



Team Riders

71832 P

Project:

Reverse engineering

Country:

Paraguay, Lambaré

Members:

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Academy:

“Academia Pueblo”

Device:

Dvd reader

Questions:

- Why a dvd reader?
Because is a thing that everyone haves in house, but only a few knows how it works.
- Why were we careful with the capacitors?
Because they may keep charge inside them.
- Why do we wear glasses?
We are being careful if one of the screws shoots out or if any component starts to spark

1. Dvd reader

For this project, we used one dvd reader from a computer company called "Satellite". The dvd reader is AC 90 – 240 Volts, 50 - 60 Hertz and 15 Watts.



We first started to remove the screws of the carcass and remove it, inside of the dvd reader we found we found 4 important parts:

- The power supply
- A digital plate
- The disk reader
- The circuit that controls the lights that are in the frontal part of the dvd reader

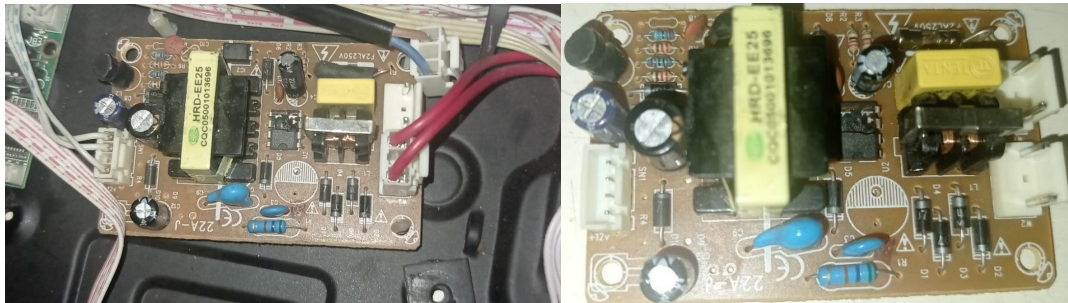
There are also 2 more parts but they are simple: the switch and the wiring that connects one part to another.

2. Functions, components:

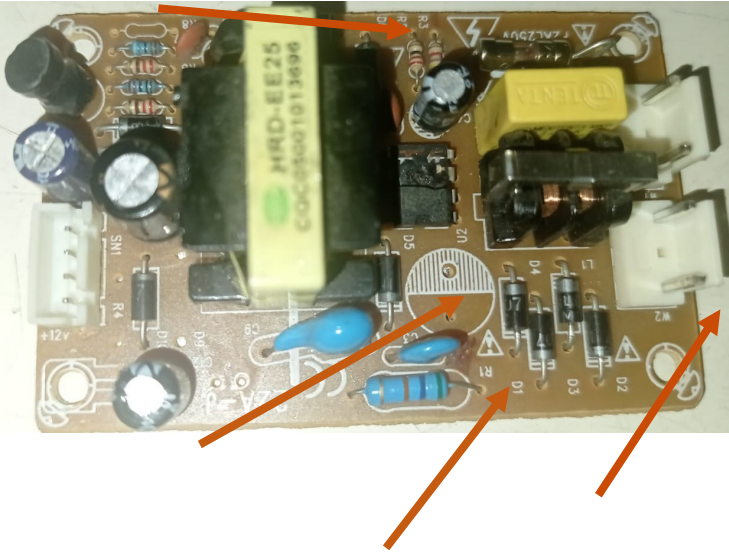
We are going now to explain what the function of the parts are, the components that use and after all the parts explanation, we are going to point for what every component is used

The power supply: receives the 220 input voltage and converts it into different lowered voltages for the circuit to work. The 220 input voltage varies depending on the country. The components that were used in the power supply are:

- Resistors
- Diodes
- Capacitors (electrolytic)
- Capacitors (ceramic)
- A fuse
- Transformer coils
- Integrated circuits

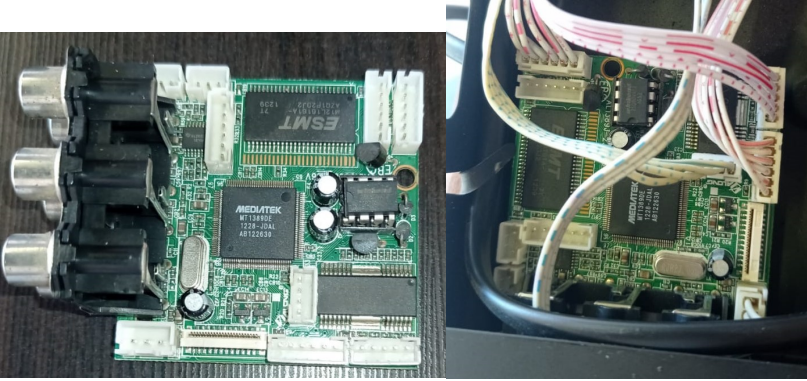


We noticed that the dvd reader didn't had 4 components (2 capacitors, a resistor and a diode), so when i tried to turn it on, it sparked and broke down

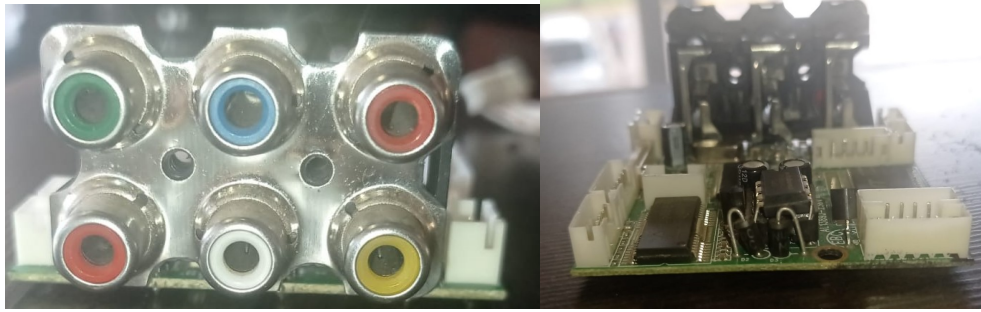


Digital plate: It's like a small computer with memory circuit that has programmed what the dvd reader needs to know to work (the figure of the mark, what kind of dvds can be read, the connections for the tv or computer, and so on). The components that were used in the digital plate were:

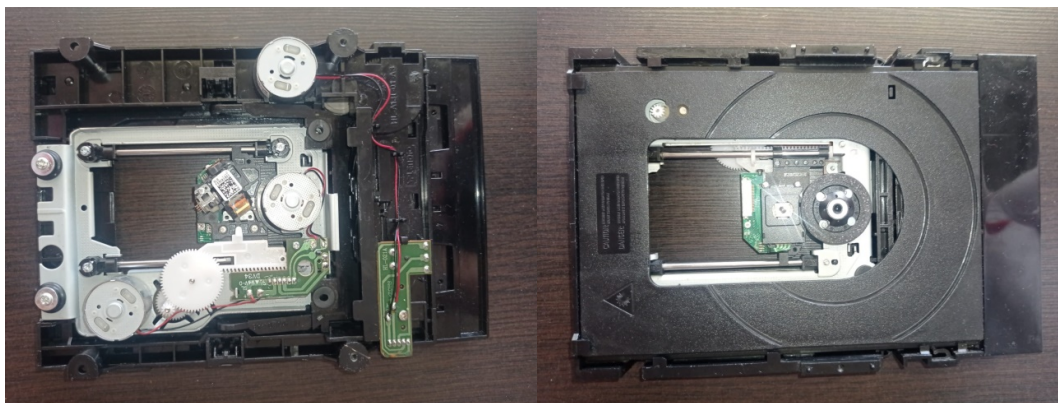
- Integrated circuits
- Capacitors (electrolytic)
- Transistors
- Diodes
- A heat sink



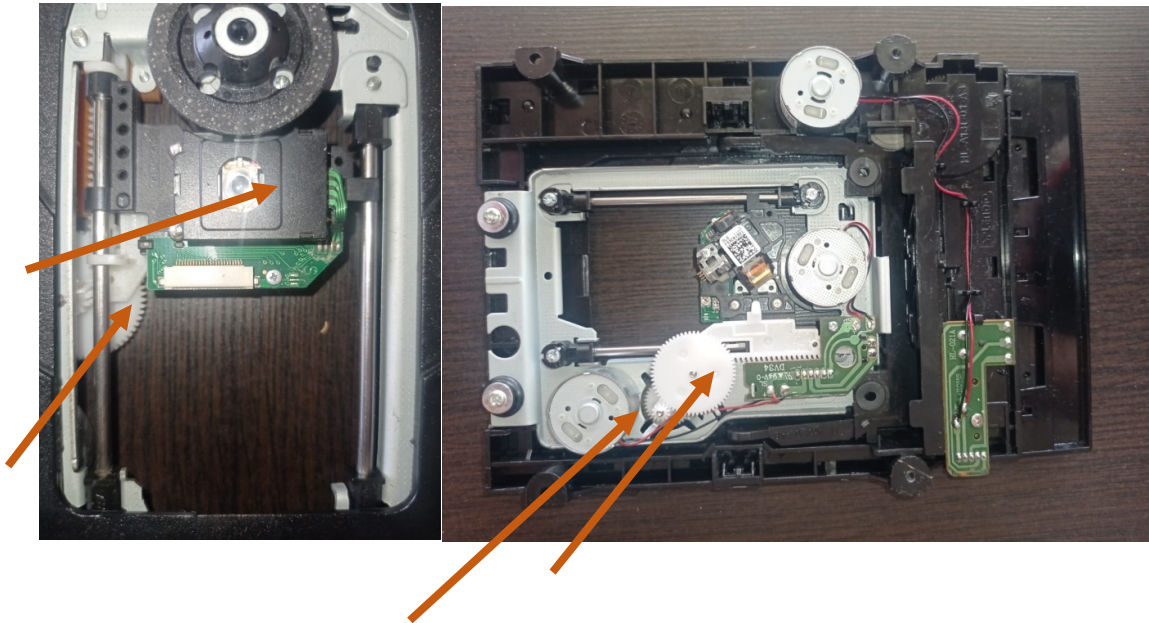
A curiosity of the digital plate is that it is really sensitive, so it is the part that most problems suffer (components burn, the pins of the integrated circuits get unsoldered and so on). We noticed that this part had all his components.



The disk reader: as its name implies, the disk reader has the task of read with the lens and give the information to the digital plate (if there's a disk, if there isn't a disk, what kind of format is the disk, if its illegible and so on).



The disk reader first opens to receive the disk, after inside the part, a motor moves the reader back and forth with respect to the disc, to read its information and to be able to project it on a screen.



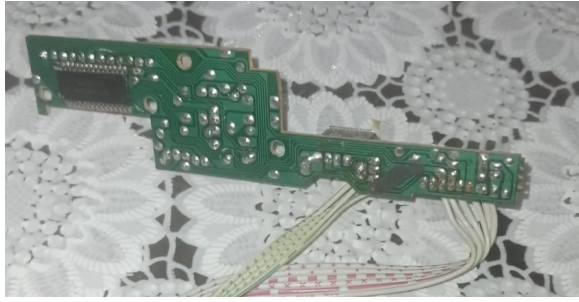
In the disk reader we just found motors.

The front lights circuit plate: this is the part with which we interact, it has buttons that when pressed send the information to the digital board to be executed. It also has a USB input to connect a device in the dvd reader.



The components that we found in this part were:

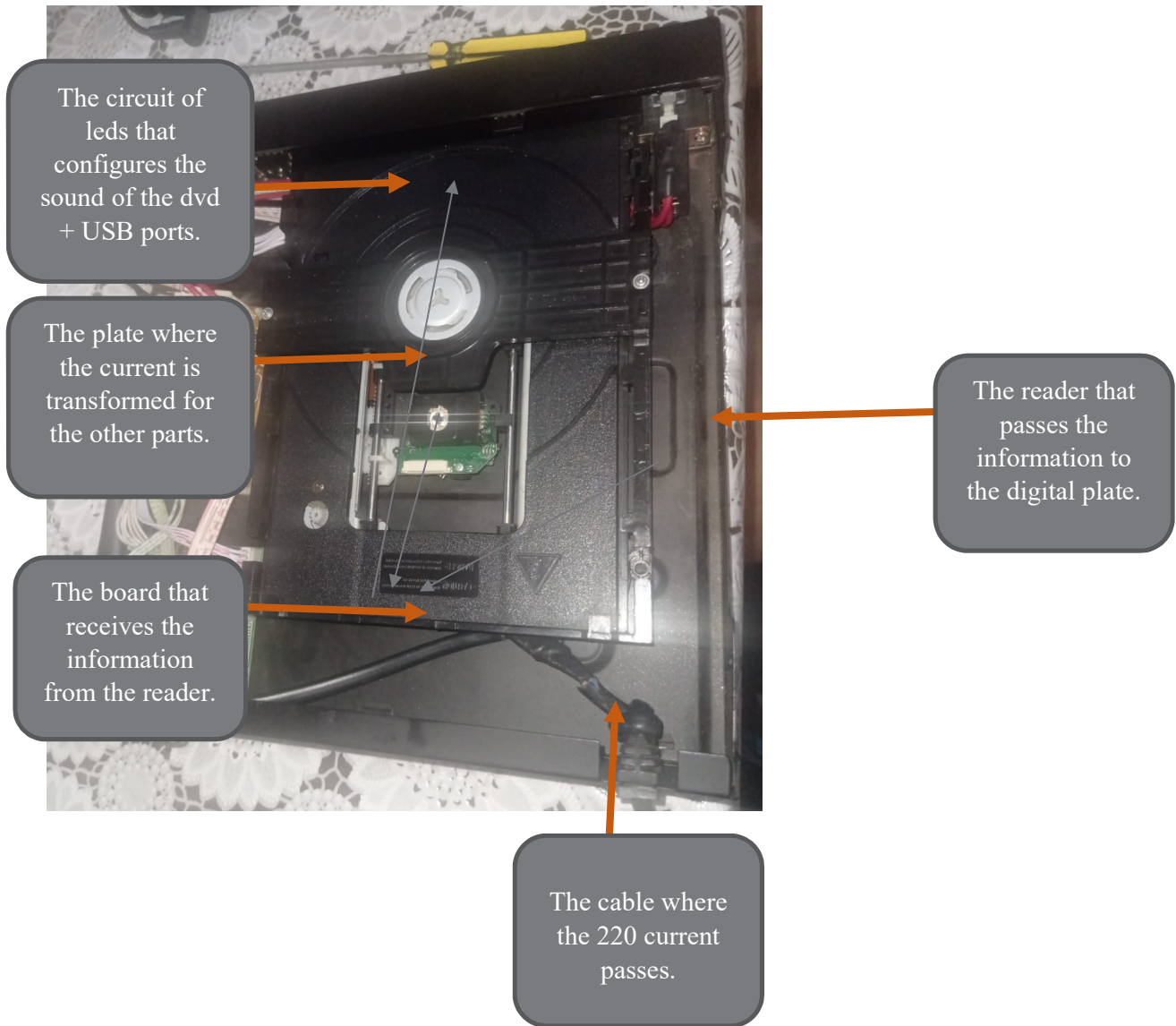
- Led diodes
- Capacitors (electrolytic)
- Resistors
- A transistor
- Capacitors (ceramic)
- An integrated circuit
- One USB input



In summary

First the current goes to the power board that converts the 220 current into different direct currents that go to the other parts, then it goes to the digital board, in which the information is first taken out if there is a disk or not, type of format and so on.

Then it goes to the disk reader, which goes from front to back with the lens to read all the information on the disk if it is readable, to later be transferred to a monitor. and finally there is the light plate that even without having potentiometers regulate things like: the volume of the dvd content, advance or delay the content and so on.



Components: functions and reuse

Diodes*: it's a semiconductor made up of an n junction and a p junction. has 2 functions with respect to its polarization (direction in which the current goes). in the direct one it lets the current pass, in the reverse it does resistance work, letting an almost non-existent current pass. They are usually made of silicon, but there are also made of germanium.



Led diodes*: it's the same as a normal diode, but in this case it emits light in its forward polarization, and not in the reverse (In the direct the positive is in the anode and the negative in the cathode, while in the reverse it is the other way around).



The diodes can be reused in amplifiers, Televisions, hot plates, ovens, organs and so on.

Integrated circuits*: Integrated circuits are components that each pin has its gate (and, or, negation), or its internal connection with another pin that has the gate, it works like a mini computer, in which the gates send signals in zeros and ones (code binary) which is later converted into information and/or orders.



The integrated circuits can be reused in devices that require a kind of repeater, which must retain information, and so on, but you have to be careful, each integrated circuit serves in a different way

Capacitors (electrolytic) *: The capacitor is a component that retains energy through an electric field inside it, normally it has polarization. It usually also has information on how many volts it supports, its capacitance (in farads) and so on.



Capacitors (ceramic) *: it has the same function as an electrolytic capacitor but in this case the ceramic one don't have a polarization and have's sheets on each terminal, while the electrolytic has a sheet with a liquid.



The capacitors could be used in television, computers and so on.

Fuses*: This component serves to safeguard the components or a fire, so if there is an overload the fuse breaks and not the rest of the components.



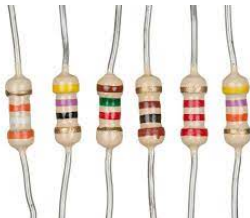
It depends of the kind of fuse do you have to reuse, it also depends on the needs of the device.

Transformer coils*: the transformer it's a component that creates electromagnetic field in which energy is stored, is transformed into a reduced current (lower voltage)



It can be used in ovens, amplifiers, radios and so on

Resistors*: it is a component that opposes the electric current, it has a color code that determines its value in ohms, they are usually made of carbon, ceramic, and so on



This component is everywhere, so it's easy to reuse, but be careful with the value (code of colors)

Transistors*: consist in three parts: the base, emitter and collector. Performs functions of amplifier, oscillator, switch or rectifier. One fact of the transistor is that you can regulate the current that pass by putting more or less current in the base.



The transistor it's in all devices which means that it's easy to reuse.

Heat sinks: It has the function of transporting heat from a component to a coolant, almost all electronic devices usually have it, so it is easy to reuse



USB ports: It is a port for USB cables, they are connected and can have two functions: charging or transferring information.



This can be used in computers, laptops, and their similar.

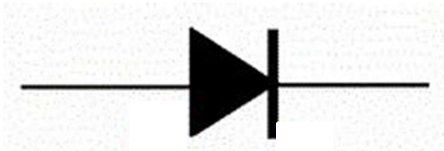
Motors: The motor is a component that rotates under a current signal. depends on the brand its revolutions per minute, amount of energy consumed and so on.



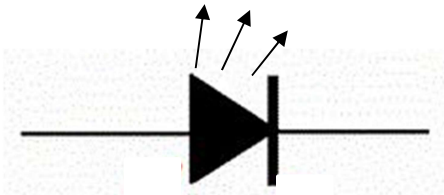
The kind of motors I found in the dvd player could be reused in toys that shoot darts to give more speed and force to the projectile

* **Observation:** these components have their technical drawing (this helps if you want to make a drawing about a circuit and add them):

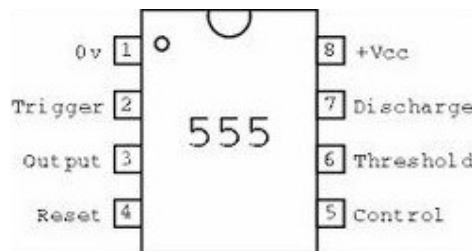
- **Diodes:**



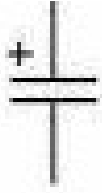
- **Led diodes:** it's the same as a



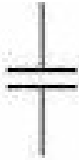
- **Integrated circuits:**



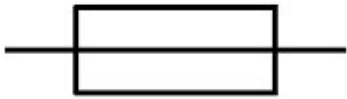
- **Capacitors (electrolytic):**



- Capacitors (ceramic):



- Fuses:



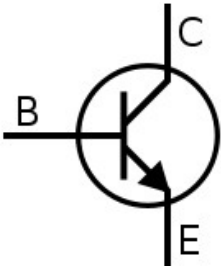
- Transformer coils:



- Resistors:



- Transistors:



Thanks for reading!!
Team Riders