Senior Design — SDMAY24-14

Periodic Report 2-04

i281/e Hardware Implementation

Reporting Period: February 25th through March 30th

Project Personnel

Dr. Alexander Stoytchev (Advisor/Client)	Daryl Damman
Logan Lee	Grant Nordling
Braxton Rokos	Gavin Tersteeg

Progress Summary

In this period, we focused on finishing up our PCB design. This task included heavy reviews with the client on each board and their visuals. PCB layout and routing was done in this timeframe, including the usage of the auto routing software "freerouting". Multiple late meetings outside of the schedule were required to achieve PCB ordering on-time. Whilst preparing the final touches on the first revision of PCBs, final documentation began with the user manual.

The user manual is one of several final deliverables for the project and is currently in its infancy. Information about DOS/281 and programming the i281e CPU is being recorded first and foremost. Individual board information was also recorded before the final parts arrived for the PCB implementation.

First revision PCBs and parts arrived one after another. A full system assembly was completed using the parts ordered and in reserve. Testing has shown several errors in the schematics and PCB design of several modules thus requiring a second revision. These will be accomplished at the start of the next period.

Decisions Made

- Second revision of PCBs is required due to some system-critical design failures.
- Mounting hardware for PCB implementation must be obtained soon.
- Poster and presentation design need to be concluded before the end of the next reporting period.

Plans for Next Reporting Period

- Receive second revision PCBs.
- Verify and reorder missing parts for initial processor order.
- Develop the poster for final deliverables.
- Produce a final presentation based on video report and the EE491 presentation.
- Write the first draft of the user manual.
- Assemble breadboard implementation into final resting place.

Past Week Accomplishments

Individual

- Daryl Damman:
    - Video Filming and Editing
    - User Manual Documentation for Register File
    - Register File PCB
    - Mainboard/Backboard PCB
- Logan Lee:
    - Code Memory PCB
    - Program Counter PCB
- Grant Nordling:
    - Control Table PCB
    - User Manual Documentation for Control Table
- Braxton Rokos
    - ALU NOR PCB
    - ALU PCB
    - ALU NOR Soldering
    - User Manual Documentation for ALU
    - Design Document Entries for Video card and ALU
- Gavin Tersteeg:
    - User Panel PCB
    - Data Memory PCB
    - User Manual Documentation for DOS/281, i281 programming, etc.

Team

- Ordered all parts and PCBs and obtained all PCBs.
- Filmed a video for the midterm peer review.

Individual contributions

Name	Individual Contributions *(Short List)*	Period Hours	Cumulative Hours (Starting from Biweekly 2)
Daryl Damman	Documentation, PCB Design, Video Editing	65	124.5
Logan Lee	PCB Design, Soldering, Documentation	41	76
Grant Nordling	PCB Design, Parts Ordering and Management, Soldering, Documentation	15	19
Braxton Rokos	PCB Design, Soldering, Documentation	37.5	76.5
Gavin Tersteeg	PCB Design, Assembly Lead, Assembly Testing, Soldering Lead	80.75	136

It shall be noted that the hours above are estimated within reason using a spreadsheet. Appropriate hour tracking shall be performed following this period. The first hour spent during our twice-weekly meetings is not included in this report's estimate.

- Team Meeting Hours: 6 hours

Midterm Feedback Discussion

Summarize the feedback you received (both written and verbal).

Our peers were from Team 25. Most of the verbal discussion devolved into clarification of requirements and technical knowledge necessary for the project. For written feedback, a more thorough test plan was requested alongside monitoring scope creep. More education is needed to describe what all goes on in the machine and project deliverables.

Describe any new insights your team generated based on this feedback.

There is still plenty of room for improvement toward the representation of our project. We've learned more about which portions of the project need to be stressed more and parts that can be talked about to either a lesser degree or about the same.

What steps are you taking based on the feedback?

Clarity. Several talking points from Team 25 stemmed from a malpresentation of parts of our project from us and a lack of requirements information. Many instances of the peer review could have been resolved had we discussed our requirements during our video and were clearer on a few talking points. Regarding scope creep, the team has taken several steps to reduce such dilemmas; however, we'll continue to monitor the work done from each member and requests of the client to deeply consider any new discussions this late into the semester.

Meeting Notes

Feb 26:

- Rearranged the layout of the PCBs on the backboard
- Reviewed Silkscreens of all PCBs to standardize the look and information provided per board

March 1:

- Reviewed layout of the final PCB design
    - Debated removing bus 13
    - Final decision was to remove bus 13, but we have a header version of it that can be tapped
    - 14 total busses
- Reviewed silkscreens
- Reviewed Mux and started routing it

March 4:

- Reviewed the tasks required to create the midterm review video
    - Chose tasks each person is responsible for
- Finished Routing and Ordering the boards

March 8:

- Worked on the final part order/Bill of Materials for the complete CPU
- Taught the client about how some of the CPU works logically

March 18:

- Talked about the final presentation and deliverables
    - What type of demos we are going to show the panel
    - Final Poster Presentation
- Assigned everyone with different documentation tasks they need to complete for the User Manual
    - Also decided the different chapters and what the client wants to see from it
    - This manual is directed towards the students and describes only the final design (no iterations)
- Talked about buying a few more parts for the class
- Discussed the future of the project
    - How many they expected to build

March 22:

- Worked on documentation for the user manual
- Worked on the user panel PCB

March 25:

- Realized we were missing some parts we ordered
    - Cataloged the parts we received versus what we ordered
- Started soldering the control table, program counter, and ALU Nor
- Gavin build the DMEM module and user panel on the 24th of March
- Sent out the backboards to ETG for the surface mount soldering and testing

March 29:

- Reviewed the completion of the program counter, control table, ALU NOR, and backboard.
- Added the boards to the backboard to see if their connections work.