

Project Title: The Vinyl Guys

Team:

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Motivation:

Vinyl records have made a strong resurgence over the past couple of years, however, traditional turntables are clunky, difficult to set up, and just plain boring. Moreover, they tend to require manual operation, which can be frustrating when you're trying to switch between tracks while trying to sit down to relax to the music. As a vinyl nut absolutely obsessed with records, this project hits close to home, and comes with several key design features that I would prefer in a turntable of my own if given the opportunity to design and fabricate one.

Goals:

The primary goal is a working turntable that can play 12" and 7" vinyl records at both 33 RPM and 45 RPM speeds. Our design will make use of an out-of-box cartridge, needle and tonearm setup, affixed to our rotational motor controller that's remotely toggleable by the listener between the aforementioned speeds. We would also like our turntable to have auto-return functionality (automatically lifting and resetting the cartridge at the end of a record's side).

Methodology

Our first focus is constructing the turntable's body. This includes the chassis, or casing, the platter itself, on which the spinning record will sit, as well as the tone-arm—cartridge mechanism. High-end turntable snobs fuss over minutiae of cartridges and styluses, but that is not our focus here. The automatic functionality is far more interesting from an embedded systems perspective, and you will easily be able to swap out our components for better hardware as far as cartridges go.

In terms of the motor controller, our MVP should be able to play 12" and 7" records at different speeds (33 RPM and 45 RPM), as controlled by a potentiometer-based mechanism. Our next focus involves constructing partial auto-return functionality. When we use the word "partial", we mean the ability to lift the needle up and down, without moving it back to the rest position.

Our stretch goal would then be using a pair of servos or similar to construct a robotic arm that can auto-return the cartridge fully back to its starting position.

Once this functionality is nailed down, we can definitely program more and more interesting features. As a record enthusiast, I have no shortage of interesting turntable wants.

Potential Risks

The primary foreseeable safety issue involves the risk of damaging records or needles due to aggressive contact between the two. Paying strict attention to the contact point and potentially allowing some buffer slack could be helpful here and is something we will investigate. We will experiment with inexpensive records, which we have many of.

Testing & Evaluating Success

A successful turntable project would be the high-fidelity listening of an album's side, with auto-return (at least in some capacity) at the end of it. Success here is very easy to observe visually and audibly.

Deliverables

1. Functional spinning turntable
2. Speed control functionality
3. Auto-return functionality
4. Successful listening of Led Zeppelin's Houses of The Holy album, side 1 with auto-return