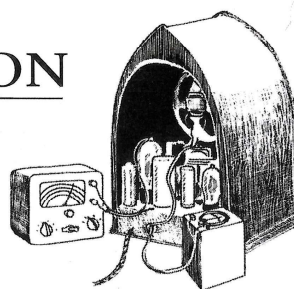


EQUIPMENT RESTORATION

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Submit restoration tips in Word, WordPerfect or plain text files with any illustrations in separate jpeg, tif or bmp files (not embedded in document).



Restoration of an International Radio Corp. Model H Kadette TRF Radio

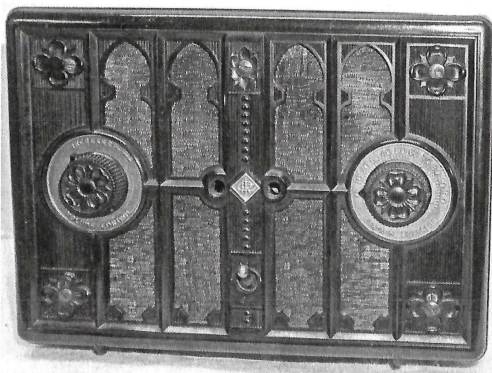
A very unique-looking table radio was introduced in about 1932-33, called Kadette Gothic. It featured a Bakelite cabinet (sometimes marbled), was relatively small, and was powered by AC or DC with no power transformer. Moreover, it used 6-volt filament tubes and was advertised as adaptable for automotive use.

The circuit is a 4-tube TRF with one of the tubes serving as a B+ rectifier. The tube

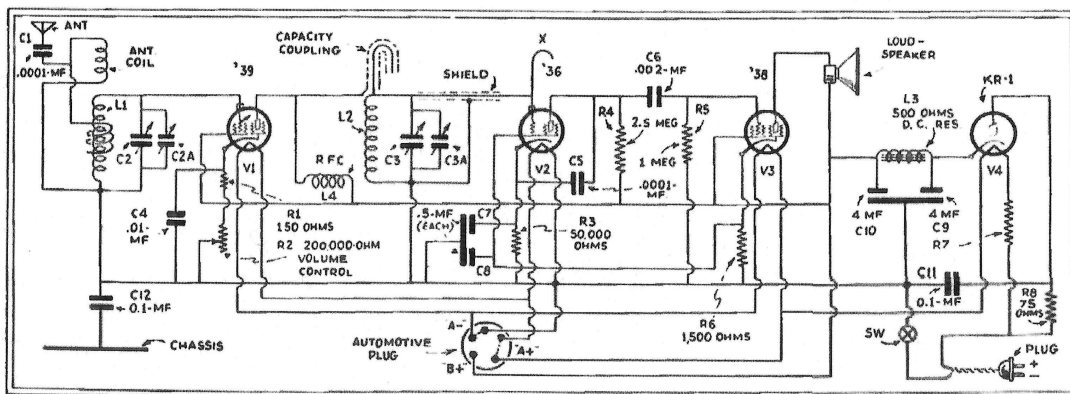
filaments and a dropping resistor are in a series string across the 110 line voltage, see schematic.

I was asked by a friend to restore the electrical circuit of his example to working condition. I appreciated being able to see the innards in more or less original condition with only one previous capacitor replacement. Fortunately, the large resistor in series with the filament string was still OK. This resistor dissipates about 30 watts of heat and would be difficult to repair if defective. It gets quite hot during operation of the set and is positioned to dissipate this heat out the back of the chassis. Later AC/DC sets were made with tubes that better matched the line voltage and eliminated the resistor, or the manufacturer put in a ballast tube or, in some cases, a resistor in the line cord.

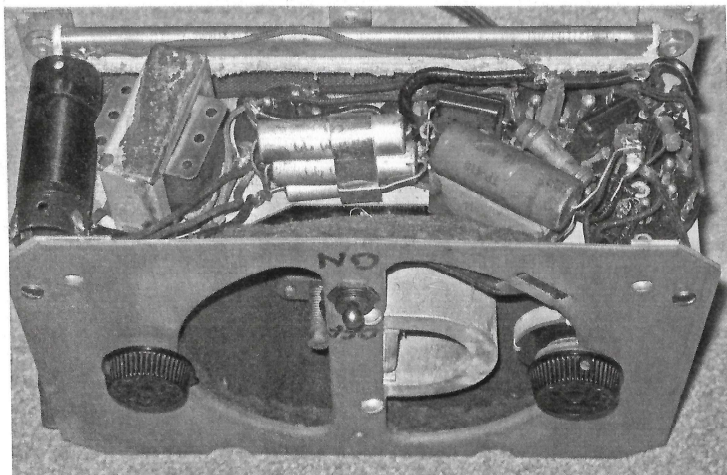
After checking the radio for obvious power line shorts, I felt comfortable powering it up. It had a modern polarized line plug and new cord installed, which insured



Kadette Gothic radio.



Circuit schematic of Kadette Gothic radio.



Chassis view of Kadette before restoration.

that the cold side of the line would go to the circuit ground when plugged directly into a wall outlet. The radio played to a very minimal extent before I did any repairs.

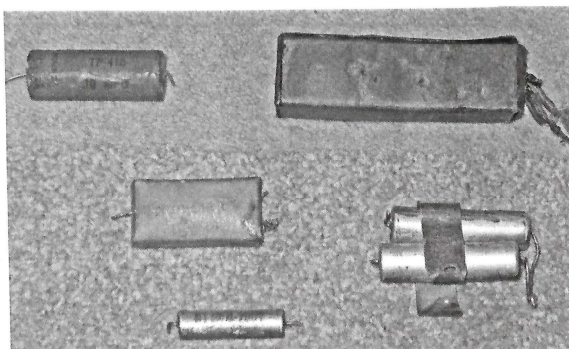
I used a Heathkit isolation transformer to slowly increase the voltage, and I could tune three or four local stations, but the sound was completely garbled and very low in volume. From the schematic, I knew that the radio was designed to isolate the circuit ground side from the chassis using a 0.1 μ F capacitor for the circuit ground to chassis connection. However, I discovered that the chassis of this radio was shorted to the circuit ground. This makes the radio somewhat unsafe because the hot side of the wall outlet can appear on the chassis through the filament string and 340 ohm dropping resistor when the set is switched off, since the switch is on the cold side of the line connection. During my repair, I was unable to determine where the short exists, but I suspect it is due to faulty insulation around the two screws that attach and isolate the tuning capacitor frame from the main chassis. The frame of the tuning capacitor is designed to be connected to the circuit ground but is isolated from the main chassis ground. The circuit operation is not affected and it's a safety concern only when the radio is switched off by the switch on the cold side but

still is plugged into the wall socket. I will unplug the radio when not in use to eliminate this potential hazard until the short of the main chassis to circuit ground is eliminated.

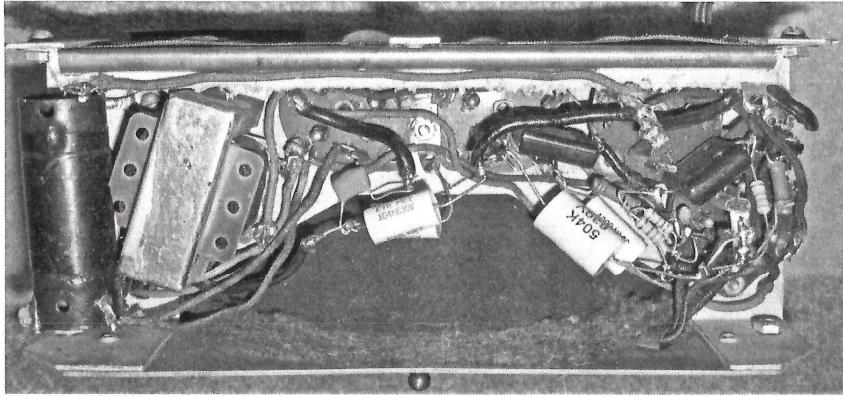
I replaced the two 4 μ F power supply capacitors and made a $\frac{3}{4} \times 1 \times 3$ inch cardboard box to enclose them on the upper side of the chassis, like the original. There were five other bypass capacitors that I sus-

pected to be bad, so I removed them and four of the five indicated as bad when checked by a capacitor meter. I replaced them all with modern foil capacitors. At this point the radio performance improved so that I could receive five local stations with strong sound. I retained the unique old capacitors in case they might be used in the future to encase caps to retain the radio's original appearance.

An external antenna was required for any reception, as might be expected. The radio has no internal antenna and the tuning coils are rather small in size. At this point I judged the audio quality to be rather tinny but acceptable for listening. I noted that the 2.5 megohm detector resistor had drifted to about 0.8 megohm so I replaced it with a modern 2.5 megohm resistor. The 1 megohm grid return resistor on the type



Capacitors removed from Kadette Radio.



Chassis view after restoration.

38 audio output tube measured 1.6 megohm so I also replaced it. This improved the audio quality somewhat, but I suspect the speaker itself may be a limiting factor for overall performance.

Without AVC, tuning the Kadette is a two-handed operation. The RF gain has to be set high enough to find a station, but not too high to overload and distort the audio. At this point I deemed the set was OK to return to the owner with a caveat about the ground short.

In reading about this radio, I was impressed to find a 1933 article in *Radio-Craft Magazine*¹ that not only included the schematic but also a very detailed description of all the circuit elements. The components are nicely squeezed into a small chas-

sis and some unusual aspects of this set include grounded shielding around the connection from the RF tuning capacitor and the first tube grid, twisted wire capacitive coupling for that connection, a vertical wire stub for regeneration from the second

tube grid back to the first tuning coil, and a power anode type detector with the screen grid unusually connected to the cathode circuit of the type 38 output tube to eliminate a dropping resistor and provide a low screen voltage for the detector. High praise was given, deserved or not, for the fact that this radio was sold through retail businesses that did not have to provide warranty service, as the manufacturer guaranteed repair at the selling location for a year for a \$1 charge.

REFERENCES:

1. *Radio-Craft Magazine*, "The International KADETTE," Gernsback Publications. New York, NY, February 1933, p. 464.