

Four Punch Prototyping

The first term of the project focused on developing the process to consistently punch all four screws out of the cartridge at one time.



Figure 2: Prototype two, one punch

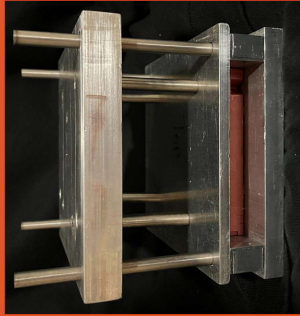


Figure 3: Prototype three, four punches

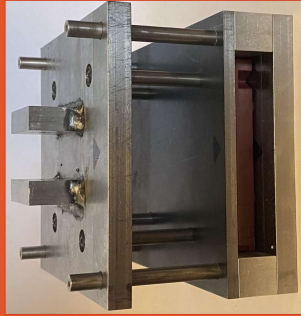


Figure 4: Manufactured punching plates



LTOpener

Why Recycle LTO Cartridges?

LTO cartridges are one of the most cost effective methods of high capacity data storage. When companies dispose of the cartridges, any confidential data must be destroyed too. Currently, the most common disposal method for LTO cartridges is incineration. The goal of this project and subsequent ones is to develop a method of separating the plastic shell from the rest of the cartridge. The polypropylene plastic that makes up shell can be recycled, reducing negative impacts on the environment.



Figure 1: Full build of LTO Cartridge Punching Mechanism seen from three views.

Punching Mechanism

During the second term of Capstone, our goal was to build a device capable orienting and processing LTO cartridges safely and efficiently.

To facilitate a horizontal punching action, a system was designed around a purchased rack and pinion. A horizontal punching method was chosen because it allows for the removal of punching debris and the use of gravity to move cartridge into and out of the punching mechanism.

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 Sponsor: Will Allen, Iron Mountain Inc.



Figure 5: LTO Cartridge. Right side shows the top, the left side shows the locations of the screws that are punched out.

Loading Mechanism

- The loading mechanism was developed for the safety and reliability of LTO Cartridge recycling.
- A gate forces cartridges to be inserted in one orientation based on the geometry of the cartridges.
- The loading mechanism holds five cartridges. A pushing block inserts one cartridge at a time into the chute.
- The support structure is built out of 80/20 aluminum, and can secure to a wood housing made for the loading mechanism.



Figure 6: Loading Mechanism