

Automatic Retrieval Media System (ARMS)

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Background

The New Mexico Tech (NMT) Skeen Library has thousands of DVDs that circulate. The DVDs have been stored in Ziotek carousels which are beginning to break and the new ARMS system will replace these.



Figure 1: The current DVD storage system at the NMT Skeen Library.

Objective

Design and manufacture an electromechanical DVD storage system within specifications. The system must be built with readily accessible mechanical and electrical parts and convenient for the library staff.

Requirements:

- Store 3000 discs
- Fit the library shelves (182cm x 52cm x 187cm)
- Easy to Use

Previous Work

Previous semesters set up two foundations that would be utilized for this semester:

- **Electrical Diagram.** Referenced in making the main Perf Board.
- **Disk Eject Prototype and Code.** The main objective is to integrate a Photointerrupter.

Progress

Main Board Design and Testing

One of our main tasks was designing and assembling the Main Circuit board on both a breadboard and a Perf Board while testing:

- Each component
- The wiring
- Frequency of:
 - Display
 - Keyboard
 - Stepper Motor

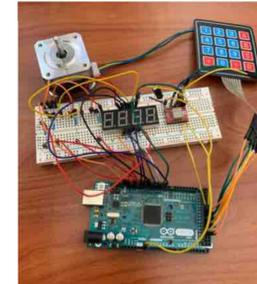


Figure 2: Breadboard wiring for main board

Disk Eject

Initial adjustments to the Disk Eject were made and continued through each testing phase:

- Currently, the carriage moves back and forth in a smooth motion.
- Servo Motor is a functioning arm, working with the arduino to eject disk after moving.

Only issue currently is the implementation of a Photointerrupter onto the carriage to be able to detect the disk to eject.

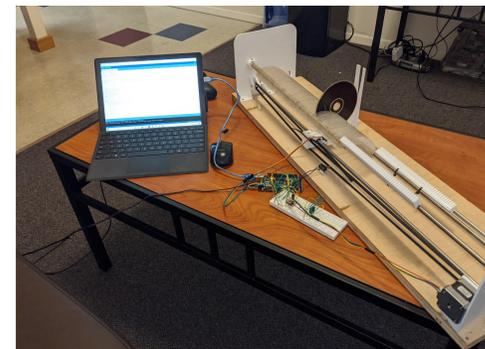


Figure 3: Setup for testing the Disk Eject motion of the prototype.

Arduino Coding

At the start of the semester, the team had little to no experience with Arduino. Each team member took time to learn arduino by working with and writing code for electrical components of the disk carousel system. Components with code written include:

- Keypad
- Display
- Stepper Motor
- Photointerrupter

Importance:

- The code for each component will be used to make a single arduino file for the main board and give us the necessary experience to design and write code for a secondary board.

Conclusions

The progress we have made is significant for constructing a future prototype. The main board design and testing will be used for wiring up the main Perf Board of the prototype. The Disk Eject project will directly carry over to the secondary board design and construction. A key result from the Disk Eject project was finding out that we need to implement the Photointerrupter onto the carriage. The arduino coding will be utilized in controlling both the main and secondary boards.

This semester we made several major decisions:

- Focused on physical lab work/testing over coding after first presentation.
- Chose to use a Perf Board rather than PCB.
- Chose to use wire wrapping over soldering for main board construction.

Future Work

- Refine casing design.
- Continue testing of the entire system to ensure that it operates consistently.
- Map secondary board.
- Wire wrap secondary board and test.

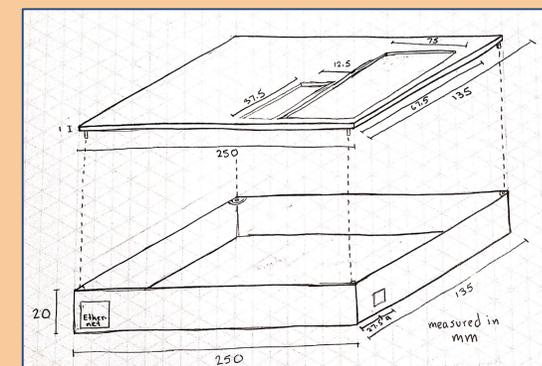


Figure 4: Sketch of housing for the main board.

Acknowledgements

NMT Skeen Library
Dr. David Cox (Sponser)
Mr. James Ruff (Advisor)
Michael Lin (Volunteer Help)