Atomic Grandfather Clock

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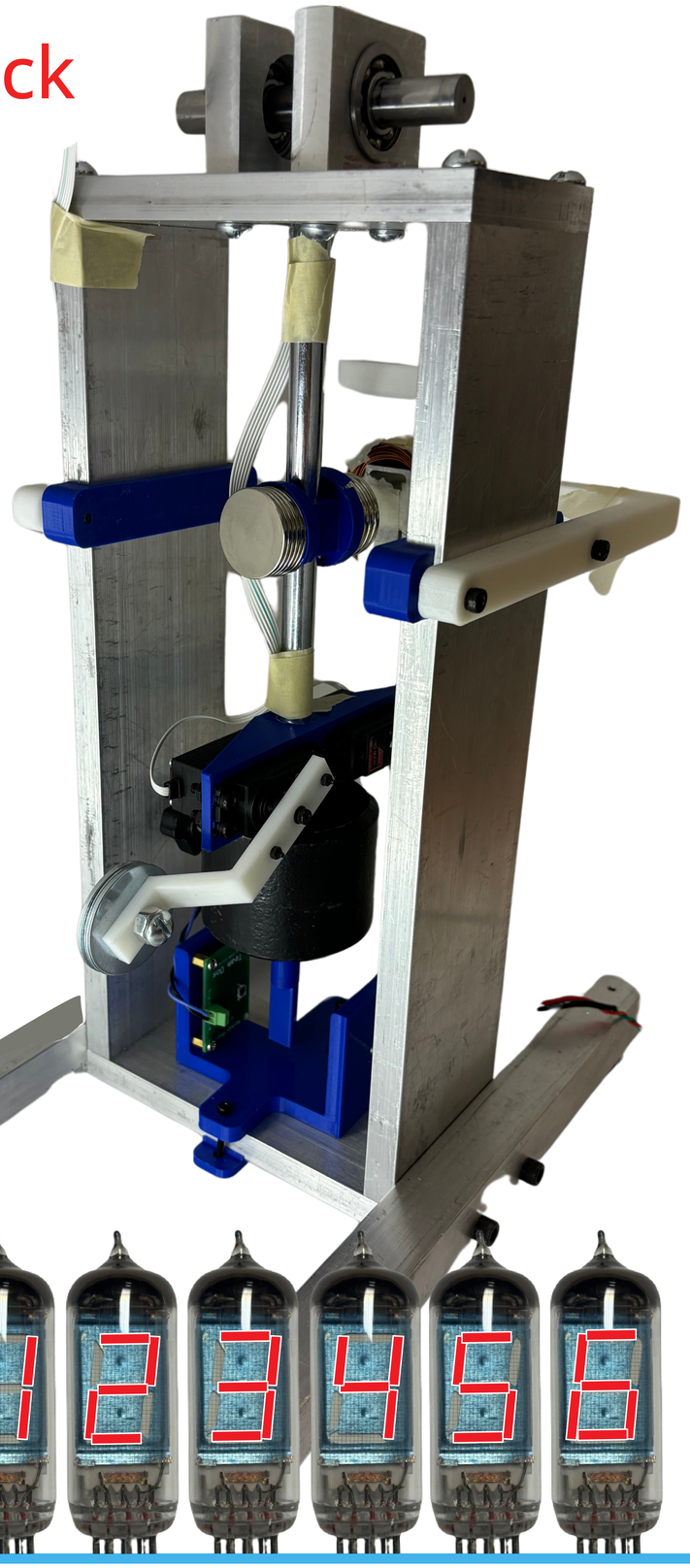
Team Dos

Pendulum Powered Clock to Accurately Tell Time



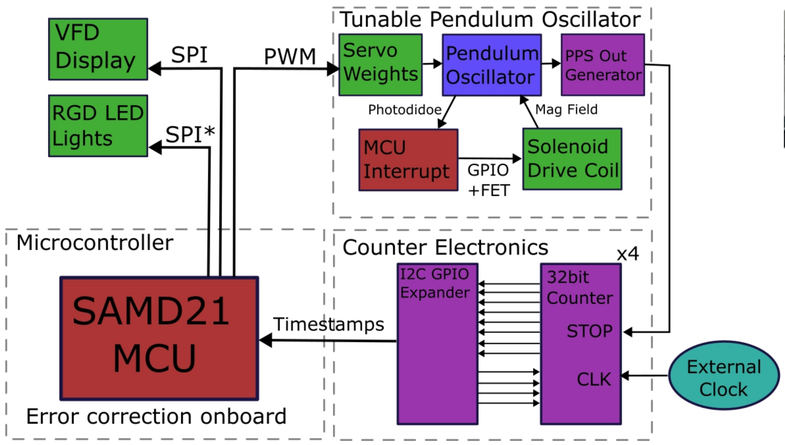
Abstract

A grandfather clock is reliant on the swing of a pendulum, which is susceptible to error. Our team has designed an atomic grandfather clock that has a mechanical pendulum that will self correct. This allows for accurate time keeping while maintaining the aesthetics and mechanics of an regular grandfather clock.

Features

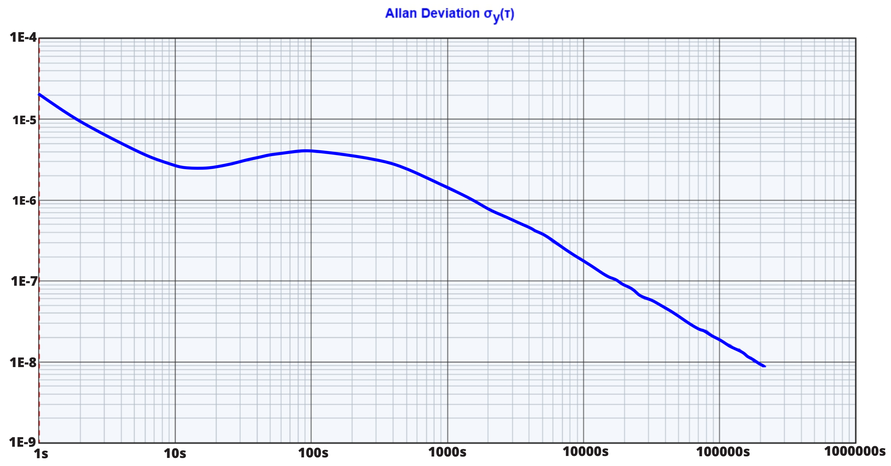
- 4-Layered SAMD21 Microcontroller Board
- Rubidium Atomic Clock Oscillator
- Retro styled Vacuum Fluorescent Displays (VFDs)
- Self-Correcting Center of Mass Pendulum
- User Interface w/ Buttons and Switches
- Power Distribution Board from Wall Outlet

Design



Accuracy and Stability

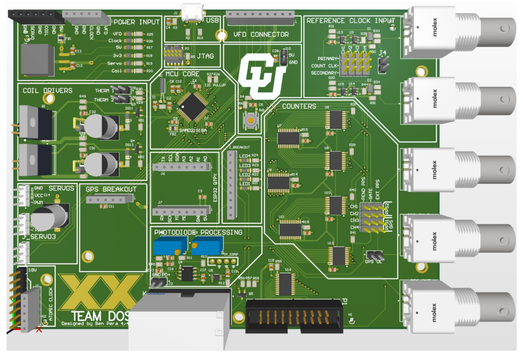
Accuracy refers to the deviation from the desired frequency. Stability refers to the loss of accuracy over time. Allan Deviation (ADEV) is a common standard used to measure the stability of a clock. Our goal is to obtain a stability of 100 us.



Takeaways

Designing iterating is the name of the game here. There was a heavy emphasis on electronic hardware design. Mistakes and errors are bound to happen as we attempt to create these boards. Knowing how to account for them is a skill we have grown to better assess risk as engineering students.

For example, while we had trouble getting our MCU board working at first, we learned from our mistakes and ended up with a board with all our modules that work as we intend it to.



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MICROCHIP

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