EE / CPRE / SE 492 - sdmay23-47
CyDAQ DSP Platform Firmware and Software Redesign

Bi-Weekly Report 4

March 27, 2023 - April 7, 2023
Client: Matthew Post
Faculty Advisor: Philip Jones

Team Members

Yohan Bopearatchy - Firmware Engineer
Wyatt Duberstein - CLI Engineer
Blake Fisher - GUI Lead
Corbin Kems - CLI Engineer Lead
Cole Langner - Testing Lead
Jens Rasmussen - Project Lead
Long Zeng - Firmware Engineer Lead

Past Period Summary

During the past period, significant progress was made on the firmware and it now works in a plug-n-play fashion without the need to install any drivers on Windows. A bare metal implementation that runs separately from petalinux was also discovered and researched in hopes to maximize possible speeds. The balance beam mode has also had significant progress with all of the previous features being transferred over to the CLI and new GUI. A wiki page on setting up a development environment virtual machine for the project was created and tested.

Past Period Accomplishments

Yohan Bopearatchy

Yohan worked on testing limits of petalinux on zybo z7.

Wyatt Duberstein

Wyatt worked on the balance beam UI page as well as transferring the balance beam data from the CLI tool to the GUI graph.

Blake Fisher

Blake worked on reviewing the GUI and Wyatt’s implementation of the Balance Beam GUI.

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Corbin Kems

Corbin worked on researching and implementing a new bare metal application that can be ran separately to petalinux. This involved researching the OpenAMP library to share control information and data transfer between the two CPU cores.

Cole Langner

Cole worked on manually testing the GUI, specifically the plotter and basic commands page.

Jens Rasmussen

Jens worked on testing the setup of the development environment.

Long Zeng

Long worked mainly on getting petalinux to work with our hardware. created a new hw design based on the nap, fixed the issue with usb chipidea driver not showing up. Fixed the device tree issue that caused kernel panic.

Pending Issues

Yohan Bopearatchy

Yohan had issues with nothing.

Wyatt Duberstein

Wyatt had issues transferring the data from the CLI tool all the way up to the GUI. I am trying to transfer the data over 4 layers and that has proven difficult.

Blake Fisher

Blake had issues with nothing.

Corbin Kems

Corbin had issues carving out the correct memory region that was 1) the correct size and 2) in the correct location for OpenAMP to use. Lots of kernel panics when memory got written over incorrectly!

Cole Langner

Cole had issues with nothing.

Jens Rasmussen

Jens had issues with nothing.

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Long Zeng

Long had issues organizing the current vitis project, merging the old firmware code to the bare metal project

Individual Contributions

Name	Hours Worked This Period	Cumulative Hours
Yohan Bopearatchy	8	234
Wyatt Duberstein	10	50
Blake Fisher	3	21
Corbin Kems	40	116
Cole Langner	5	16
Jens Rasmussen	5	20
Long Zeng	30	116

Plans For Upcoming Period

Yohan Bopearatchy

Yohan will work on helping with bare metal application and continue testing petalinux.

Wyatt Duberstein

Wyatt will work on continuing the balance beam page, hopefully finishing it by this weeks meeting if I can get it worked out.

Blake Fisher

Blake will work on redesigning the connection status indicator on the GUI.

Corbin Kems

Corbin will work on finalizing the signaling between the two CPU cores (petalinux and bare metal) as well as re-implement the bare-metal application so basic operation can work. The goal is to get it to work just like the existing firmware as a baseline, so we can find any existing bugs. Then, improve the firmware in the last few weeks of the semester with new changes.

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Cole Langner

Cole will work on continuing setting up automated tests. When the new firmware is implemented he will test the new firmware with the GUI, as well as running through the lab that will be used during the lab test.

Jens Rasmussen

Jens will work on creating / finishing the documentation on the development environment virtual machine and try to help with petalinux.

Long Zeng

Long will work on creating the vitis project mainly on the bare metal part

Summary of Advisor Meetings

During the last period our group had a very useful meeting with Dr. Jones where he suggested using OpenAMP with a bare metal application running alongside petalinux. This suggestion helped resolve a few issues and improve the petalinux implementation that Corbin and Long had been working on. Matt and the ETG team handed off the DAC and external ADC code to get merged into the new firmware. The balance beam mode received positive feedback from the client and progress can continue with that and live sampling / plotting.