Team 65292C's TI submission

Our names are Adit Paul and Dillon Mehta. Our Texas Instruments online challenge project is on a 2012 Lenovo ThinkPad disk drive. The model number is GT50N. We decided to do this project on a disk drive because we were watching a DVD movie and we wondered how the computer reads the DVD. Before we decided to take the disk drive apart, we wanted to learn a little bit more about our project.

We learned that a DVD has grooves in it. The pits are zeroes and the flat area represents one (Binary), the disk reader has a laser that is able to read these grooves via laser. The flat portion reflects the light back to the photoelectric cell, while the grove does not reflect light. The computer then interprets this data as ones and zeros. There are multiple types of DVDs each using a different kind of laser. A disk drive is read by infrared light, a DVD is read in red light, and a blue-ray is read by blue light. Blue-ray contains more data (25GB) because the wavelength of blue light is much smaller than infrared and red light. It allows you to have more pits because the ray is much more precise. DVD has progressed over the years from only being able to hold 0.7GBs to 25GBs.We took the covering over the disk drive and we found an interfacing board and the place where a DVD sits. After looking closer at the interfacing board we found components from Texas Instruments, Panasonic, and Winbond. Under the motor, we found the motor diver made by Nidec.

After that we found out that the Winbond chip (Model #25Q16CVSIG) is a serial flash chip that uses SPI interface and utilizes NAND flash. The Winbond chip has 16 megabits on it and uses 3V. The Panasonic chip is an IC circuit that can act as an amplifier, oscillator, and even computer memory. In our case, the Panasonic chip communicates with the laser, by reading and writing on the disk. The Nidec Chip is a motor driver. Motor Drivers are used to amplifying power to the motors. They also run the motors. After looking closer at the TI chip we found out that it operates a small stepper motor which is connected to a leadscrew. The leadscrew moves the laser back and forth over the surface of the CD. After identifying the chips that we found, we dug deeper into the disk drive and we found the mechanisms that move the laser horizontally. This was the TI chip that we previously had found on the circuit board. We also got a closer look at the Nidec motor driver and motor. We learned a lot about how computers read DVDs, and the next time we watch a movie we won't have to wonder so much. We got a really good look at technology from the past and using that we can shape a better future.

The disk drive before opening it. Model #GT50N

This is the disk drive with the cover of. We had to remove the rails because the disk drive was not powered. At the top of the picture the interfacing board.


The interfacing board with the Panasonic chip, Texas Instruments Chip, Winbond, and in the top left corner there is the SATA II interface.
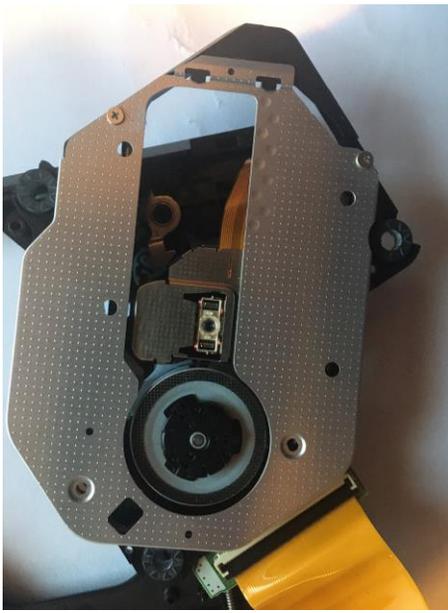
This is a picture of the motor and the laser.

Panasonic Chip Model #MN103SK8GRA. It communicates with the laser.
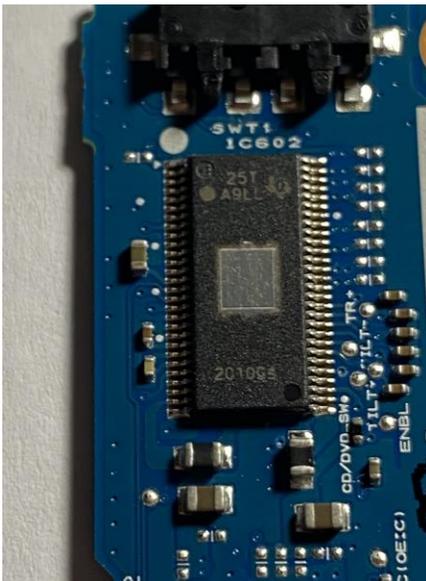
Texas Instruments Chip Model #25I A9LL. It interfaces with the leadscrew that is used to move the laser across the disc.
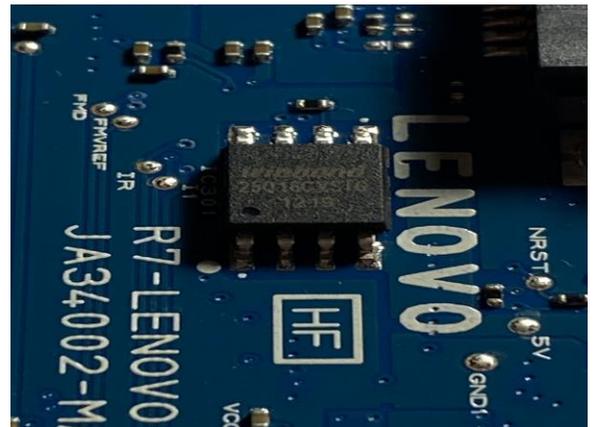
Winbond Chip Model #25016CVSIG. It stores all the code that is needed to run the disc.
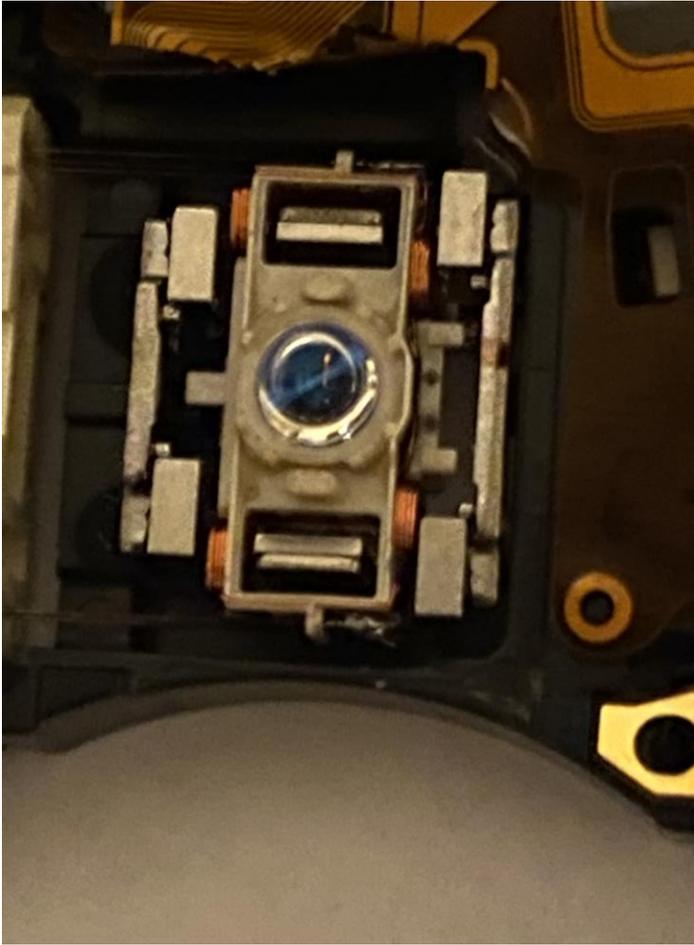
A close up of the laser which is used to read and write on a disc. It is managed by the Panasonic chip.

The Nidec motor and motor driver. It moves the disc in a circle so the laser can access all parts of it. It is connected to the interfacing board. It is also connected to the button that opens and closes the disc tray.
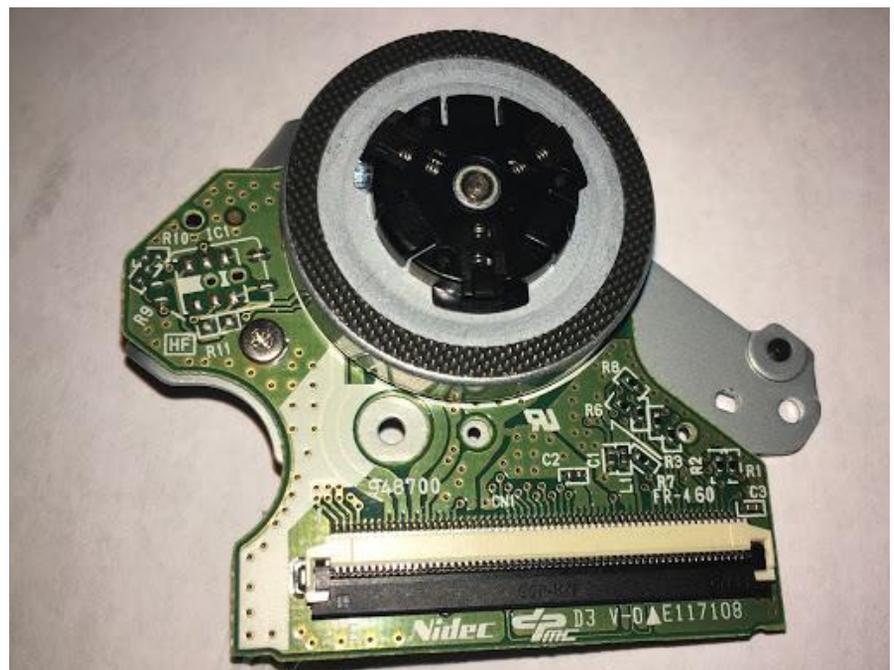
This is the leadscrew that moves the laser. It is managed by the TI chip.

Us with our mentor, Mrs.Willams during Tower Takeover. Dillon is in the red shirt, and Adit is in the black hoodie.