Senior Design — Team 14

Periodic Report 05

Reporting Period: October 23rd through November 5th

Team Members:

- Daryl Damman - Team Lead
- Logan Lee - Testing & Prototyping
- Grant Nordling - Parts Management & Quality Control
- Braxton Rokos - PCB Routing & Prototyping
- Gavin Tersteeg - Quality Control & Testing

Progress Summary

Several meetings were held during this period to continue the development of the i281 processor. During this period, we have created a few more breadboard MUX circuits. We have also started on developing the schematics for the ALU, Flag Registers, Clock, Program Counter, and Register Files. In addition to the schematics, initial layouts for the breadboards with chips were pondered. The ALU and Flag Registers were deemed to be the same board. The initial breadboarding of the CMEM was also started. During the second meeting of the period, the client approved of our design for the clock as it was different than the design he suggested. We made some adjustments to our boot sequence design as we look into it more. We also showcased our CMEM module to the client. We also designed and 3D printed a panel to mount switches onto. We made some decisions on where LEDs should be locaded and if a signal should be visualized more than once.

Pending Concerns and Issues

Progress on the project is further behind than anticipated. This is a larger concern if the breadboard portion of the project exceeds all worst-case scenarios and bleeds well into the second semester.

Upcoming Plans for Next Period

All members of the team will continue to develop the component they are assigned to. These developments include schematics, documentation, breadboarding, and testing. We have also created a new part order document. We are hoping to get that out as soon as possible.

Accomplishments

- All MUXs have been developed for the processor as of writing.
- Initial Schematics for most major components have been or are being developed.
- A second testing board was developed.
- A successful showcase of the CMEM module.

Individual Contributions

Daryl Damman

Schematics were made for the register file and hard disk modules. More document templates were created for breadboard pin-out and datasheet inserts. Made sure that the testing document had the required framework and sufficient starting details for the team to flush out. Roughly half the testing presentation was written as well, despite it not being due until the next period.

Logan Lee

Developed a method for creating the clock circuit that is different and more effective for our purposes than Ben Eater's. Started creating the breadboard version of the Program Counter.

Grant Nordling

Made Program Counter register schematic. Wrote main portions of the previous weekly report. Started work on control table schematic.

Braxton Rokos

Made the first revisions of the ALU and PC Update Logic schematics. Added a few things to the testing document. Began creating and laying out the ALU on the breadboards.

Gavin Tersteeg

Created the user panel. The switches are held by a 3D printed brack, and then mounted to a piece of polycarbonate. A breadboard is also mounted to the polycarb backing to act as a interface to the rest of the computer.

Constructed the debugging module which handles control signals from the front panel as well as displaying the current instruction and execution address. Needs to be hooked up to the rest of the system to be fully debugged.

Constructed the system clock, which can provide 5 selectable speeds that the system can operate at. Also handles halt and single step signals.