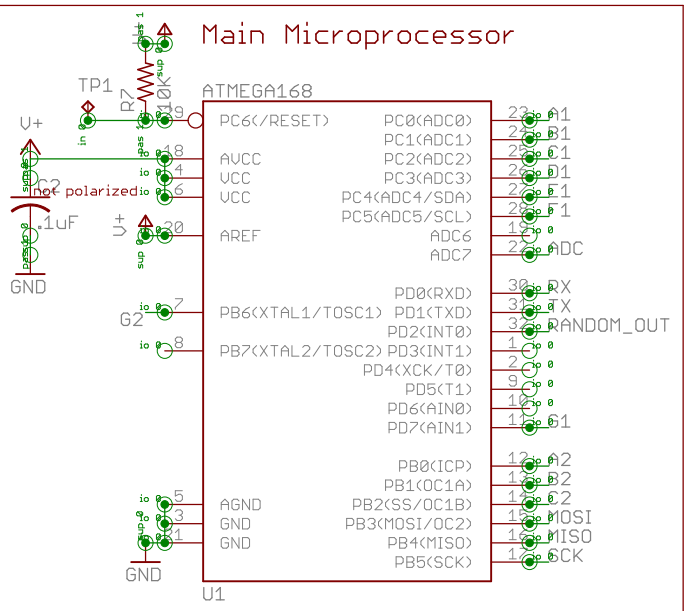

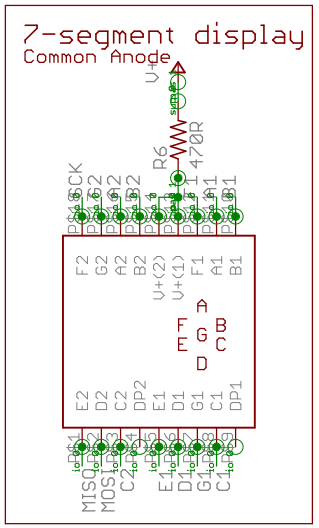

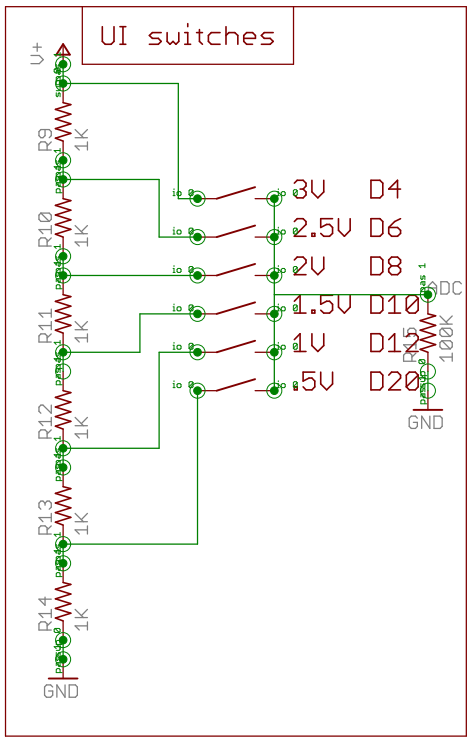

Random Bit Generator Theory of Operation

The noise in the Zener is loudest when the current through the zener is around 10uA
So: 0V ground + .75V Base-Emitter voltage on 2n3904 = .75V
.75V + 1.22V across Zener = 1.97V
(3V - 1.97V) = 1.03V across 100K R1, so 10.3uA, good enough
10.3uA * ~200 Current Gain (Hfe) = 2mA
3V - (2mA * 470R) = 1.59V, close to the middle of the 3V Vcc
Zener current is noisy, that noise is amplified by 2n3904 too
And due to cap, only this noise is taken and sent to the op amp
Amp has an extremely large gain, due to 1M ohm feedback resistor.
For good measure, the signal is fed through a second op amp acting as a comparator.
This is fed as a digital signal into the atmega8
The Atmega8 has a timer ISR that triggers every 32uS, sampling the digital input
The Von Neumann Method is implemented in this ISR to de-bias the input
When the conditions of the method are met, the new bit is mixed into a 32 bit number
Hence, this 32 bit number is both random and constantly updated

open hardware

Random bit generator hardware from Leon Nathaniel Maurer, http://tinyurl.com/DIYrandomgen

Multi-Sized dice roller

TITLE: D&D_dice_1

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