



## Electronics Online Challenge

RCA Clock Radio Model: RC105-A



# Texas Instruments Electronics Online Challenge

8931A - The 5 Guys

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1/1/17

## Introduction:

This report reflects my findings while deconstructing and researching internal components and IC chips from an RCA Clock Radio - Model: RC105-A. The reason that I choose this device was based on several factors. First, it was readily available, second, I was very interested in learning how a radio works, and third, in my digital electronics class, we have been learning and building circuit boards that make sound and react to sound, so I thought it would be a good idea to take apart a radio and learn more about the components and the IC chips that make the radio work.

## Internal Components List:

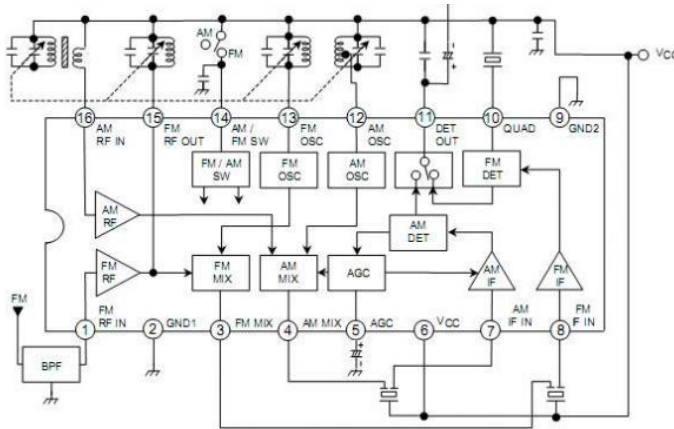
- **Resistors - R (x50)**
- **Transistors - Q (x4)**
- **Oscillator - X**
- **16Ω 0.5W Speaker**
- **Internal Antenna**
- **Diodes - D (x16)**
- **IC Chips - U (x3)**
- **Buttons (x8)**
- **LCD**
- **Intermediate Frequency Transformer - IFT**
- **Capacitors - C (x47)**
- **Potentiometer - P (x2)**
- **Switches (x2)**
- **Transformer**

## Internal Components Descriptions:

- **Buttons:** A device which closes or opens a circuit. This includes an On/Off, Wake Mode 1, Wake Mode 2, Sleep, Snooze, and Left/Right buttons.
- **Switches:** A device that redirects the flow of electricity somewhere else. This includes a switch that changes between AM/FM and an alarm/clock mode switch.
- **16Ω 0.5W Speaker:** Converts electrical impulses into audible sound.
- **R:** Used to reduce the voltage throughout the system.
- **D:** Allows a current to pass in only one direction.
- **C:** Stores an electric charge.
- **Q:** Amplifies or switches electronic signals and power.
- **U:** An Integrated Circuit (more info below).
- **P:** A variable resistor which controls the volume and the radio channel.
- **X:** Generates oscillating electric current with a precise frequency.
- **LCD:** (Liquid Crystal Display) Displays the current time on the radio and radio station.
- **Transformer:** Converts AC power to DC power. M/N: SF - 28U/111122
- **Internal Antenna:** Receives radio signals.
- **IFT:** Converts the frequency of an incoming signal to an intermediate frequency.

## IC Chips Summary:

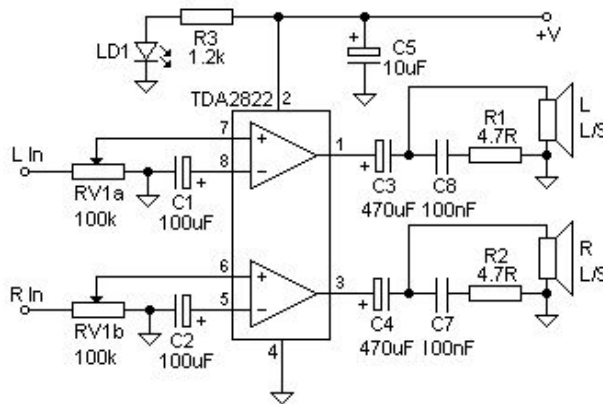
- U1: [TA2003](#) (Unisonic Technologies)
  - This 16-pin chip integrates the complete tuner function of the radio from antenna input to digital output.



- U2: VCP132 (RCA)
  - This custom made 44-pin IC chip controls timekeeping functions as well as the switch/button functions, displaying the time on the LCD's, and sound adjustments.



- U3: [2822M](#) (STMicroelectronics)
  - This 8-pin IC chip is a dual audio power amplifier.

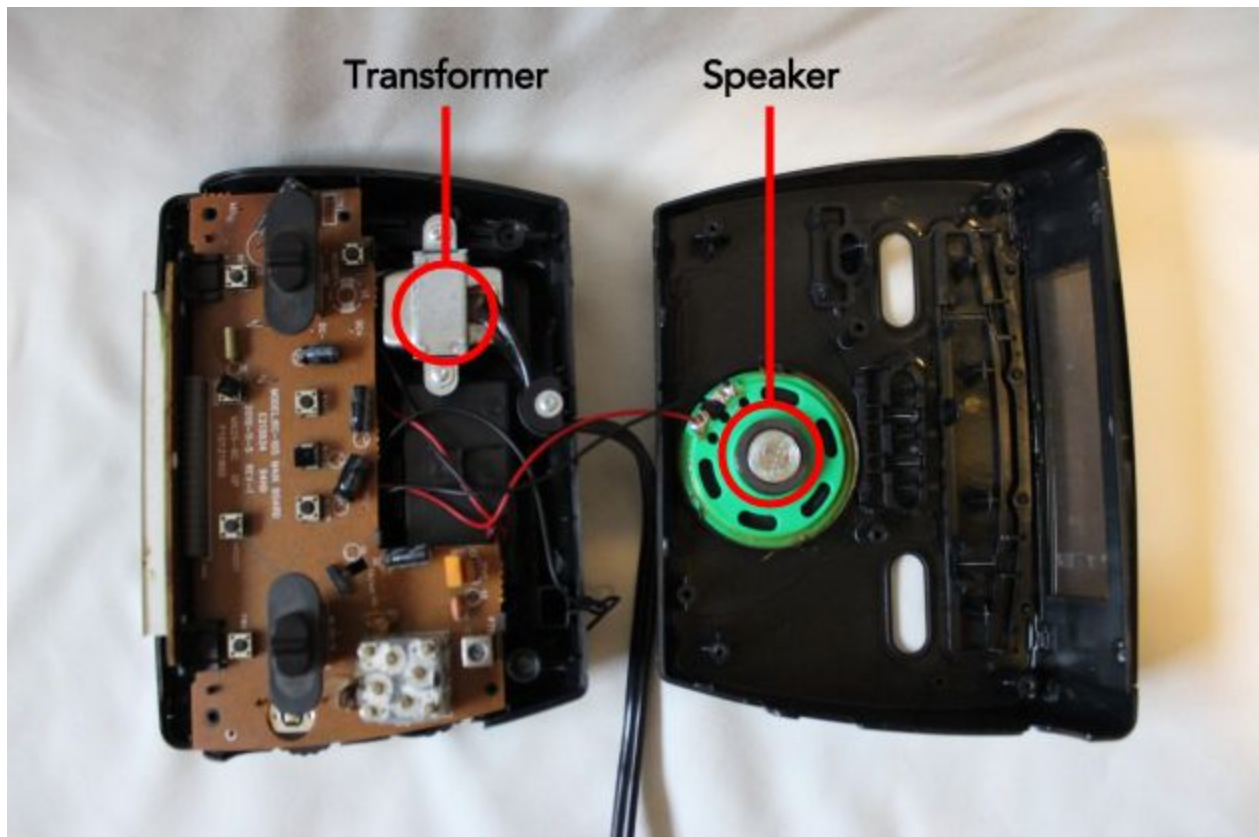


Note: None of the internal components or IC Chips were produced by Texas Instruments.

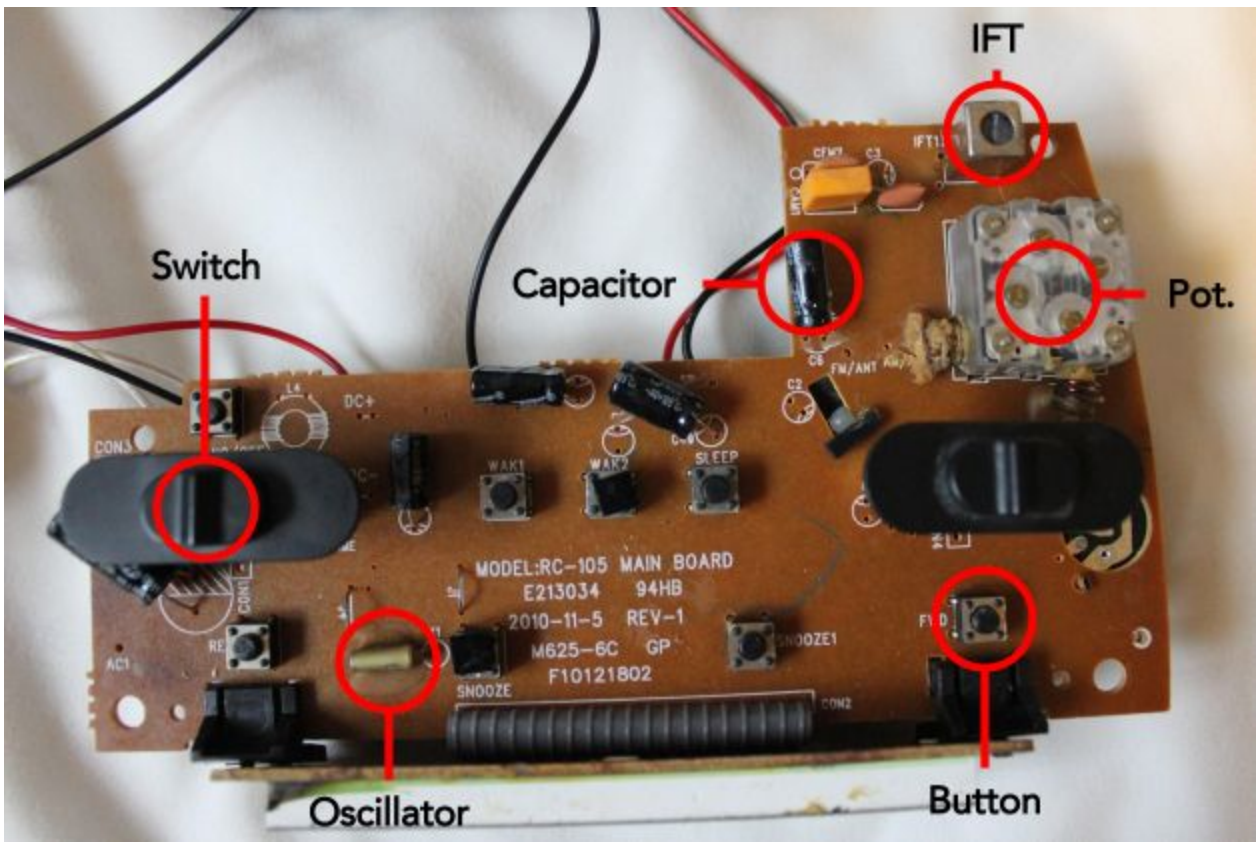
Pictures:



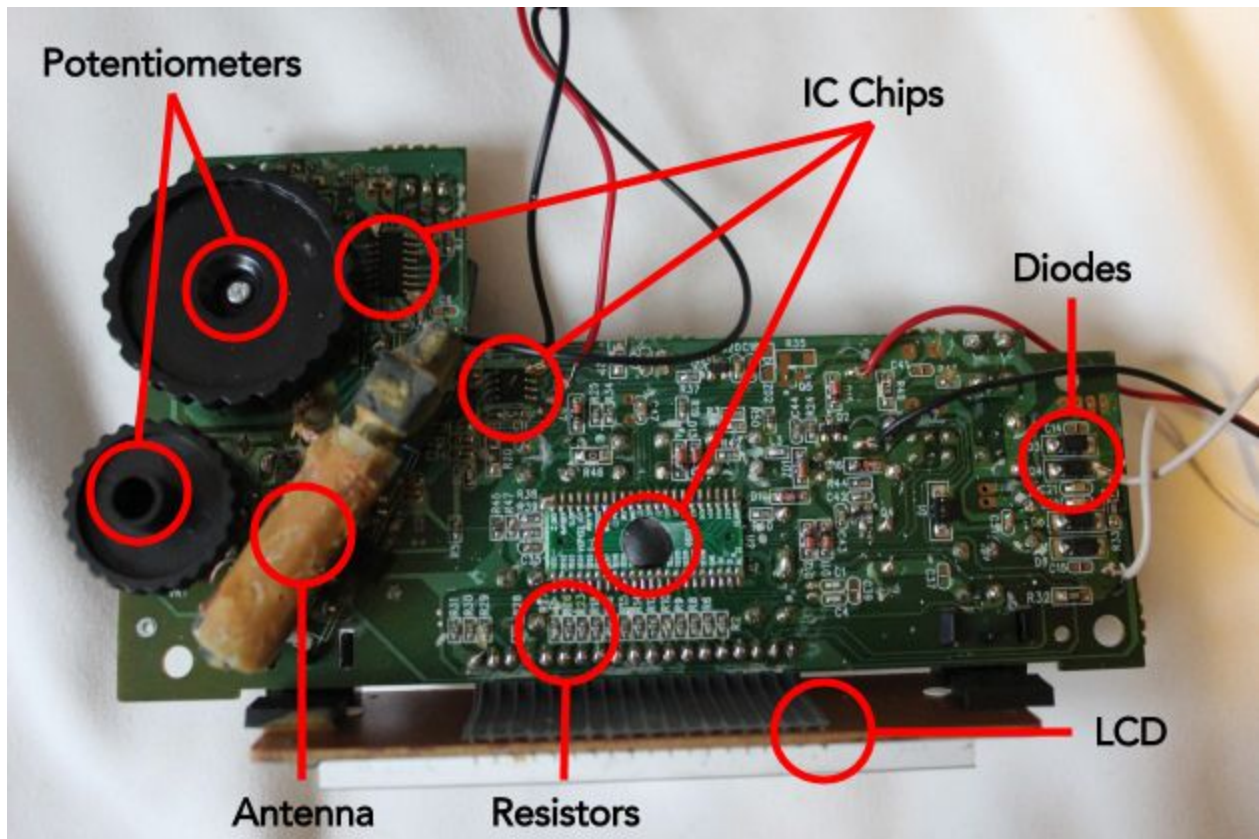
The clock radio before being disassembled



The initial view of the inside of the clock radio



The top of the main board



The bottom of the main board

## **Conclusion:**

While researching and deconstructing this device, I learned that it can be really fun figuring out how a device such as this radio works and seeing what each component's role is and how they all come together to make it work. Before I started learning about digital electronics, I never really understood how these devices worked. I took them for granted and assumed that it was just some silly device anyone could design, build and use. Once I began learning more about digital electronics, I gained a greater appreciation for the devices we use on a daily basis.

## **Cited Sources:**

**TA2003 Linear Integrated Circuit [PDF]. (2014). Unisonic Technologies.**

<http://www.unisonic.com.tw/datasheet/TA2003.pdf>

**Dual Low-Voltage Power Amplifier [PDF]. (2003). STMicroelectronics.**

<http://www.st.com/content/ccc/resource/technical/document/datasheet/9e/18/f7/cd/2e/b8/43/62/CD00000134.pdf/files/CD00000134.pdf/jcr:content/translations/en.CD00000134.pdf>