Electronics online challenge

The device I disassembled was an old VCR player, I selected it because it was easy to come by and large enough that there would be a lot of components. Inside the device, I found numerous capacitors and resistors, several integrated circuits, and an operational amplifier. None of the components were manufactured by TI.

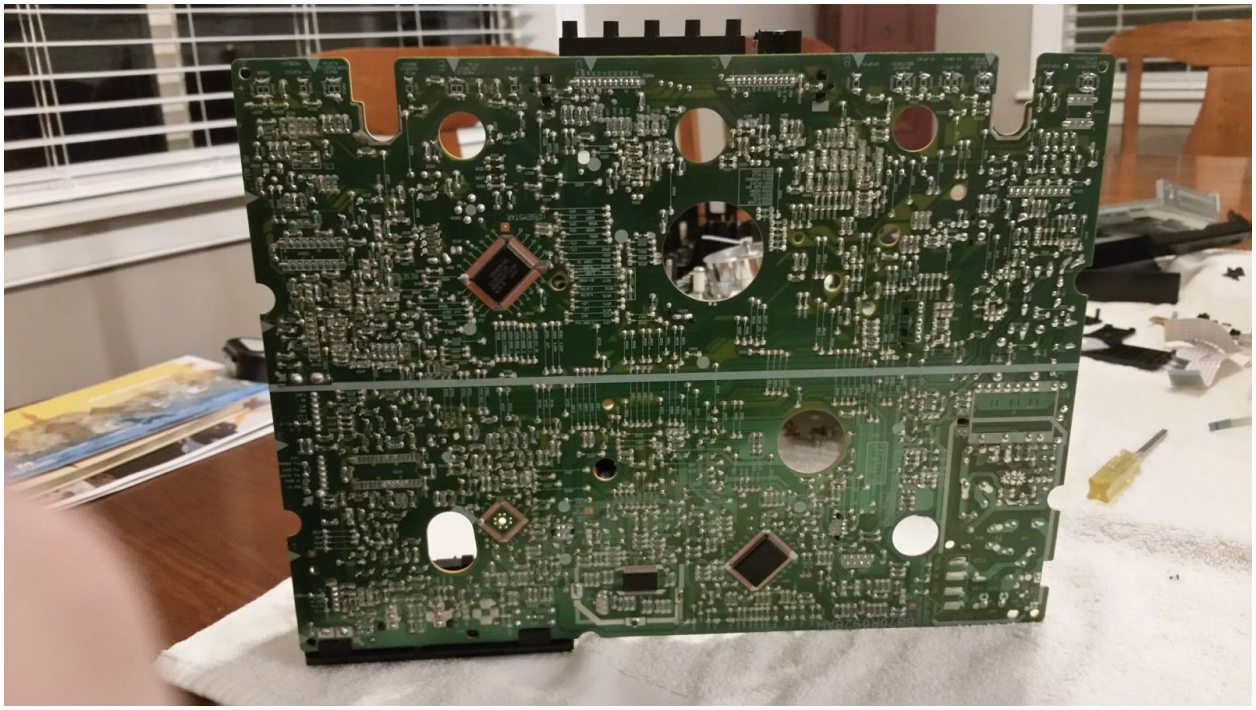
In electronic circuits, a capacitor is used to block direct current while allowing alternating current to pass. Capacitors are used for other systems as well: In analog filter networks, it smooths the output of power supplies; in resonant circuits they tune radios to particular frequencies; and in electric power transmission systems they stabilize voltage and power flow. A capacitor works by storing energy in the form of an electrostatic field between two or more separated conductors. In the case of the vcr player, they served to block direct current and let alternating current pass through.

Resistors are passive components that use electrical resistance as a circuit element to restrict the flow of electrons through a circuit. They are most commonly used to reduce current flow, adjust signal levels, divide voltages, bias active elements, and terminate transmission lines. A resistor simply reduces the current by a precise amount, and this amount is indicated by colored bands on the resistor. In the vcr, there were several dozen resistors, and it appears that they most of them worked to reduce current flow, divide voltages, and bias active elements.

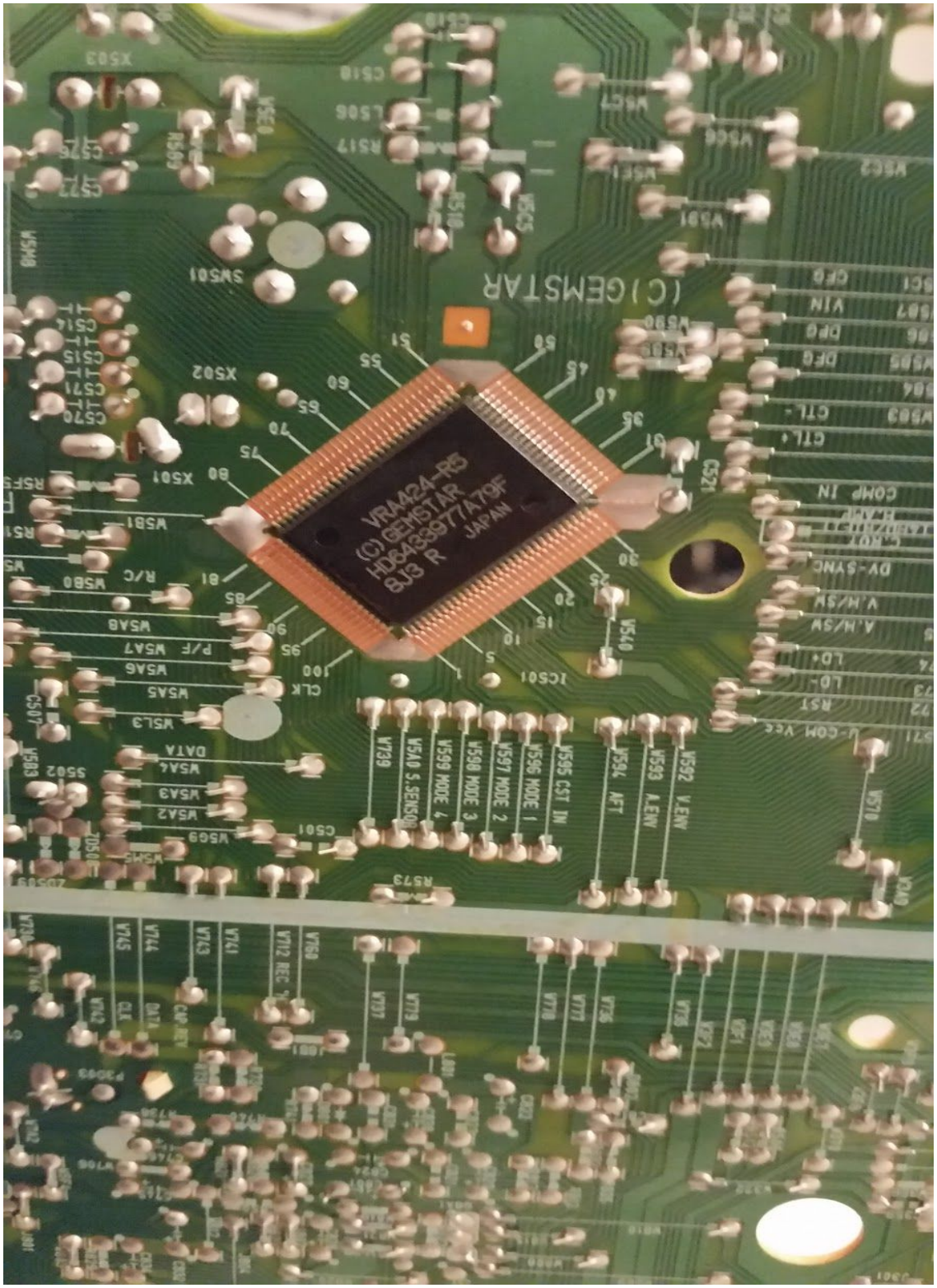
An integrated circuit is a semiconductor wafer which holds thousands of tiny resistors, capacitors, and transistors. An integrated circuit can be used as an amplifier, oscillator, timer, counter, computer memory, or microprocessor. They can be categorized as either linear or digital, depending on the intended application. The ic's into the vcr player were probably digital chips, operating at only a few defined states or levels, unlike linear chips, which operate over a continuous range of signal amplitudes. The vcr's ic's likely functioned as microprocessors or system memory.

An operational amplifier is a linear device that has all the necessary properties for near ideal DC amplification; and therefore they are used in signal conditioning, filtering, and mathematical operations. Operational amplifiers can amplify a current or a voltage, and yield a high gain. They are composed of transistors, resistors, diodes, junction gate field effect transistors (JFETS), and one capacitor. In the vcr, the operational amplifier was used for signal amplification.

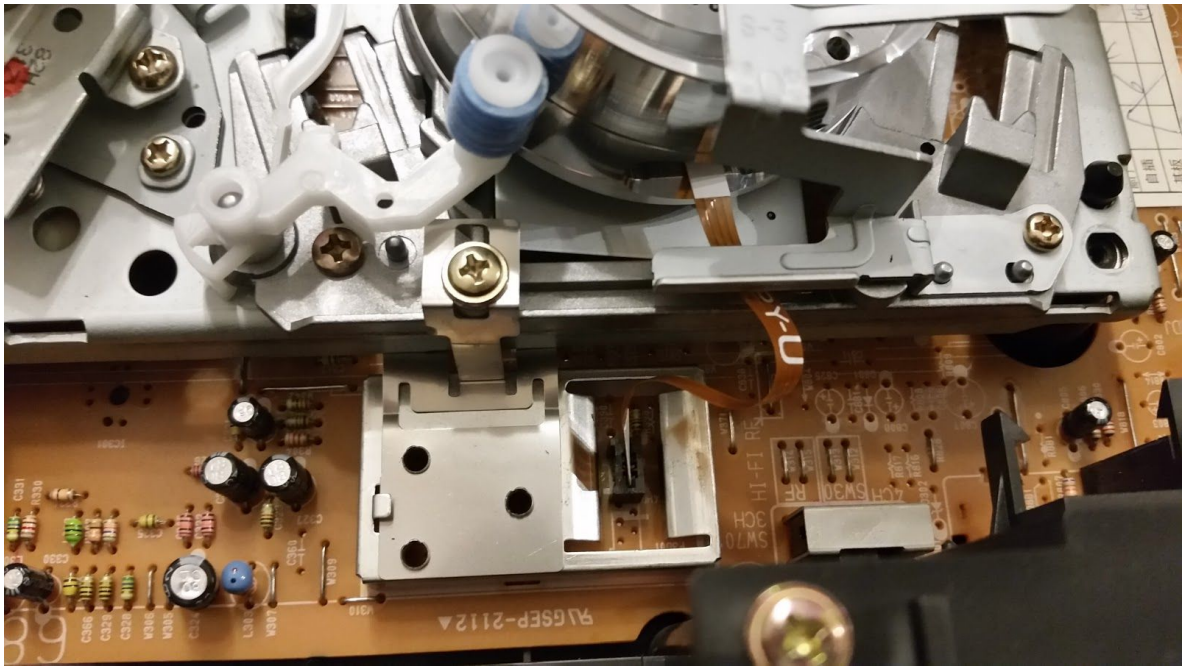
In this experiment, I learned that capacitors and resistors are very common components, and are necessary in many other, more complex components in electronic design. I also learned that all of these components can serve multiple purposes, depending on the application and accompanying hardware.



The underside of the circuit board, with three integrated circuit chips.



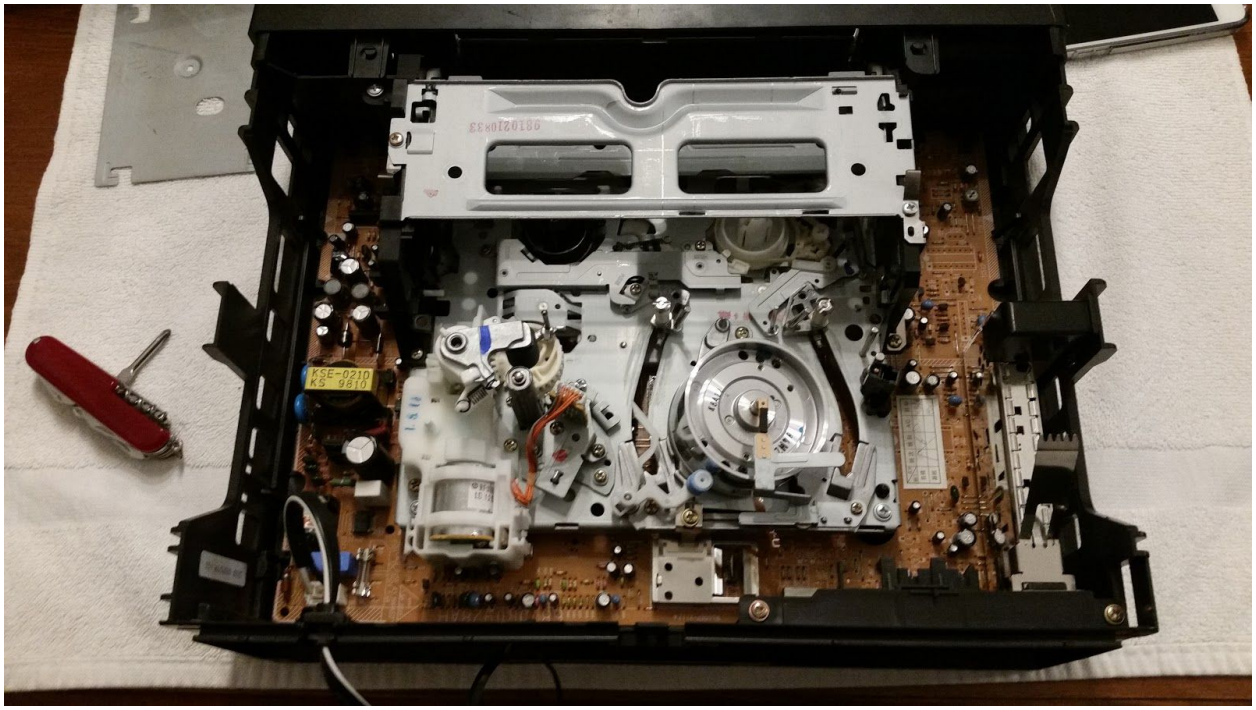
Close view of one of the integrated circuit chips



Several capacitors and resistors on the top side of the circuit board (bottom left)

More capacitors and resistors, behind the rear I/O of the vcr player

The operational amplifier, near a glass fuse and more resistors and capacitors



The vcr player before disassembly, with all components visible