

## Restoring a Russian Zvezda 'Red Star' Model 54

Gary Albach, July 2020, Victoria, Canada

While on a trip across Russia a few years ago my wife and I saw a stunning and unusual red radio on display in a Moscow home we were visiting, but unfortunately it was not for sale. We remembered it and when one came up for sale at an auction in the U.S., we bid on it and won. This article gives a short background on the history of these interesting radios from the Soviet Cold War era and provides details regarding my restoration.

### Background

The Zvezda 'Red Star' 54 was manufactured in Russia between 1954 and 1960 as a household radio for sale to Russian consumers. It is a 5-band set, with broadcast, long wave, and three shortwave bands. It was available in at least three colours, red, green and brown/black, with about 600,000 sets being produced in total. There are blue sets on the market, but the general opinion of collectors in Russia (expressed in RadioMuseum forums) is that these sets have been repainted.

The Zvezda was a copy of a French design, the SNR Excelsior 52. The Russians even copied the naming tradition, the French 52 was from 1952, the Russian 54 was introduced in 1954.



From the website of John Koster

There were two factories in the USSR where these sets were manufactured. The first to start production in 1954 was in the Kharkov (Institute of Instrument-Making and Technologies) Komunar Works (Productive Association), located in Kharkiv, Ukraine, then part of the USSR (see map). The initial design had a vertical chassis, like the one that I have; in 1955 the chassis was redesigned to be horizontal and production started at a second plant in Moscow.



Further details of this model can be found at:

[http://www.vintageradio.nl/radio's/zvezda54\\_engels.htm](http://www.vintageradio.nl/radio's/zvezda54_engels.htm)

which includes this interesting history:

*'After the death of Stalin, on March 5th, 1953, the Soviet Union wanted to show that the repressive period was over. A cautious start was made with the production of better household goods. During and after the war, the production of military goods was considered more important. The radio is a copy of the French Excelsior 52 radio. In 1952 a group of Soviet diplomats was in Paris to negotiate the future status of Austria, then still occupied by the Soviet Union. An Excelsior 52 was given to this delegation as a present.*

*There were many design problems. The metal cabinet caused resonance in the audible range (between 1000 and 3000 Hz), that is why the inside of the cabinet is covered with felt. This again led to higher internal temperatures. New loudspeakers had to be designed for the receiver as the quality of Russian loudspeakers was not very high. The production of miniature tubes had just started. These tubes were scarce and not all types were available. That is why an older tube like the 6A7 was used. Also its too "Western" and at the same time somewhat "vulgar" design, led to some resistance in the political leadership.'*



### **The Circuit**

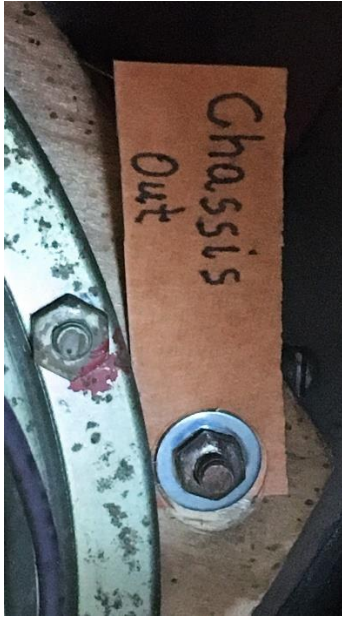
The radio is similar to the standard 'AA5' circuit, with a local oscillator/mixer (6SA7 equivalent), one IF stage at 465 kHz (6BJ6 equivalent), an AF amplifier (another Russian 6BJ6, now used at audio frequencies), and a single-ended power output stage (a Russian tube with no direct American equivalent but similar electrically to a 6BQ5). The diode detector is a 6AL5 equivalent, where the second diode is used from the IF amp to provide the AGC voltage. The rectifier is a Russian tube like a 6X4 but with a different pin out. There is a tuning-eye indicator with a 6E5S, an octal-base Russian equivalent of a 6E5.

The radio has a three-position tone control using feedback in the audio output stage that provides better control of fidelity than a common treble-cut circuit.

In this set, the full-wave rectifier tube shown on the schematic had been replaced by a solid-state bridge rectifier and the power transformer wired for 127VAC operation. A North American line cord had been installed and the original tucked neatly inside the cabinet.

### **Chassis Restoration**

The most difficult job at first was getting the chassis out of the cabinet, and then back in. The chassis is bolted to a plywood speaker baffle board from the front, and the baffle board in turn is secured to the inside front of the cabinet with nuts on four threaded studs protruding through the plywood. Removing these nuts from the back frees the chassis assembly to slide backwards. It was not obvious that these four small nuts secure the entire chassis in the cabinet, so thankfully during a previous repair they had been labeled in four separate languages – English, Polish, French and Russian!



The problem getting the chassis out is that the baffle board is wider than the opening in the back of the cabinet. No amount of jockeying (and cursing!) could get the very heavy chassis through the opening, so I finally resorted to partially disassembling the sheet metal panels on one side of the cabinet and bending them slightly outward. Getting the chassis back into the cabinet was the reverse operation, leveraging it back in with a screwdriver, with the added frustration of having to reinstall the stiff cream coloured rubber trim strips between the sheet metal sections. The second time I removed the chassis, it came right out with a minimal amount of jockeying. In hindsight, both times the band selector lever was one notch to the right of centre, on the broadcast band looking from the front, and during my second removal I angled the right side of the chassis forward, looking from the back.



All the resistors except one were original carbon film radial 'dogbone' construction with Russian markings and all tested within tolerance. The single replacement was a 470k carbon composite

part, replacing the 510k value shown on the schematic; the 'new' part had predictably drifted up in value and was now exactly 510k, so I left it in place.

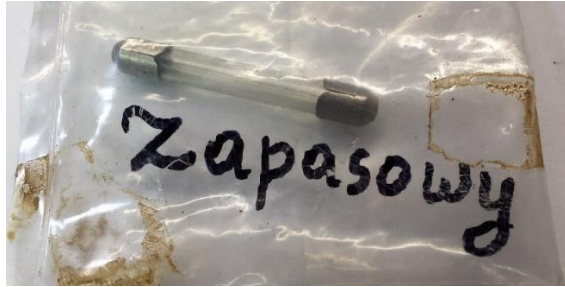
The capacitors offered an interesting series of decisions. When I recap a radio, I usually replace all the paper and electrolytic caps at the same time (the 'shotgun' approach). However, this radio had been recapped at some point with the alternative 'just replace what's absolutely necessary' approach, using high quality parts and workmanship.

Some of the paper caps had been replaced with WIMA-brand German parts, which tested good, so I left these in place because they looked similar to the originals. I 'shot gunned' everything else. Several replacement paper caps of unknown quality were replaced with high quality ceramic disk caps to preserve the original look to the wiring. Several molded 'domino' style caps in the .001uF range were sufficiently out of sight so I replaced them with small radial-lead polys. The few remaining original tubular paper caps were restuffed with yellow polys and replaced. A pair of caps across the AC line had been replaced, but for safety I discarded them and installed X1/Y2 safety caps.

The original electrolytic caps were still installed, but after 65 years I thought it time to replace them. Because of obvious modifications already done on the power supply (addition of a solid-state bridge rectifier and associated bypass capacitors) I didn't feel badly about adding new electrolytics under the chassis rather than restuffing the old cans.



There was a spare fuse taped to the inside and labelled 'Zapasowy', which Google Translate tells me is Polish for 'spare'. The printing was the same as on the four labels denoting the nuts to remove the chassis, so might the radio have been serviced in Poland?

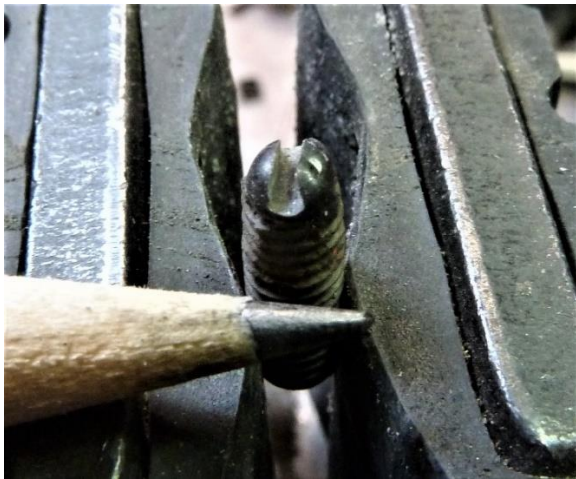


The IF transformers also proved to be a new experience for me as well. The adjacent pictures show that the coils are mounted side-by-side inside metal cans, adjustable horizontally through holes in the sides of the cans. An interesting aside was the way the can was secured to the chassis – as seen in the picture, there was a simple tapered Bakelite chock inserted into a protrusion from the interior coil assembly and jamming the can down against the chassis. The powered iron slugs inside were firmly corroded into the coils and the slots were broken open but were freed with a few drops of WD40 overnight.



The threaded slugs were then held in a vise with rubber jaws, tiny drops of JB KwikWeld applied to the broken tops, and new slots cut with a small hacksaw.





### **Cabinet Restoration**

The cabinet can only be described as massive. Made entirely of heavy-gauge sheet metal, it is bolted together in sections much like I would imagine the construction of a Russian tractor. It is quite large (584mm x 380mm / 23in x 15in) but not very deep (203 mm / 8 in), probably designed originally by the French to sit on a shelf or mantle.

The interior of the cabinet is lined with heavy felt to dampen vibrations from the speakers, and apart from regluing it in several places, little more needed to be done. The red exterior paint appeared to be original, judging from the 'snakeskin' pattern that was showing through a layer of clear glossy varnish. This glossy finish was not objectionable, so I decided to leave it in place as I was concerned about damaging the underlying red finish if I tried to remove it.

The lettering and silvering on the back of the large glass dial were intact except for around the edges where the silver had cracked and flaked over time. There is no reason to remove the dial glass to service the radio, so I photographed it for posterity and left it in place to add to the 'patina' of the cabinet.



### Alignment and Use

Alignment of the IF transformers at 465 kHz was straightforward once the powered iron cores were repaired. And tuning of the oscillator and antenna coils on each band is generally the same as with any other consumer shortwave radio.

By North American standards, the dial is quite different – all the scales being marked only in meters, with the shortest wavelength/highest frequency being on the extreme left. Tuning the dial to the right tunes downward in frequency.

The sound from the two large speakers inside a steel cabinet is imposing, particularly when playing the Russian national anthem with the prominent red star gleaming at the centre of the radio. One can envision a parade of tanks in Red Square in front of the Kremlin, music blaring.

Gary