Friday

June 2, 2023

I have finished a new instruction where you can move data from one register to another. On the way I have added a few d
rivers to regulate the information and I have also added another 74HC244 and connected in a way so that I connected the inputs to the output of one bank and the output to the input of the other bank. Here is my current work.

Saturday

June 3, 2023

I think that today I should add an adder.(See what I did there? Add an Adder?) I found out that 74Hc283 is the best and I am gonna put it in the circuit. I found out that I have to make it so that the write and the read of the two registers onto the data bus so I have to change the end. To change the end I have to change everything soo… BYE. Now I restarted and I made it so that the registers are connected to the data bus. I decide that the decoder is no use so I deleted it. Now I am creating it so that am using just and gates. I decided that I shoukld write a datasheet for it also.Now I finally finished the two MOVs. During that time I also had a to add a bunch of pull dowm resistors to the outputs of drivers.

Sunday

June 4, 2023

I am creating jmp and so far I am trying to make it so that the the counter doesn't load the instruction but the one after it. Why can't I figure it out? You know what? I switching to the orginal. Adding a Adder.
 This was the supposedly jump. Now I have added the adder and after In am done fixing bugs. Acually never mind because dad said sleep.

Monday

June 4, 2023

I am almost done with data +   A. For some reason I cant put a   bit in the bus even though the   drivers are closed. Yay I fixed it by connecting the driver's inputs to ground. Now I am starting to do Reg + A. It works! Now lets see if we can tackle JUMP again. I think jump works I am going to write a binary counter program. See if it works. I had to make the ADDER and it is working well. YAYYYYYYY!!!!! The binary counter works!!!!!

Tuesday

June 5, 2023

I am adding jumpif. I found out I can use the undeflow of a subtraction problem to determine if it is greater , smaller, or equal. Welp, gottat blank out.

Wednesday

June 6, 2023

junmpif workin on it. YESSSSS IT WORKS!!!! Now I need to add cpl for it to do sub. It says logic osscilation. Hunh. I better use step play.Step play is so time wasting. Wait what? How is voltage flowing through if it's closed? What ever I am adding a whole new set of drivers. Now it works. Now lets make a program when you press a button and a light lights up. Let me seee….. There's too little RAM! Gotta fix that… Now I have to deal with how to make the reset one pulse while ram on… Oops gotta go sleep here's Schematic

Thursday

June 7, 2023

15:58 The reset for the counters are off, one pulse, on. I think I neeed a flip flop to store the off, and then turn to on when the clock moves a pulse. I tried a RS flip flop and then connected the pulse to the reset and the Run button to set but it didn't work because to change the output I have to change set which is connected to pulse. So I am going to change to D type flip flop so that it can change.

16:15 It didn't work. I have decided that maybe I should switch a counter

16:25 I found a counter called 7490 it works perfectly. Let's GOOOOO!!!!!!!!!!!!!!!! Now lets see if I can write the Press Game.

16:56 The program didn't work. It has something to do with the JMPIF. Let me see… First though Break time!

17:05 I'm back. Now lets see what's wrong.

17:25 I am solving that it says circuit oscillation. Time to go to Step Play….(After 20000 years)…….

18:07 What is wrong? I used Step Play everything seems right… Let me try it again.

18:34 I found it! It was because I didn't have to have a pulse for it to run. I need to add some thing to make it so that you need to have a pulse.

18:40 I am trying to conect a RS flip flop to fix the problem, Let me test it.

18:52 It doesn't work because of the AND. Let me change it to NAND so that it can do the exact oppisite of what it shouldn't do. Let's see if it works.

19:00 I just took a break. Looks like I have to change the AND for the counter because everytime I reset it the second counter adds 1. IDK how to change it so it works. Let me think….

19:17 I just thought of it and it works! The only reason it will do that is because the d flip flop starts with ~Q on. If I give it a pulse it turns to 0. All I have to do is connect the clear to the pulse. Now lets try the PRESS GAME.

19:25 Acuatlly , lets test JMP first.

19:28 I have encountered a problem I have long tried to ignore but I guess it came back. The SRAM I am using writes into the outputs. Everytime I change the code to 0000 when I am done coding, when I press the button to run the Program it loads that 0000 to adress 0000. So everytime I am done coding I have to display the first command then press the button to run. And I have to solve that. Let me think… (for the hundreth time.)...First though thy break is needed.

19:47 I'm back, Lets continue.

19:55 I'm thinking that maybe I should align four registers to store the first command the release it when I press RUN. I am going to try it and see if it works.

20:04 I am done building. See if this works.

20:09 I have to tweak the circuit a little because the output is interfering with the original one. I could temporialy close the output. Yeah lets try that.

20:21 I done building lets test.

20:23 DINNER

21:40 Now let's test.

21:46 It says different ouputs on same line. I better debug that. I'll be back.

21:48 I think that maybe I should make two lines. One for output, one for input.

22:34 I had to go take the chinese test.

22:51 It says that it I still two different levels on same line.

Friday

June 9, 2023

13:29 Dad said that it doesn't load because I have to look at the time graph so let's try that.

13:36 For write I have to turn CE and WE on then write data and after that turn them off.

13:40 For Read I have turn on CE then turn on OE, read data, turn off.

13:50 I tested it and found out that I forgot to put down a pull down resistor. After I fix that I am going to test it.

13:55 I found out why. It was because they are ~. That means they are the oppisite. I am supposed to give them a negative input to enable them.

14:15 Okay so I figured it out now all I gotta do is implement that into my CPU. Meet you when I have problems or did it.

14:45 I am going to take a break

15:52 I have to delete the program counter part here's the Schematic so far.

15:54 Now let's rebuild the Program counter so that it pulses.

16:54 I am back from eating dinner-lunch. I am continueing to build.

17:24 Okay so I have to use 2 flip flops to create a two pulse delay so
that it will load it in.

17:50 I just found out my design w
as wrong. Here was my schematic. But I have to take my chinese test. See you at
around 22:00.

1:13 am This is my final schematic for Friday.

June 10, 2023

Saturday

12:25 I am starting to make my CPU. So far the CPU has a problem with the Read. All I have to do
is fix Read. The problem is that CE is not closing.

12:32 So I have to make it so that the driver for CE on the Write is closed when I am reading.

12:35 I am leaving to go to garage Sale.

14:26 I am back from going to garage sale. Now when I added the drivers it says output shortcut.
So let me debug that.

15:04 Yes!! It works. Now The Program Counter can acuatly count.

15:10 I have to go baby sit Benji. Bye.

16:26 I am back from eating and watching baby. Now let's test the Press Game.

16:28 I found out that there has to be a driver to turn on OE when write is turned back on. Let me do that.

16:33 There is a problem. It says circuit oscillation again because of jump. I need to check my notes to see how I fixed it.

16:35 I checked my notes and it says that I need a pulse for it to load. I need to make it up all over again.

17:12 I thought of a solution and it did work. So basicly there is 4 D-flip fliops that store the place where you want to jump and AND gates, OR gates, and NOR gates control the clock.

17:17 When I tested the JMP I found out that when you jump to a place where it has a number it loads that in. But after I stop it and implement a new JMP it jumps to that address. So I have to connect that so that the the drivers are registers, and I need to clear it after every single jump. Let me do that.

17:24 After I was done testing it still didn't work because I had to clear the thing for one pulse longer, so I am going to place a delay on the clear. After I take a break.

18:18 After I placed a delay it got worse. The clear kept on holding because the LOAD flip flop wasn't closing for some reason that I didn't know. I need to debug that.

18:29 I just realized I can look at what I did before through the screenshots. I found out how to do it. Now let's see if JMP works.

18:46 It still is jumping to the wrong place. Let me think of new ways.

10:11 I think this will work. I can only delay the JMP part, that way the second time around it will read 0000B. Let me test.

20:17 I didn't work because the first time around it still jumped and the register read 1011B

Monday

June 12, 2023

Goals: Read 2 sections of Modern Processor Design   DONE
        Finish Press Game   DONE
        Read CHUMP   DONE

11:55 I am going to start with finishing the Press Game.

12:00 It didn't work because when I tried the JMPIF command and told it to jump to 1111B, A was 0000B. When the 1111B came in to the data bus the CPL thought it was his command and 1111B loaded into the A. I have to change the opcode of A.

12:06 When I tried it again it still didn't work because the JMP is to slow. I am going to make it a bit quicker by changing the D-Flip Flop to a RS-Flip Flop. That way the JMP will catch up.

12:13 It worked! Now let's see if the Press Game will work now.

12:35 The Press Game worked, but I found another problem. The CPL kept on working. I decided that there should be a driver connected to the ENABLE of the Register to control whether it should complement or not. This is so that I can write into A. I am just going to add another "level" for it to pass to be enabled.

12:41 I think I am done with the Press Game and the CPU. I may make further changes but I think it is good enough for Version 1.0. Now I am going to read Modern Design.

2:07 I am going to eat Lunch.

4:06 I am back. I need to fix CPL on the CPU. It says Circut Oscillation. I already found out about this and all I need to do is add two pairs of drivers. Hopefully it fixes it.

4:22 It doesn't work because the output of the driver is connected to the input. I am going to connect another driver so that the electrictiy won't flow back.

4:30 It works! Now I am done with the CPU because DAD said so. I am going to just read some books.

6:31 I am reading Understanding Fundamentals of CPU architecture. I learned that static RAM cannot store if the power is turned off, while dynamic can.

6:44 I am going to read TTL Cookbook.

6:49 I learned that you can use a NAND, AND, OR, NOR, as a pulse train, where you can have one pin as control and another where you make a pulse, and depending on the gate the output will be oppsite or te same as your pulse.

6:52 I also learned there is a thing called Negative logic where everything is oppisite.

7:29 I learned that a not very effective way to deal with ouputs connecting is to add a pull up resistor so that the gates can only pull them down, but tri-state ouputs are still better.

7:57 I learned that you can write truth tables into a ROM and make for example a BCD - 7 Segment Display decoder

Tuesday

June 13, 2023

Goals: Add External Memory   NOT DONE
        Assemble RAM Into Chips   NOT DONE
        Read TTL Cookbook   NOT DONE

12:55 Starting to add External RAM

1:23 Dad says that I should start with changing componets into chips. Starting to do it.

2:10 I am starting to build at the program counter.

2:48 I decided that it would be easier to collect all the componets, then start building. I have collected all the componets I need except for the D-type flip flop.
3:04 I just realized that I don't need a single D-Flip Flop. I can just use 6 oppsite clocked D-Flip Flops and use them.

3:39 I am going to eat lunch. So far I am half done with the Program Counter.

4:36 I am back. I am going to probably finish the Program counter today.

5:13 I finished write, but I found out a easier and simpler way to design this. I am going to try it out. It is to use two d-type flip flops and make one clock negative logic. That way there will still be a wait in-between.

6:10 It didn't work becauase CE is not closing. I need to fix that.

6:31 I changed a lot of the circuit, but Ce is still not closing. I have made a new plan. I can just connect CE to VCC and then I can just toggle OE and WE. This better work.

6:51 I am done. I am going back to the original and I am going to stop changing it.

7:23 It I am adding a 2 pulse – 1 pulse thing for the PC. So far I guess write is working. But I did not complete any of my goals.

Quotes from DAD "It is when you reach the wall, that your brain will work and you will learn."

Wednesday

June 14, 2023

Goals: Assemble All Into Chips(If possible) NOT DONE
        Read TTL Cookbook*   NOT DONE

1:30 I am going to fot the last time change the PC. I am going to try another design. I will use a small counter to do a oscillating pulse for the two D-flips with clear. And also use it's output as a input for a nother small counter and that is the pulse.

3:09 YESS ! It works. Now I have to add everything else in two hours. EZ right?

4:09 I have added the MOV DATA – REG command. I am testing to see if it works.

4:19 I just found out that my RAM can't read because my button is clock and the control for Read or not. I hae to find a way to fix this. I am going to pray I will get some ideas.

5:28 I got an idea and it worked! Okay so now let's see if MOV works.

5:34 MOV does not work. I need to find out why.

8:51 I figured it out. It is because WRITE for the 16 registers are timing is one pulse fast. I need to make it hold for one extra pulse.

8:58 I added a bunch of inverters to invert the enable of the drivers but found out I don't need it so I deleted I it and 7 minutes wasted.

9:14 I have finished MOV DATA – REG. Now I am going to work on MOV REG – REG.

9:53 I had to find a chip so that it can act as A so that when it moves it stores it in A then moves it into the REG you want to place it in.

10:14 I found one. It is 74F173. It is basicly a register. I am going to actually build the MOV now.

11:23 I am going to take a break

11:50 I am beack from taking a break. I ne
ed to add READ function. That's all I need to add.

12:33 The first half of the MOV REG – REG works but the second part where I load A- Reg does not work. I am finally going home. This is Schematic.

Thursday

June 15, 2023

Goals: Finish Chips Assembly (Must Finish or else …)
       Read TTL Cookbook

2:36 I need to test the project again to know what is wrong.

3:01 I found out that the MOV DATA – REG does not work because the WRITE pins are turned off 1 pulse too fast. I tried fixing it with a third Hex D – Flip Flop, but it didn't work even though the driver is supposed to open event if there is only one that is off. I need to figure out why it doesn't pass through.

3:05 I am so dumb. I did not connect the output of the third Hex D – Flip Flop to the the WRITE pins. Okay Now on to the MOV REG – REG.

3:30 I founf two things that are wrong. Number one is that the address and the data get opened when the contents of A get moved back into the REG, then the address and the data are connected together so I have decided to use two 74LS244 to connect the two main data sources to the address and data. That way the data and address won't disturb each other. The second is the READ is not enabled, so I will have to look into that. I am going to take a break every hour. Since we get here.

3:40 I am back now I need to add one chip, and fix it so the REGS can READ.

4:02 Now I have to delete everything to add that change.

4:30 I don't know what is what. I don't know how I used to design it and I don't know where the wires are supposed to connect. I have to reastart MOV.

4:48 I am have a problem. The there are two out puts conecting with different ouputs. I have to find which 2.

5:23 I fixed it by Ctrl Z 10 times and I got it working by not deleting as much as I did last time. I am testing my first MOV.

6:01 I found out that we have a proble. The driver that connects coming it data to REG is too fast. I already fixed the one from A – REG but for some reason it does not work for the first one.

6:35 YESS! I prayed and Jesus gave reminded me that the second one was connected different from the way I had it for the first one. I realized that he was right.(Of course.)

6:54 It still doesn't work. I need to find another way to make it longer.

7:03 Well I done nothing but went back further.

June 30, 2023

Friday

6:26 oppsy I forgot to do this well I have a overview of today. So far I restarted and made it using the Havard archetecture and It works reallly well and it is simple to understand. I have completed the two MOVs, JMP, and the two JMPIF's as well. Here is my list of componets so far including the ones I have at home:

Componet	Amount
74LS873	4
74LS161	2
74LS154	1
IN4148	16
74LS139	1
74LS07	2
74LS244	1
74LS175	1
74LS4017	1
74LS04	2
74LS32	1
74LS126	1

Here's a photo of my schematic. I almost done!!!!

July 1, 2023

2:23 Hello I am back. Okay so all I need to do is add
the two adds:) Okay so let me do that…

3:48 I came back from lunch and I built the adder. But then I realized that I have to have 2 internal busses for the Registers. One for input one for ouput. I changed it and found out that MOV REG-REG does not work. I need to foind what is wrong and fix it.

3:56 I tried a octal d-fliflop with 3S* but it interfered with the input 74LS244. I need to find a way for them to cooperate let me try pulldown resistors…..

5:32 After some teaching from DAD and some reading I found out that A is actually a buffer that stores the number temporialy for a addition. Now I was trying add when I acidendtly did JMPIF direct and it said output short circuit. I need to fix that.

5:51 I fixed tha but found out it does not jump because 74LS161 has syscrohnous load and it doesn't count when the four opcodes ae realised I need to change it to 191.

6:29 I finished! I am done. Time to see how many chips I used.