

EE 4910 WEEKLY REPORT: 7

3/31/2026 - 4/6/2026

Group number: 06

Project title: Developing a Cost Effective NIR VIS Spectrometer

Client &/Advisor: Avishek Das & Manojit Pramanik

Team Members/Role: Ryan Majstorovic, Evan Tamer, Dawson Posekany, Samar Gill

Weekly Summary

This week marked a significant milestone for the team: working code that could be tested with the CCD was completed and demonstrated at the weekly meeting. This represents the functional completion of one stage of the design process — the microcontroller integration — and was a key goal the team had been working toward going into this meeting.

Another accomplishment this week was finalizing the optical component order. After a discussion on Sunday, the team agreed to purchase a premade optical housing for initial CCD-microcontroller testing, rather than sourcing individual custom components. This was driven by time constraints and the recognition that additional time would be needed for calibration and fine-tuning of the software. A housing was sourced on eBay for quick delivery, and a separate order was placed through ETG.

The team's goal for the upcoming week is to begin testing with optical components already available in the lab while waiting for the housing to be delivered. Work on the microcontroller timers will also continue in the meantime.

Past week accomplishments

Samar: Initial setup of the microcontroller was working. Timers still need to be adjusted (see Pending Issues).

Evan: Finalized LEDs and LASER diodes for calibration device. Also looked into standards for spectrometers to determine if this would be a suitable method for an actual product. Began looking at setting up USB and ADC.

Ryan: Confirmed that the driver board was working, verified that voltage readings were correct, and optimized timers to achieve 135 FPS from the CCD. Additionally, simulations concluded that the current optics selections are improper to meet design size needs. To address that we must choose a different focusing lens and re-run simulations to optimize reflection based gratings vs transmission gratings for size.

Dawson: Researched optical components, including fiber optic cable for the final product and enclosures for testing optics.

Pending issues

1. Microcontroller timers still need to be adjusted and finalized.

Individual contributions

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Ryan Majstorovic	Confirmed driver board was working, verified voltage readings, and optimized timers to achieve 135 FPS.	7	42
Dawson Posekany	Optical Research	6	37
Samar Gill	Initial microcontroller setup working; timers still need adjustment.	6	36
Evan Tamer	Chose parts for calibration device and continued looking at microcontroller code	6	37

Comments and extended discussion

We need to investigate software acquisition for 3DOptix software it seems the cost for a student plan is ~\$35 a month we need at least one month and then possibly needing more during the second semester.

Planned Tasks for the next couple of weeks:

1. 4/7/26 – Begin optics testing with components available in the lab.
4/7/26 – Continue working on microcontroller timers.
2. 4/13/26 – Begin testing with optical housing once delivered. Continue software and timer refinement.
3. 4/20/26 – Full optics bench testing with delivered housing. Continue calibration and software refinement.

Plans for the upcoming week

Samar & Evan: Begin optics testing with components available in the lab. Continue working on adjusting timers for the microcontroller.

Dawson and Ryan: Begin optics testing with components in the lab while waiting for the ordered housing to arrive. Start scoping out the GUI and software component.

Ryan: Desolder the headers for the CCD from the CCD driver board and direct solder the CCD to the driver board due to connection issues during testing.

Begin optics testing with components in the lab while waiting for the ordered housing to arrive.

Samar, Evan, Ryan & Dawson: The full team will begin optics testing using components already available in the lab. The team will also continue refining the microcontroller timers while waiting for the ordered optical housing to arrive.

The team will use the time waiting for the optical housing delivery to make progress on timer adjustments and conduct preliminary optics tests with available lab components.

Appendix:

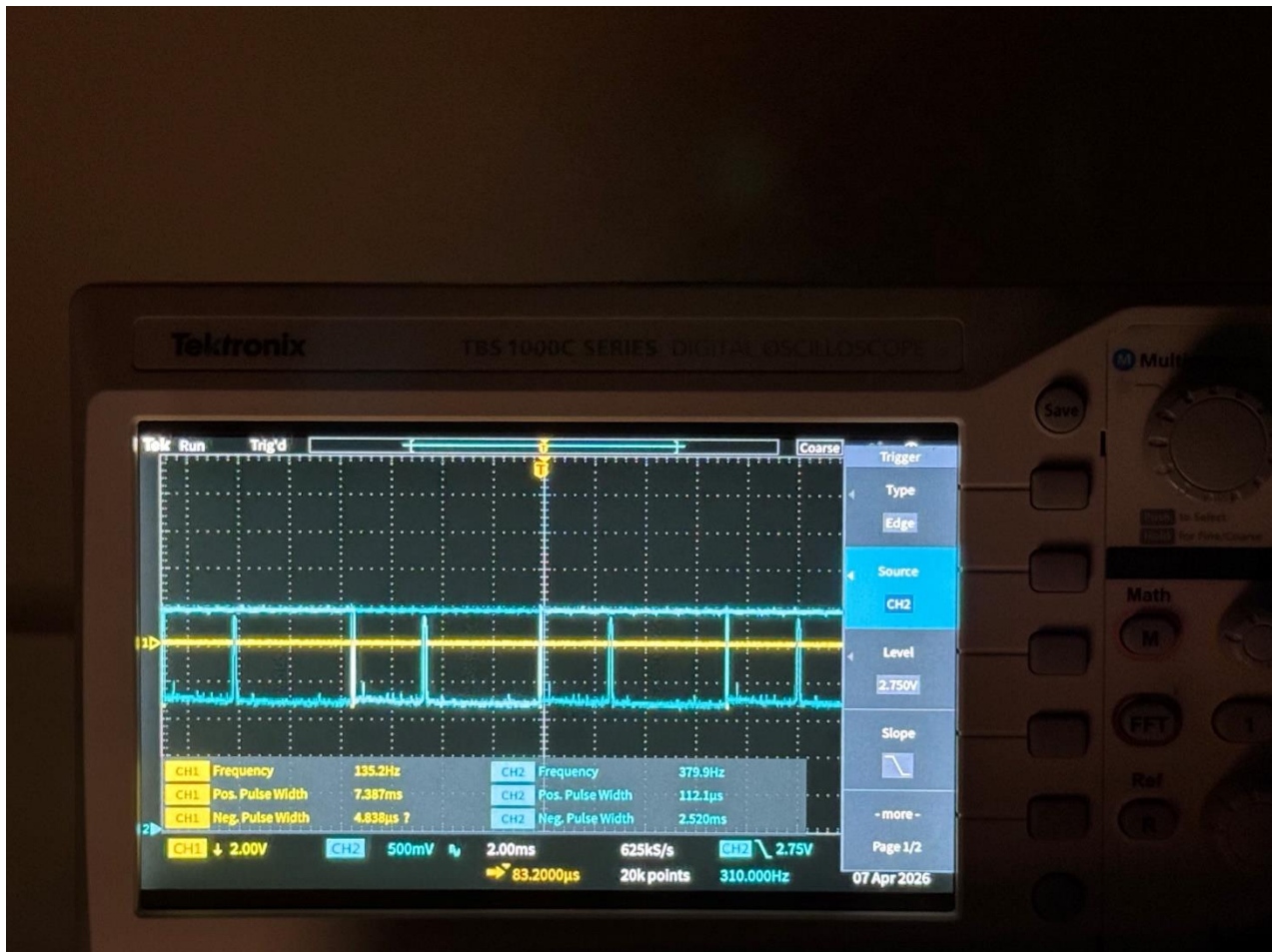


Figure 1 Peak can be seen being captured into the ccd from the piece of wire being in front of the CCD Sensor

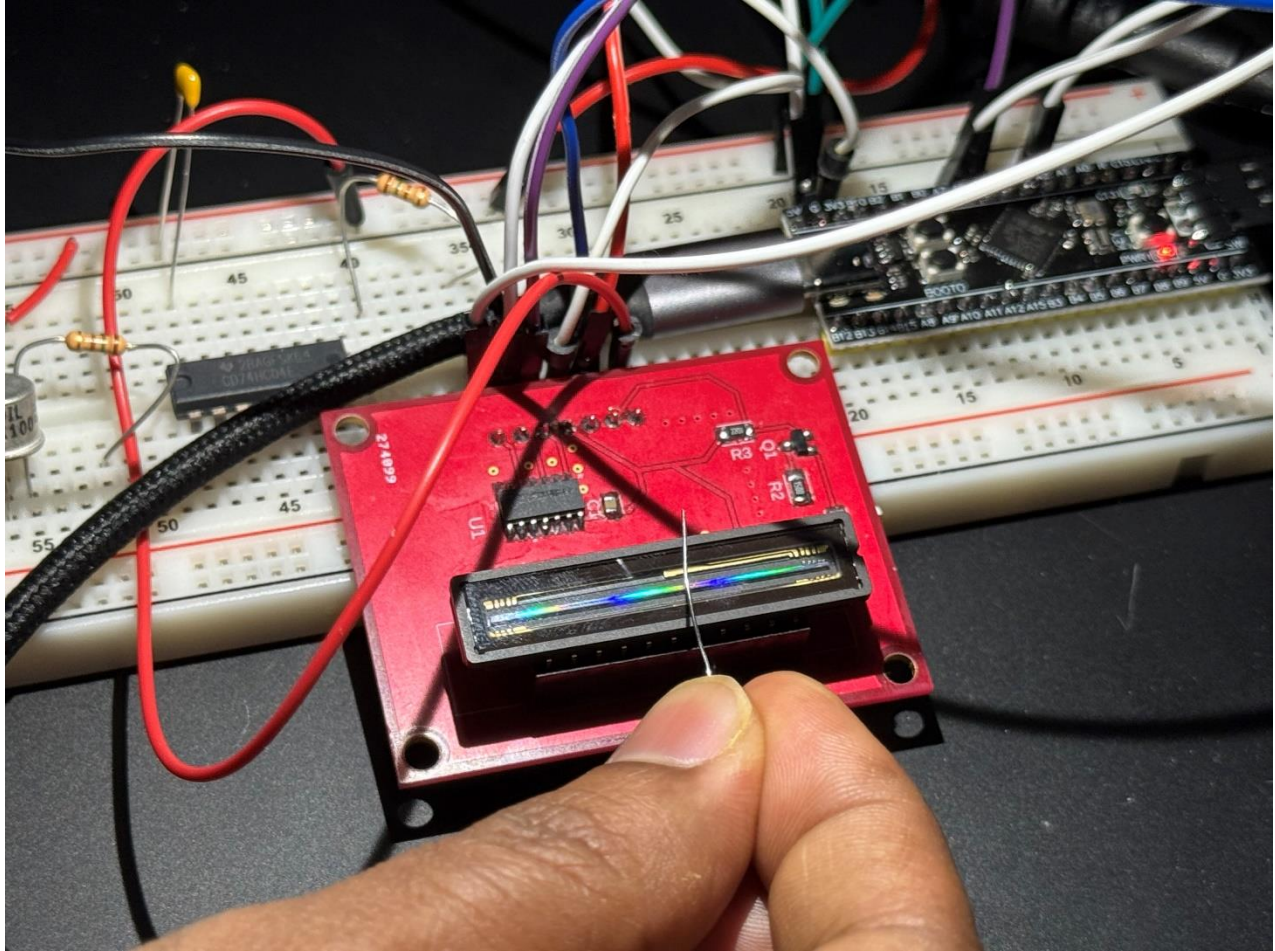




Figure 2 Single capture of the CCD output with this timer settings we ran into an issue the SH does not transition High in the timeframe of ICG being Low. Extending the ICG off time allowed for correcting these missed frames.