Monitoring of Diamond Polishing Process

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Our Purpose
To create a device that monitors the diamond polishing process by measuring, displaying, and saving frequency as well as using an accelerometer to measure the balance of the wheel and setting off an alarm when unbalanced.

Diamond Polishing
So why do diamonds such as this need to be made? They can be used as a circuit element due to their high conductivity, durability, and ability to operate at higher voltages.

In order to polish the diamonds, a certain process must be followed. Diamond powder placed on wheel, the diamond glued onto arm and is held against spinning cast iron wheel.

Implementation
In order to measure the frequency, a microphone picks up the analog signal at frequencies up to 17 kHz. This needs to be amplified by a designed microphone amplifier, which will make the signal readable.

Additionally, an Arduino will measure frequency from microphone and display it on a 7-segment digital display. The measured data will be saved as a .txt file by Cool Term, a third party software.

Finally, an accelerometer is attached to the outside of the arm that will measure the balance by detecting the vibration. The Arduino is programmed to set off alarm when the vibration of the wheel reaches a certain threshold.

Results
The microphone picked up the frequencies emitted by the diamond contacting the wheel. This frequency was measured successfully and output onto the instantaneous display to be read by the sponsor. The data could also be saved in a .txt file. Finally, the accelerometer triggered the alarm when the threshold was reached.

Final Budget

Conclusion
With the measuring device constructed, the sponsor will more easily be able to capture the data involved in the diamond polishing process. With these stored values, new experiments may be conducted to observe the surface properties of the diamond. This tool will simplify the research process for our sponsor in the long run.