

# Final Summary Report

Radios. The transmission and collection of electromagnetic waves has been a technology around since the late 19th century. It is a technology that has been utilized to relay anything from valuable wartime information to pop music for passengers to a nearby Vex Competition. For our TI Online Electronics Challenge, we have chosen a Sony radio model CFD-V17 as the electronic to be taken apart and examined as it has been and still is a prevalent technology used in our daily lives.

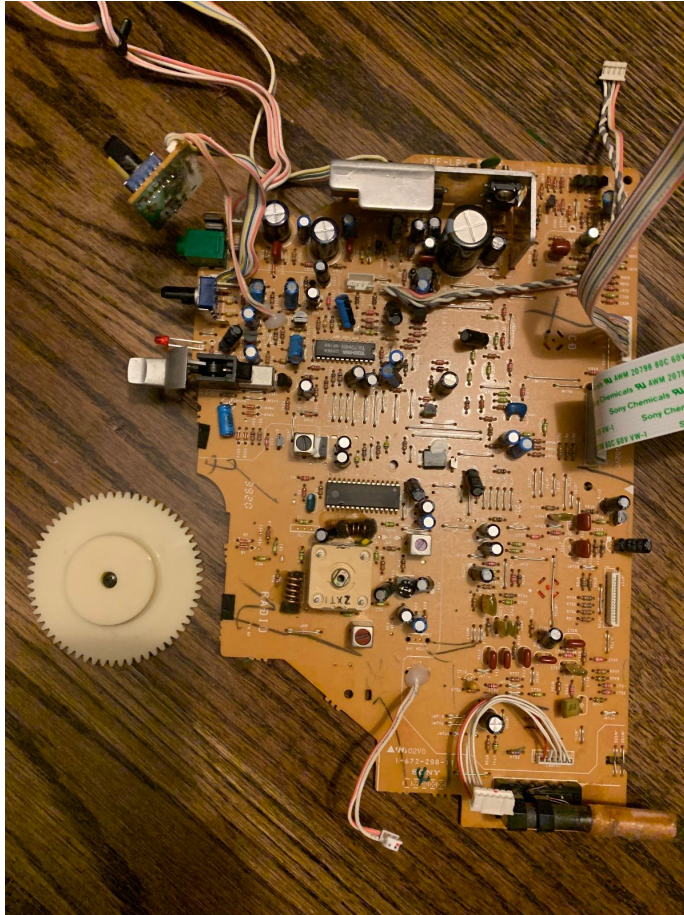
To play cassettes within the radio, a system preamplifier IC is used to convert electronic signals into different functions used to control the cassette. An audio preamplifier receives small electronic inputs usually less than 10mV and amplifies the signal into an audio signal. In this radio, a TA2068N is used; it has the capability to control the playback of the cassette as well as several other functions.

To utilize the FM/AM radio, a high performance one-chip bipolar IC (Sony CXA1538S) is used. The built in intermediate-frequency (IF) amplifier allows it to raise the signal levels in intermediate to high frequencies received by the antenna and the lower (base) signals it recovers from the receiver. It also is equipped with a demodulator, a device that is used to decipher the original information in a modulated carrier wave. This component is the main part that allows the radio to decipher the different frequencies of radio and turn it into audible feedback.

An output transformerless (OTL) monolithic power IC (BA5417) is used to amplify the audio signal to be reproduced through two speakers equipped with the radio. Audio transformers are used to keep the power supply of two different audio systems isolated. An OTL amplifier is used in this radio as by using a regular output transformer audio can be lost at the more extreme ends of the audio, limiting the amount of feedback that is able to be produced. By using an OTL amplifier, the radio provides a more reliable and pleasurable listening experience as it offers a larger range of amplification and higher quality fidelity.

Through the disassembly of this radio and the research and learning done to learn about the operation of its parts, a significant amount has been learned. First and foremost, we discovered how a radio functions as its radio waves are first modulated, encoding information at the origin and sent out in the form of different frequencies. Radios then use demodulators to decode the information and convert it into audio signals that are later amplified in speakers for listeners to enjoy. We also learned about the usefulness of an output transformerless amplifier. Regular output transformers produce unwanted phase shifts at the more extreme ends of the audio. Overall, more distortion is created with output transformers than more modern models of OTL amplifiers. We also learned about the importance about safety equipment as capacitors within the radio possess charges that could be discharged during the disassembly.

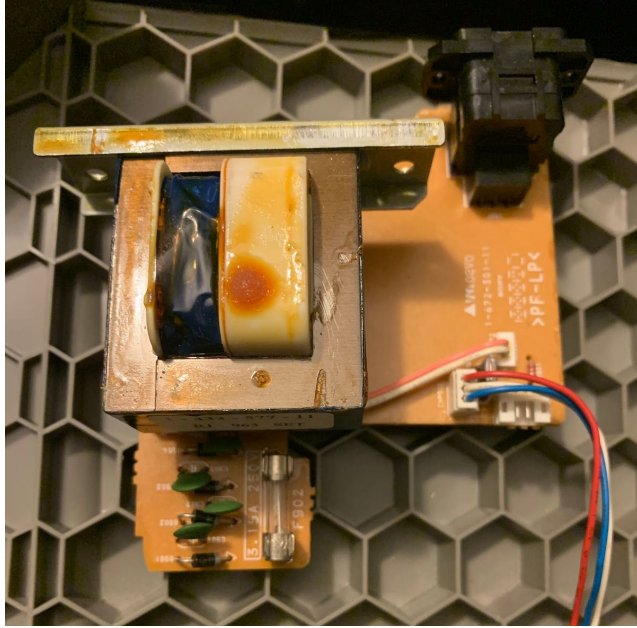
## Images



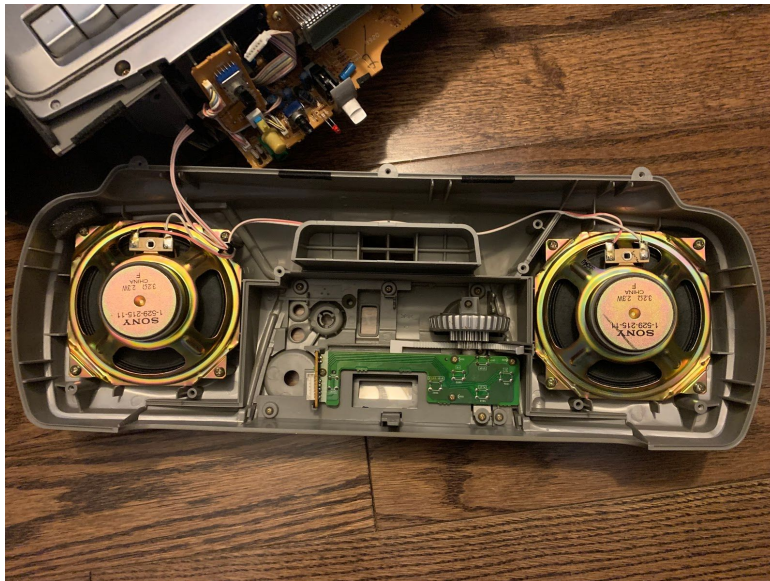
Main Board, consists of the system preamplifier (TA2068N), OTL monolithic power IC (BA5417), and high performance one-chip bipolar IC (Sony CXA1538S) and more



(Left) volume board, (right) display board (LED)

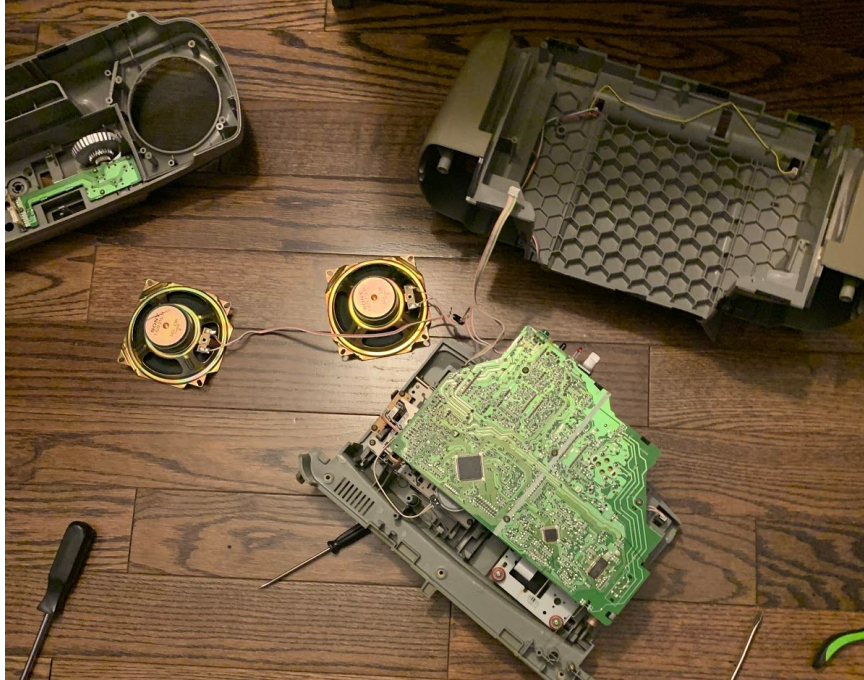


Power Board (left) and Inlet Board (right)



Front Cabinet Assy (front behind) with speakers





Front Cabinet Assy (top left), Cabinet upper assy (bottom) (lower view), rear cabinet (top right)



Mechanism desk (left), CD motor board (right)