

In this video series I'm going to attempt to recreate the 8 bit computer from Ben Eater's excellent series, "Building an 8-bit breadboard computer." I'm going to do this in System Verilog on a Cyclone IV FPGA using the DE2-115 Education Board. That was a mouthful, so let's parse it.

Ben Eater produced a series of videos where he breadboards an 8 bit CPU from (mostly) 7400 series TTL logic chips. These videos are outstanding and I will reference them frequently.

System Verilog is a Hardware Definition Language, or HDL. If you are like me, you may remember seeing images with engineers holding up huge translucent sheets on which the transistors that make up a modern chip are laid out – this, as far as I can tell – hasn't been done in years. HDLs (and I use the plural here because there are more than one) are the languages in which modern chips are written. So this, has been replaced by this, which still yields something like this.

The Cyclone IV is a family of FPGAs or Field Programmable Gate Arrays produced by Altera, now owned by Intel. The DE2-115 is a development and education board centered around a Cyclone IV with a bunch of stuff one might want to use with it. Professor Bruce Land has a series of lectures from his ECE5760 course at Cornell. I chose the DE2-115 because that's what he uses and I needed to start somewhere.

My name is Tim Allen; I'm trained in Physics and Economics. But when you do a Physics degree Electrical and Computer Engineering just kinda come with the territory, you take some Engineering classes or you just kinda figure it out. Bottom line, I'm not an expert but hopefully I my stumble through this may make your journey easier.

Handwritten binary representations of the number 1000 (decimal) using 8-bit groups:

8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1
0 0 0 0 1 0 1 1	1 0 0 0 1 0 0 1	0 1 1 0
<div style="display: flex; justify-content: space-around; align-items: center;"> 0 5 9 6 </div>		

000

0110 0010

6 2

1 1001

9

0110

6 5

01111000

7 8