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Electronics Online Challenge Sponsored by Texas Instruments

Device - Equity by La Crosse Blue LED Digital Desktop Alarm Clock

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Final Summary Report

I decided to use the Equity by La Crosse Blue LED Digital Desktop Alarm Clock for this challenge. I chose this because it is a very cheap device that I got from Walmart for around 10 USD, so if something were to break, I would not lose sleep over it. Also because a digital alarm clock may be simple in daily use, but can still be complex in terms of electronics.

The main component inside was the circuit board, which had 6 diodes, 11 resistors, 1 transistor, 1 Jumper, 4 capacitors and the integrated circuit. All of the other components were connected to the circuit board. The other components consisted of the LED screen that displays the time, the buttons that are used to set the time and alarm, the buzzer and a hidden snooze button separate from the rest, a battery connector for a 9 volt battery, which would serve as a backup power source to save the time settings in case it were to lose power via the main power cable, and the transformer that connected the power cable and the circuit board. None of them were TI components. Given this was a cheap digital clock, I am not surprised because if they can cut corners with lower quality components, I am sure they would.

Transformers are used in alternating current circuits and trade voltage for current without affecting total electrical power. There are 4 diodes after this connection and this is called a rectifier circuit, which brings the 120 volts received to 9 volts ("What is the purpose of a transformer?", 2019). The circuit board is itself a component, but a complex one at that, so I wanted to explain what some of the devices on the circuit board do. Those marked with an R and then a number are resistors, which limit the flow of current. Those marked with a D are diodes, which allow flow of current in one direction. Those marked with a C are capacitors, which store electric charge. Those marked with Q were transistors, which are switches. Those marked with J are Jumpers and connect two circuit paths if there is a gap. The integrated Circuit is covered by the blob of black resin, and acts as a circuit on a chip, which in this case controls the LED's that display the time ("Circuit Board Parts – The Most Comprehensive Introduction Is Here", n.d.).

What I learned from this experiment is that it's worth taking a look at any device, because you may be surprised at what you'll find. I had the option of taking apart an old computer, but I chose an alarm clock, because I already know what's in a computer, but didn't really know what was in an alarm clock. Now I know and even learned some things, like what a transformer and rectifier circuit was and how certain components are utilized.

Parts List

- Circuit Board
 - 6 Diodes
 - 11 Resistors
 - 1 Transistor
 - 1 Jumper
 - 4 Capacitors
 - Integrated Circuit
- LED Digital Display
- Main Buttons
- Buzzer
- Separate Button
- Battery Connector
- Transformer

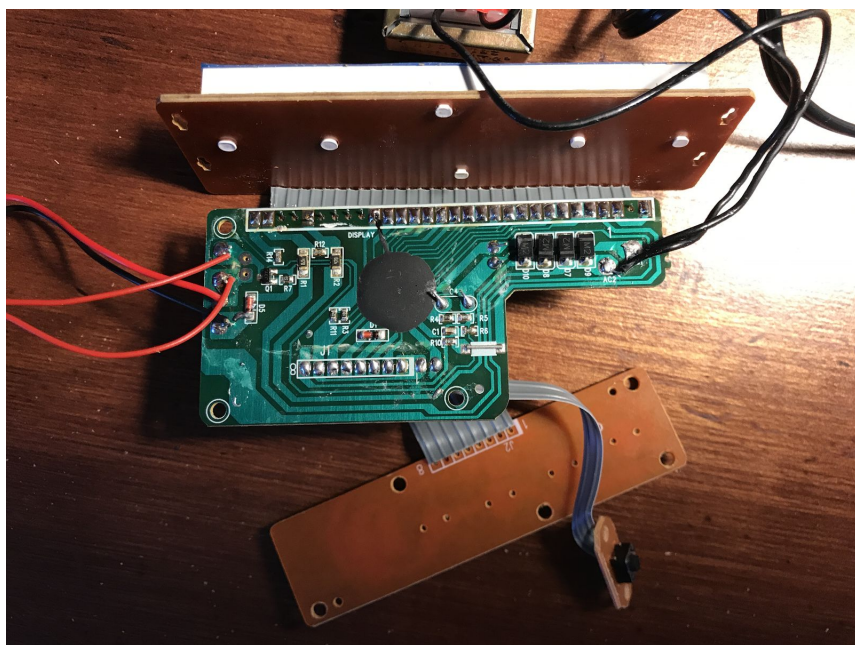
Pictures



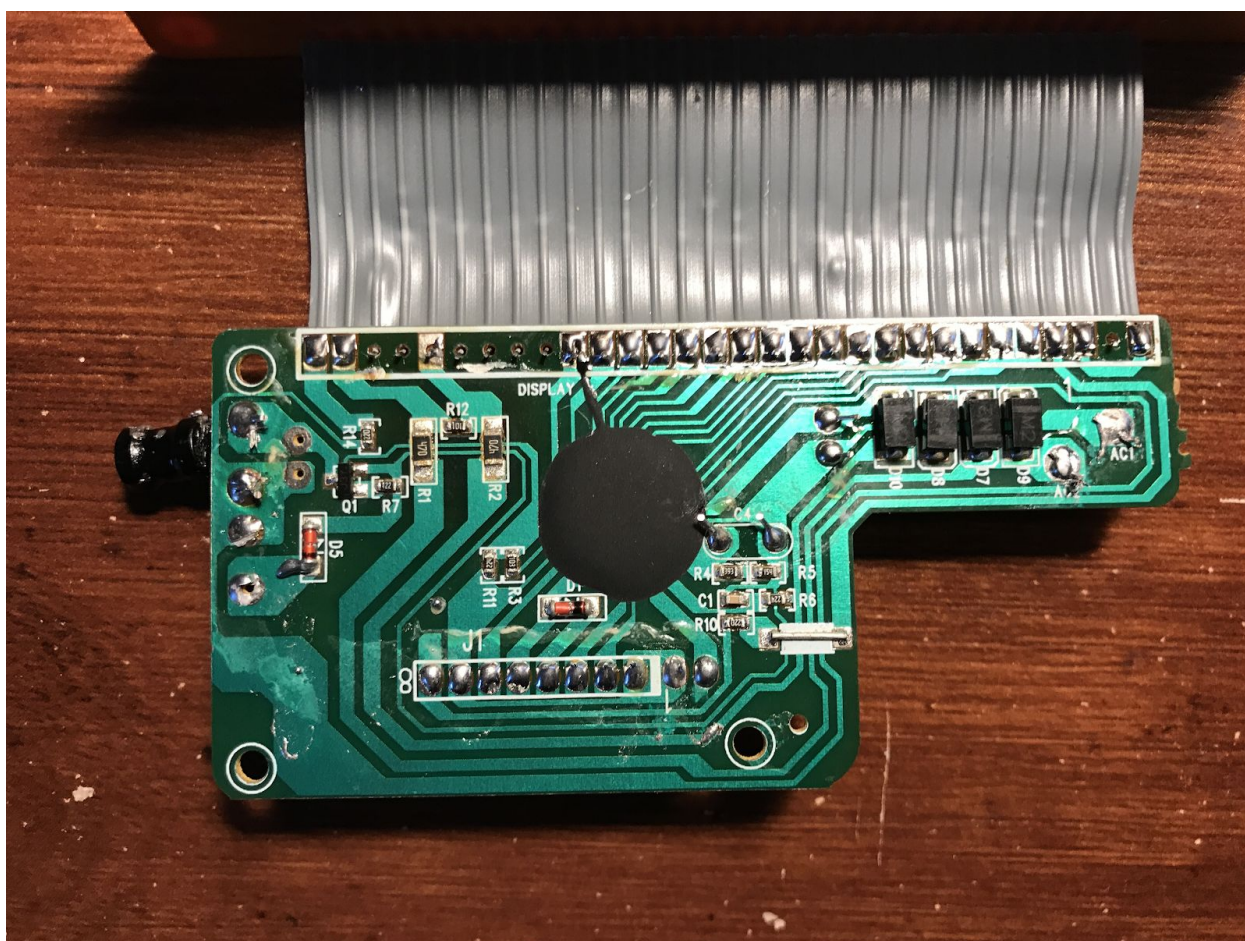
Front View of Device



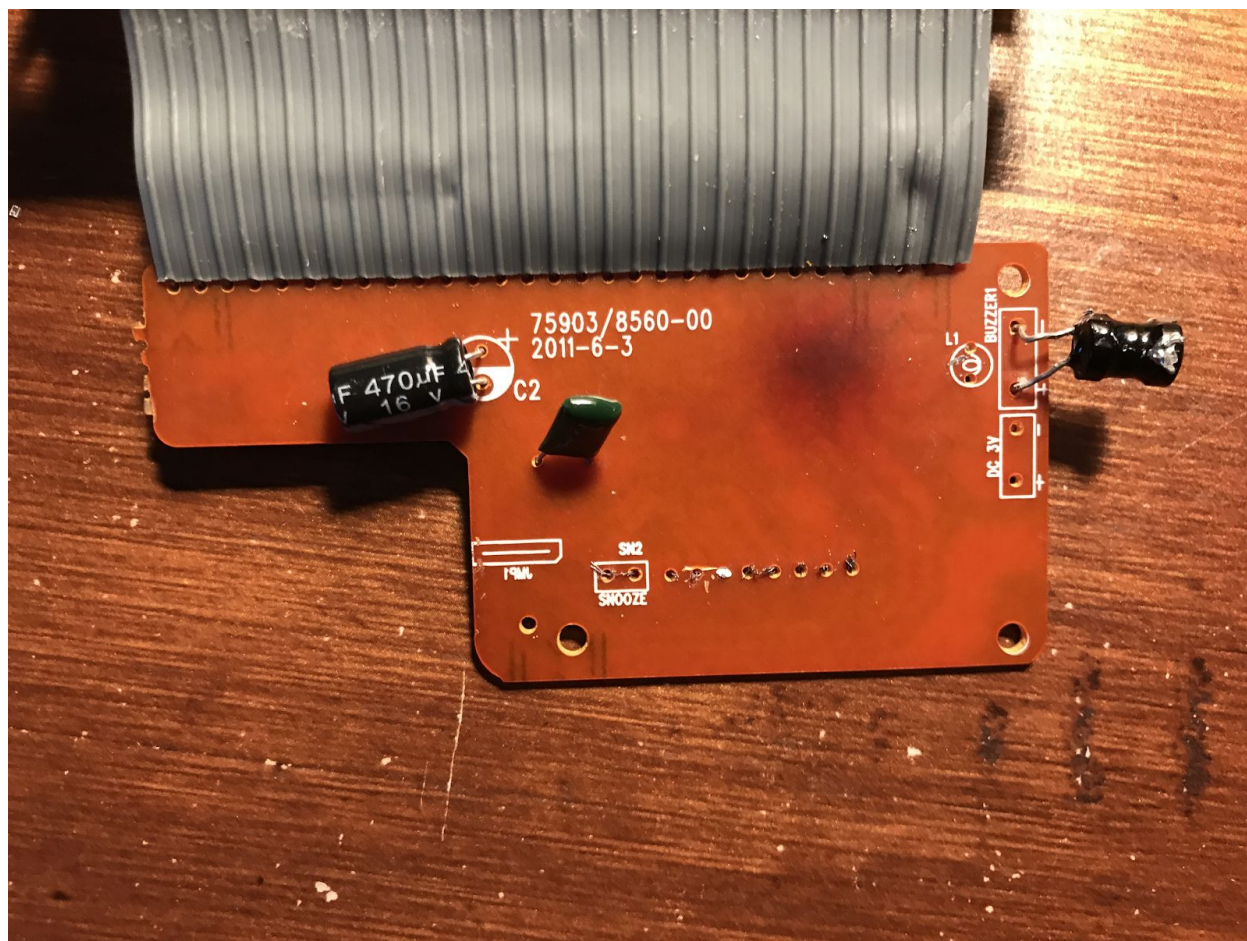
Bottom View of Device



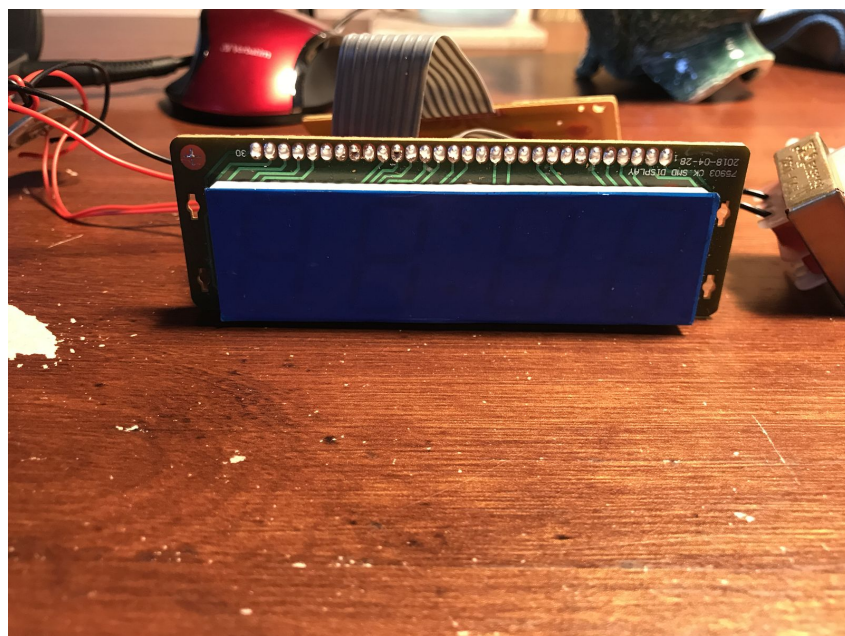
Circuit Board



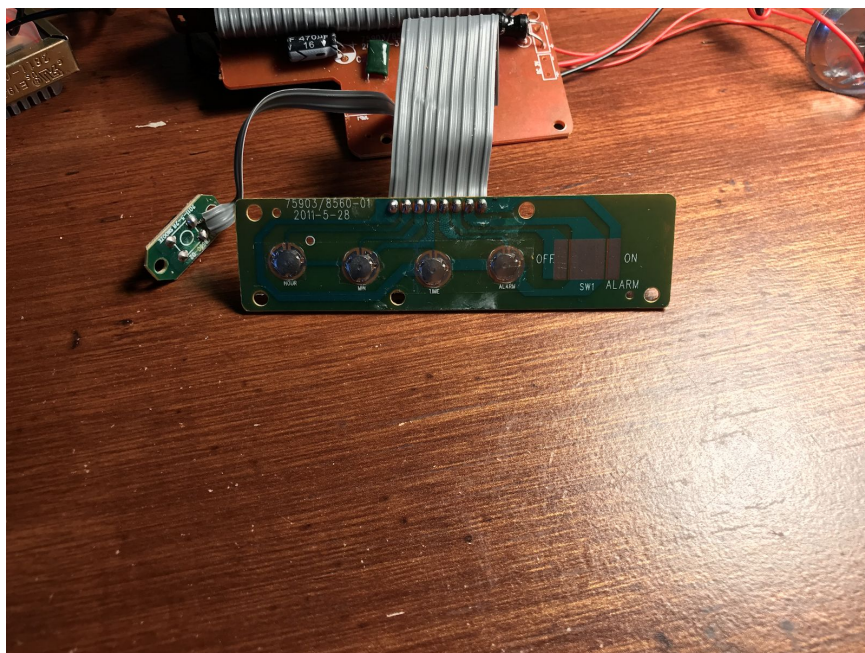
Circuit Board (closer)



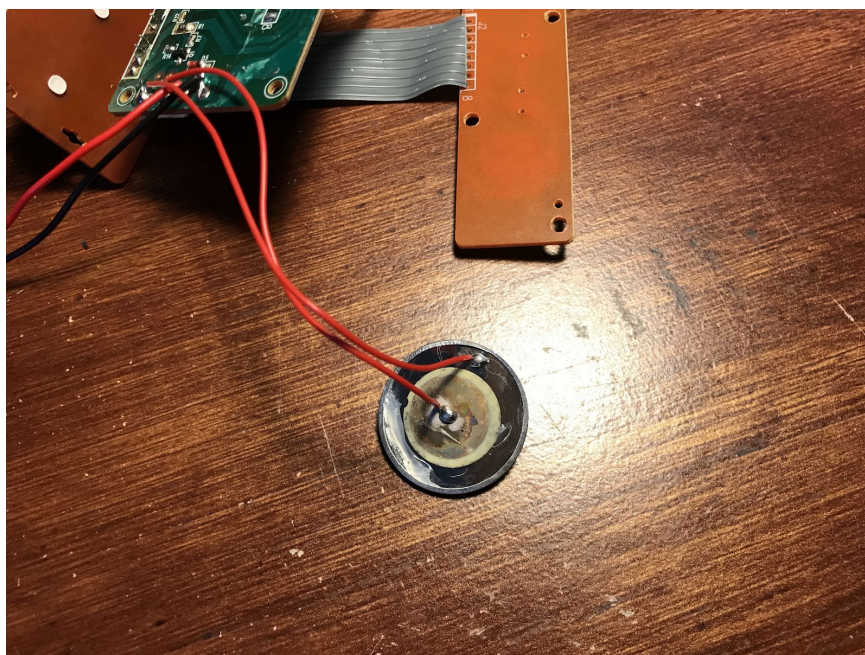
Circuit Board (Rear)



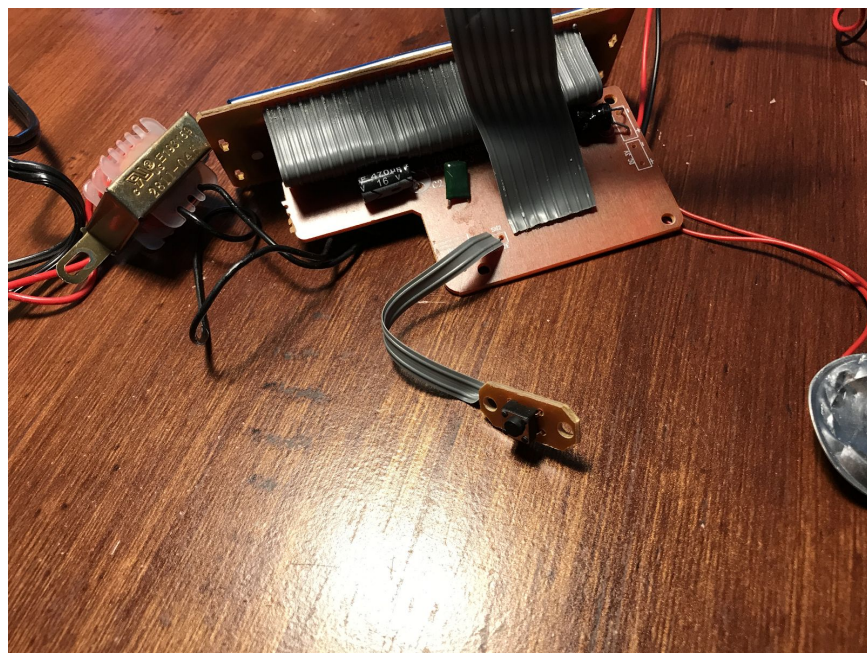
LED Digital Display



Main Buttons



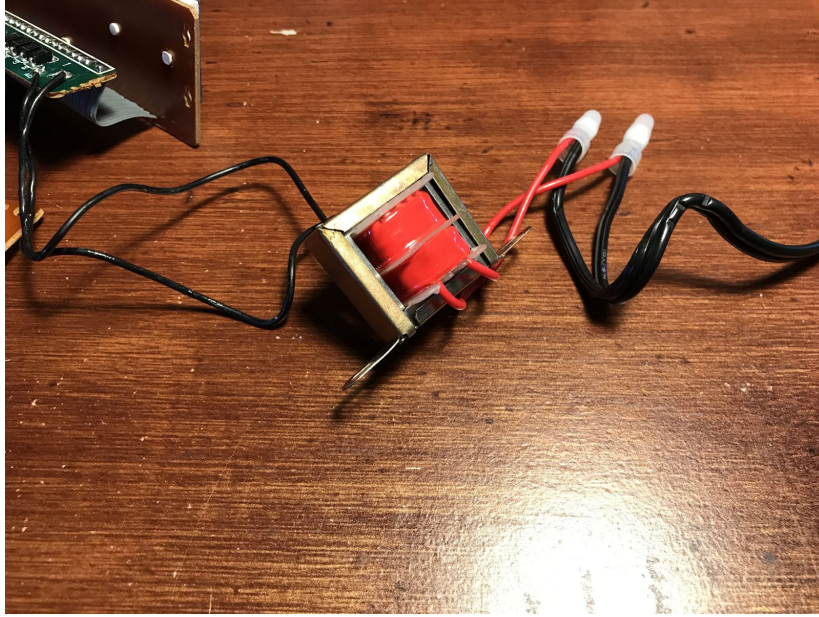
Buzzer



Snooze Button



9 Volt Battery Connector



Transformer

References

Circuit Board Parts - The Most Comprehensive Introduction Is Here. (2020, December 03). Retrieved December 07, 2020, from <https://www.wellpcb.com/special/circuit-board-parts.html>

Posted by Power Temp Systems, I. (2020, July 22). What is the purpose of a transformer? Retrieved December 07, 2020, from <https://powertemp.com/what-is-the-purpose-of-a-transformer/>