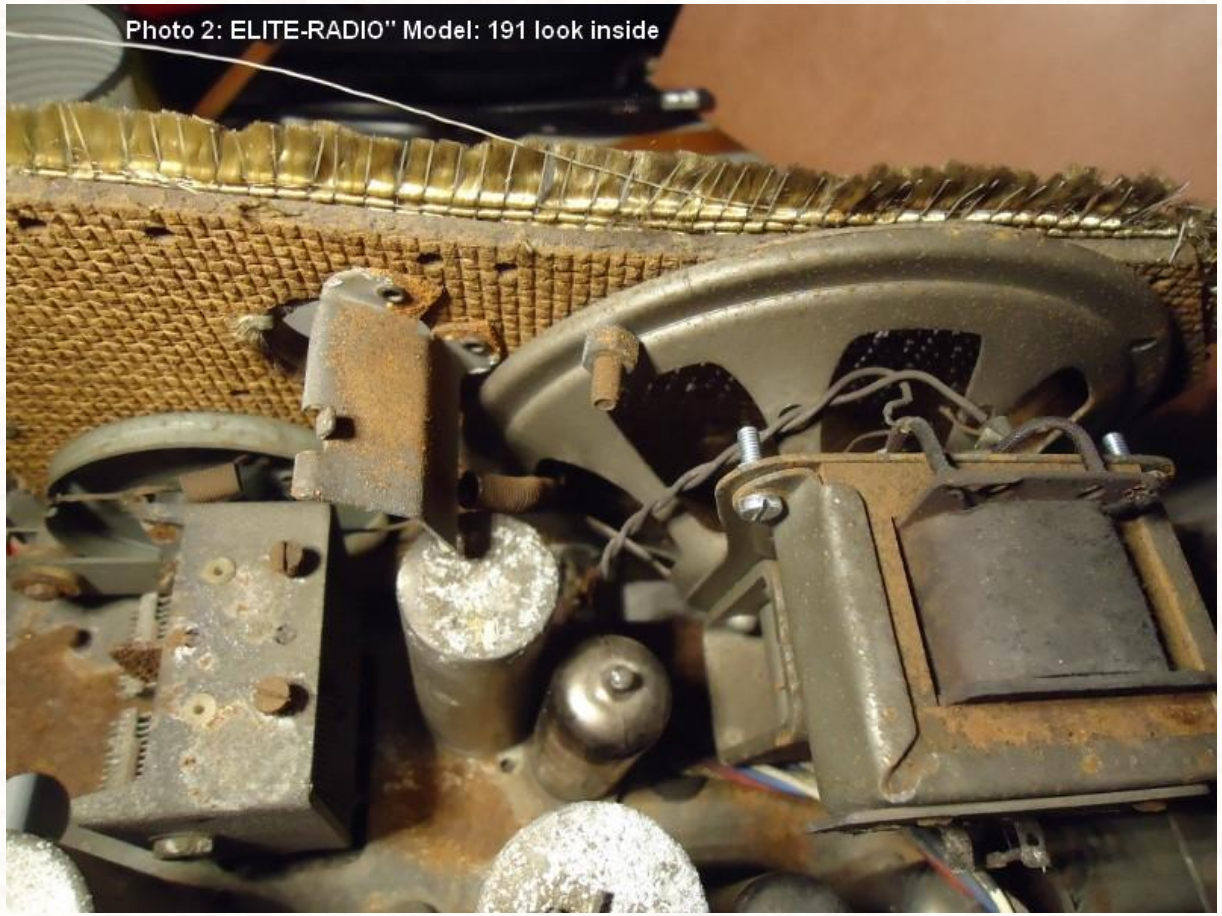
3ème Concours CHCR de restauration radio

ELITE-RADIO" Model: 191

Introduction

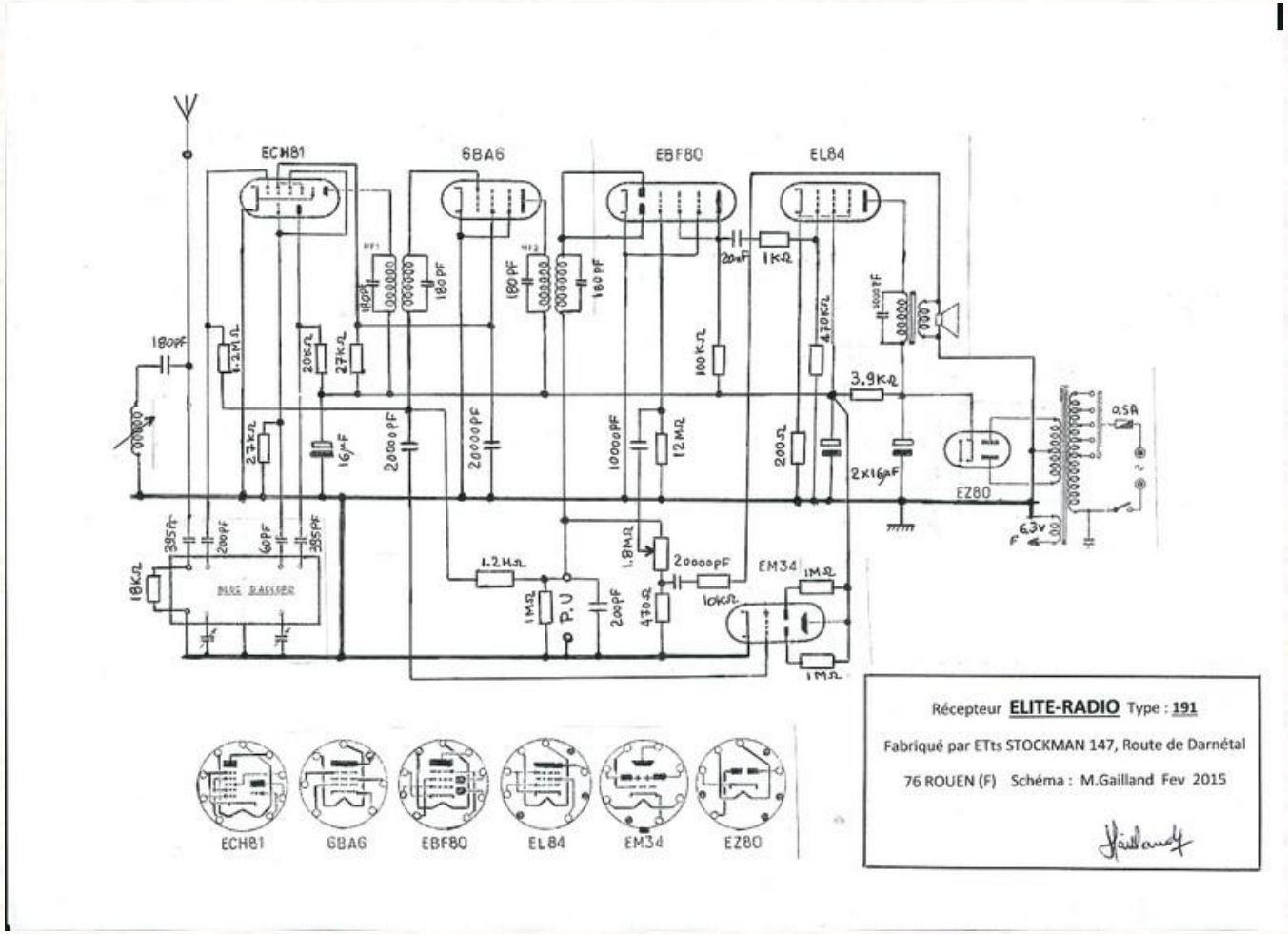
Photo 1: ELITE-RADIO" Model: 191 before restoration

- First of all, this small receiver from a little known brand was much damaged and not inspiring for even a restoration, but at least complete. Some people would have used it to get some spare parts out of it



- The thing is, this receiver was given to me by an old friend with whom I spent a few years in a technical school, studying electricity and electronics. So, the competition of restoration was a good opportunity for its restoration. (Photos 2)

Pedigree of this receiver



- It's a small fifties radio set as we saw so often in the kitchen of our parents.
- Brand : "ELITE-RADIO" Model: 191; it was made by the now disappeared establishment Stockman, which were located 147, route de Darnétal in ROUEN (France). The design is relatively classical, although small; its conception is of good quality. It can receive three ranges of waves: LW, MW and SW plus has a pick-up entry.
- **Technical description** : see schematic
- Tube lineup is as follows: ECH81, 6BA6, EBF80, EL84, EZ80 and EM34. We note two feedback paths to improve frequency response, one coming directly from the speaker, in opposition of phase relative to the entry of the preamplifier E(B)F80. There is no decoupling capacitor for polarization resistance of the final tube EL84. The presence of a anti-oscillation resistance connected between the grid control of the EL84 and the coupling capacitor. The presence of a LC filter in the antenna circuit is used to eliminate a range of frequency which may cause interference mainly from a local transmitter; example: semaphores in telegraphy which transmit on frequencies bordering the IF of this receiver (455 / 472 kHz). We can also notice two detection diodes connected in parallel, so the detected signal is used both for the low frequency amplifier and the AVC control, after filtering.

Dismantling of the receiver

Photo 3: ELITE-RADIO'' Model: 191 first difficulty with command knobs

- The first difficulty was the condition of the three setscrews on the command knobs which were rusted with broken heads. (Photo 3)

- Using an electric drill being careful not to damage the knobs and a small extracting tool of my own design, after a few hours of effort, I eventually extracted them without damage. It will be necessary to drill and tap them again, in order to put back in the set screws (without head) with a diameter of 3mm. The stripping of the strongly corroded frame being imperative, (Photo 4)

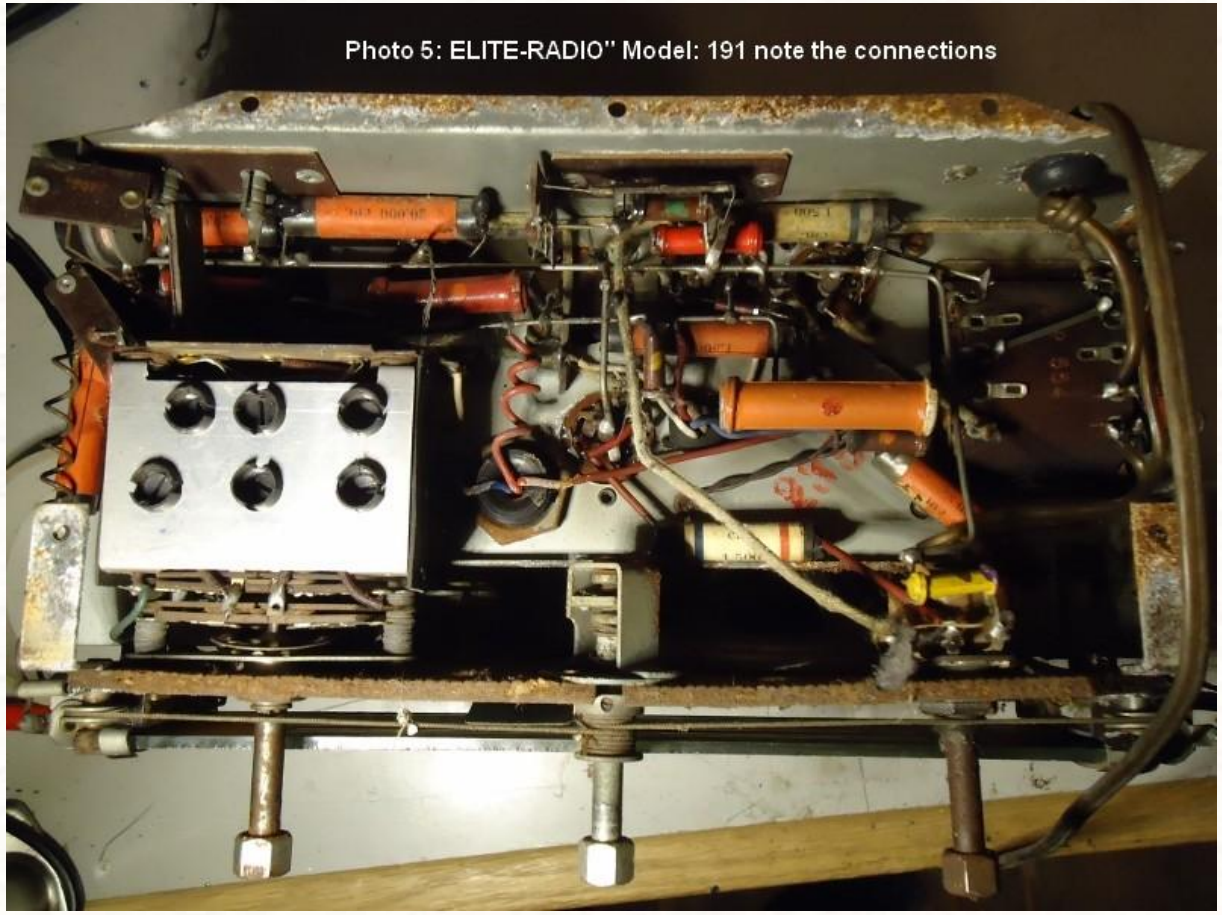
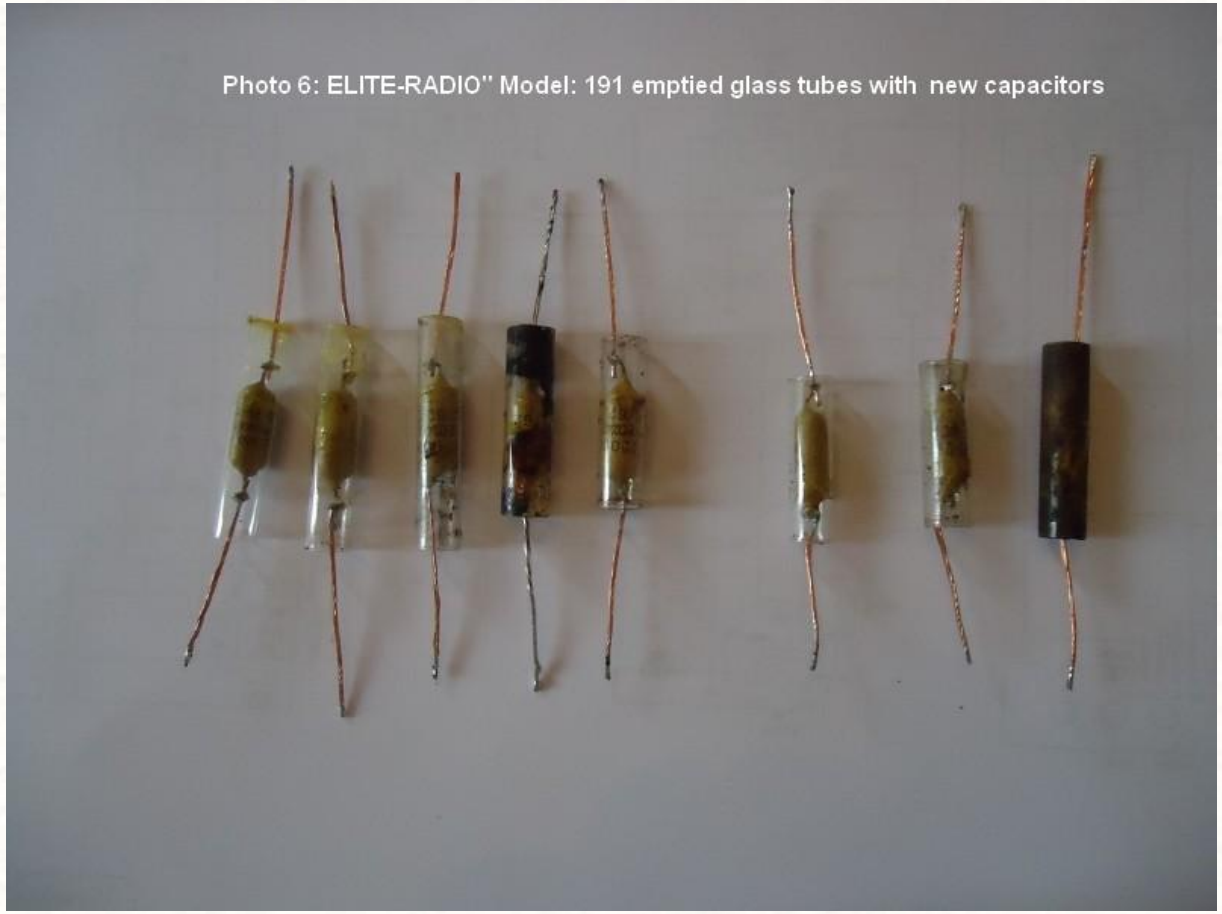


Photo 5: ELITE-RADIO" Model: 191 note the connections

- I proceeded to the removal of every component, taking care to note the connections, (Photo 5) and taking numerous photos; which allowed me to establish a schematic which could not be found on the web.

Restoration of the various components



- All the paper capacitors values were out of tolerance, I emptied glass tubes and inserted into them new capacitors; then I stuck labels, realized from an Excel file, identical to the originals. (Photos 6, 7)

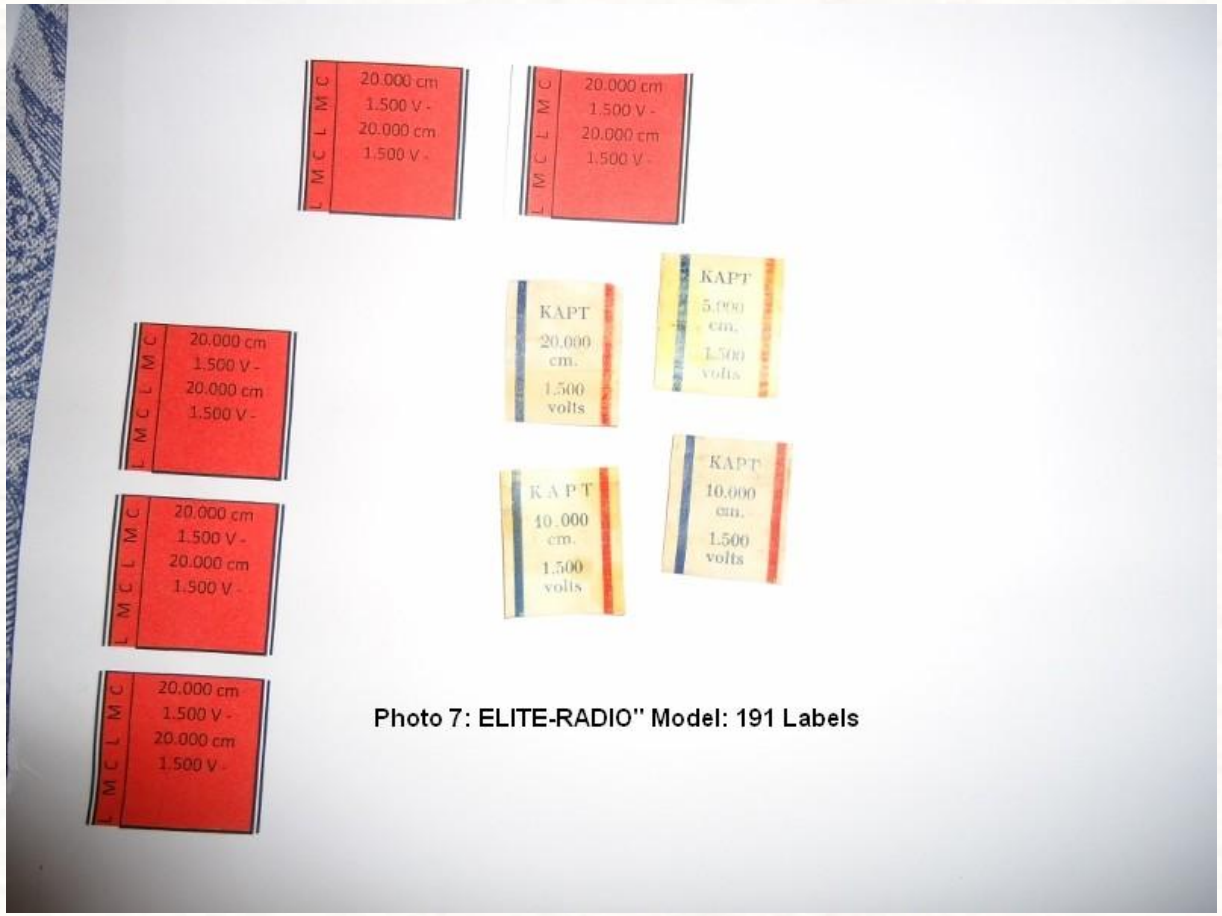


Photo 7: ELITE-RADIO" Model: 191 Labels

- All the mica capacitors have proved good by a capacitance meter = > cleaned for reassembly.
- The electrolytic capacitors, out-of-service (cases deeply corroded) were replaced by 2 X 16 µF and 1 X 16 µF identical capacitors, after a regeneration time (2 days) using a device I previously made.
- Any resistance out of tolerance (+:/-20 %) was replaced by a similar one.
- Intermediate Frequency transformers (IF): covers, very corroded were removed and dipped into a solution with bicarbonate, sanded down with very fine sandpaper and repainted. The windings were tested in an oscillator assembly, which I built from a schematic found on the web, connected to a frequency meter. A light adjustment was in order to find the 455 kHz frequency.
- Supply Transformer: isolation test of the windings between them and the mass, then switched on power supply to verify all transformer voltages = > everything was correct. To give it a beautiful aspect, the "outside" sheet steels were laid down in order to take the rust off, the contacts of the voltage selector cleaned, and then the set has been repainted.
- Output audio transformer: the same processing as for the power supply transformer but with a complete dismantling
- Variable capacitor: little corroded, a simple brushing was enough to restore it. A small mechanical adjustment was performed to avoid blades short circuiting.

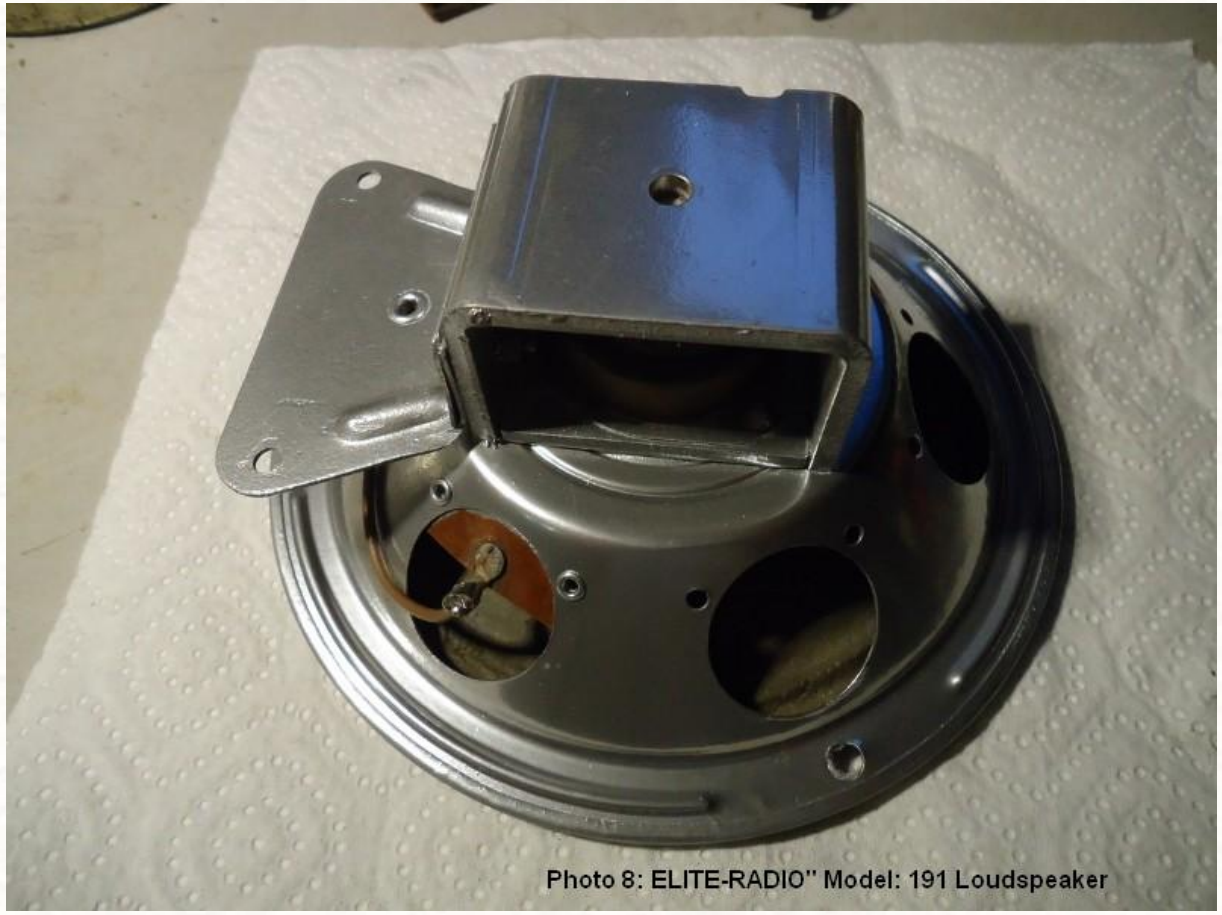


Photo 8: ELITE-RADIO'' Model: 191 Loudspeaker

- Loudspeaker: its membrane having disappeared under the teeth of a rodent, and not having time to fetch a hypothetical spare membrane, I got back a same size loudspeaker with an intact membrane, slightly corroded, on which I put on the transformer support after modification. Repainted, the set now looks fine! (Photo 8)

- Tubes: all have been tested on a tube checker. Except the ECH81 which was a little border line (it will be necessary to change it for the final tests) they are still good for the service.

Particular works

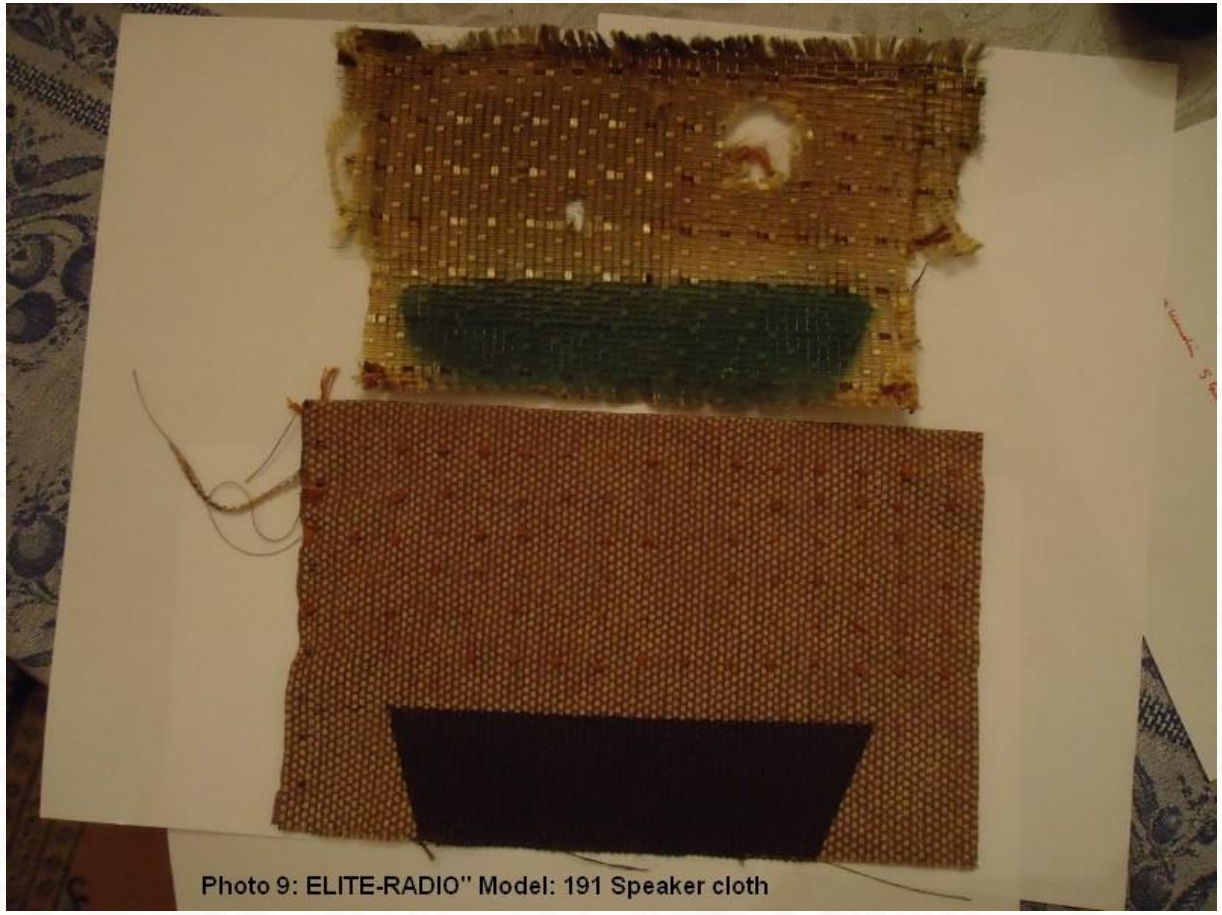


Photo 9: ELITE-RADIO'' Model: 191 Speaker cloth

- Speaker cloth (in front of the receiver) was moth-eaten or nibbled by the same tiny creature which ate the loudspeaker membrane. Therefore it was necessary to find a replacement. I found some in a special furniture fabric. I fixed it in place on the hardboard of the façade by sticking it, after putting in black paint to the background which will allow good contrast with the needle (Photo 9).

Photo 16: ELITE-RADIO'' Model: 191 The cabinet

- The cabinet making underwent a severe cleaning with a "regenerative" product, internal bracing were made and set up (Photos 16, 17, 18)

Photo 17: ELITE-RADIO'' Model: 191 The cabinet

Photo 18: ELITE-RADIO'' Model: 191 The cabinet

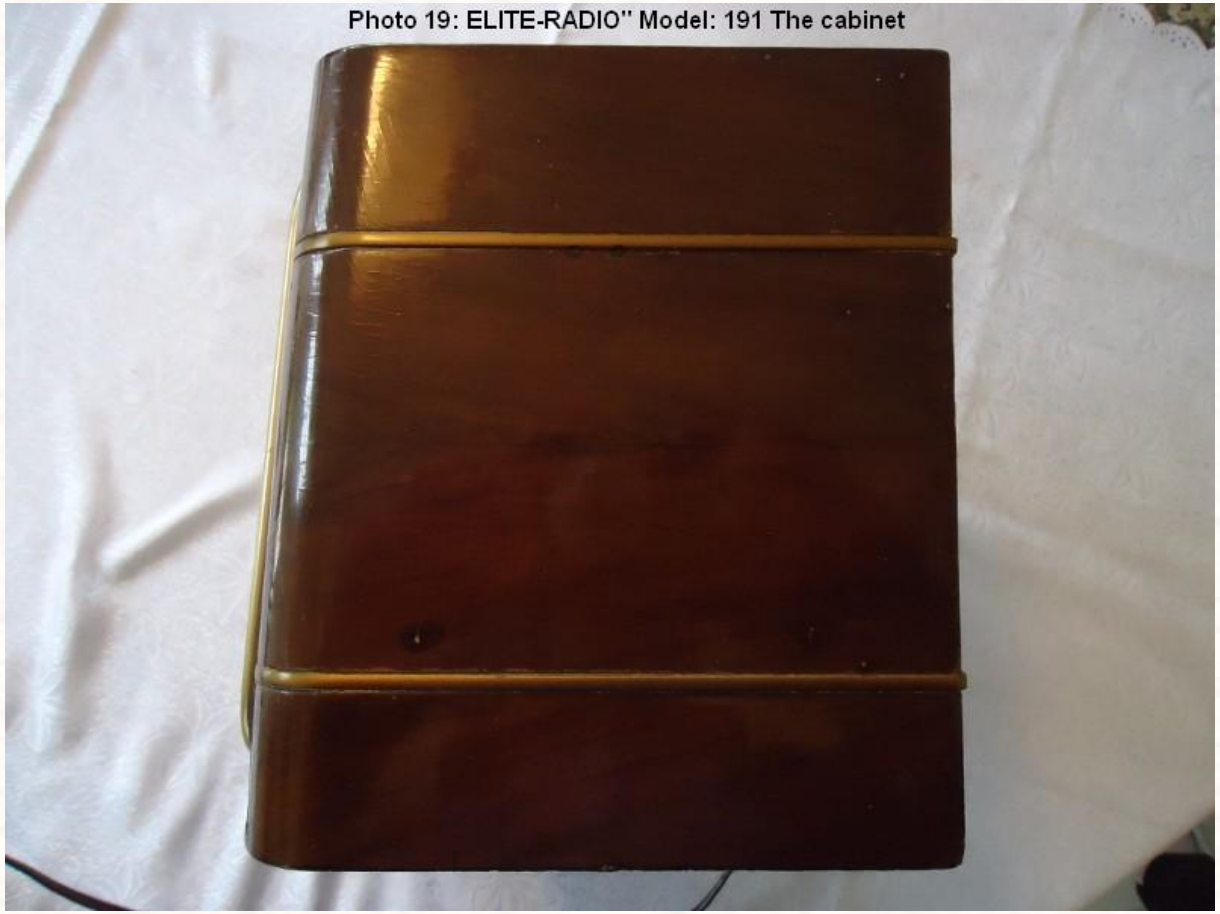


Photo 19: ELITE-RADIO" Model: 191 The cabinet

- and retouches to the varnish completed the set which presents a beautiful patina (Photo 19).

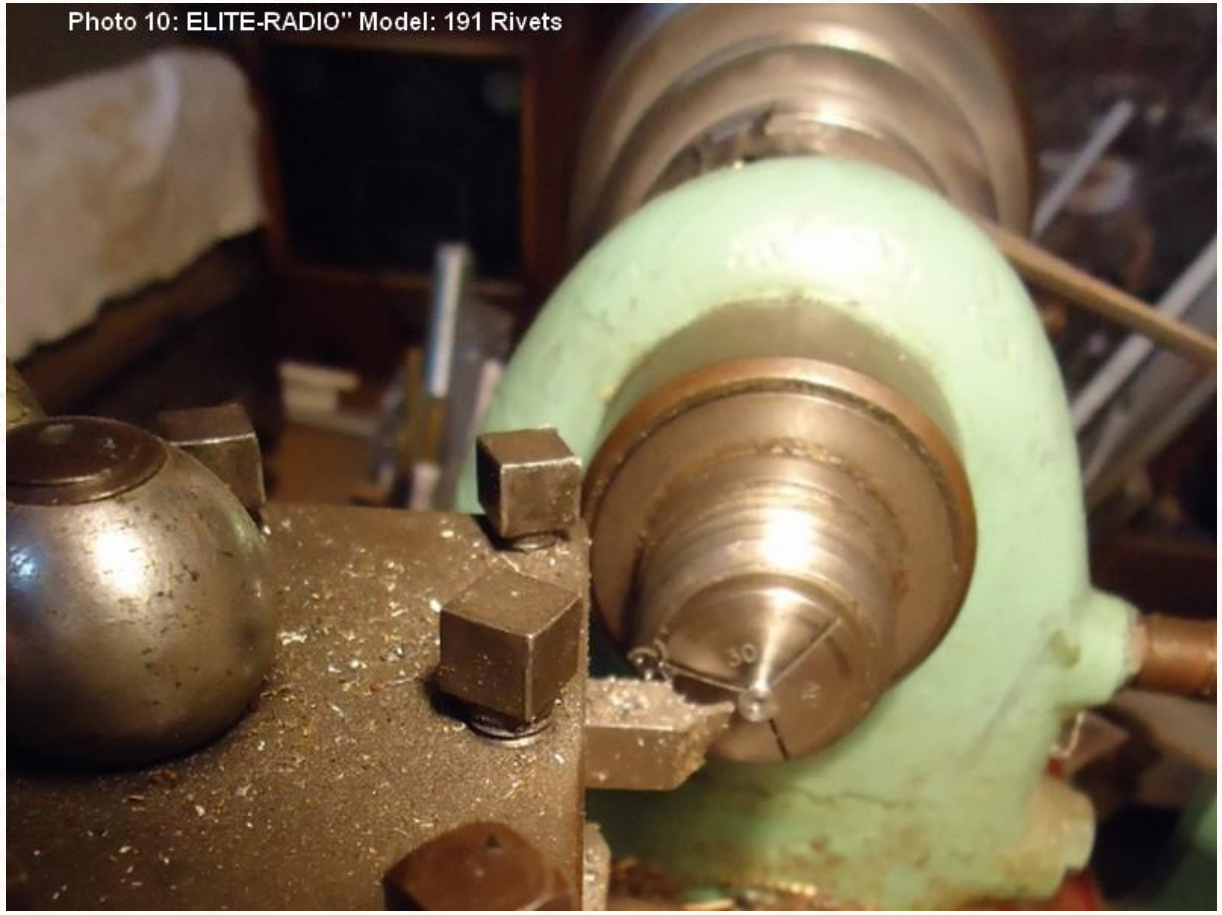


Photo 10: ELITE-RADIO" Model: 191 Rivets

- Rivets: all connectors and lamp sockets were fixed to the frame with rivets. To remove them I had to destroy the rivets using a drill. Unfortunately I didn't possess any similar rivet. In order to keep the same aspect, I modified, using a lathe, some screws 3 mm in diameter with cylindrical head, to give them the aspect of a head of rivet (Photo 10).

Works of reassembly

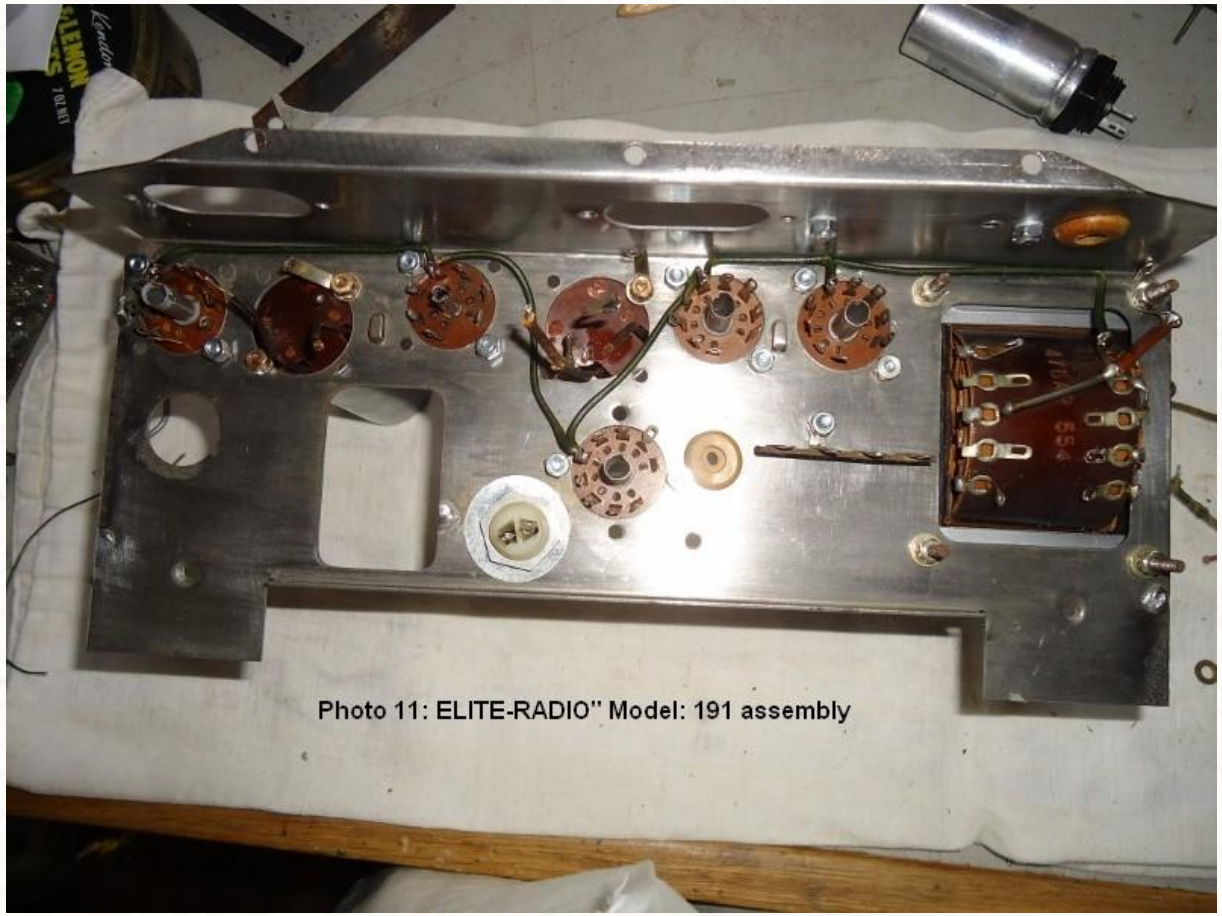


Photo 11: ELITE-RADIO" Model: 191 assembly

- The first operation was to install new tube sockets identical to the former which were in very poor condition.
- Then I reinstalled the IF transformers, the power supply transformer; now, I could proceed with the first welds by setting up the filament heating circuit (Photos 11, 12, 13, 14).

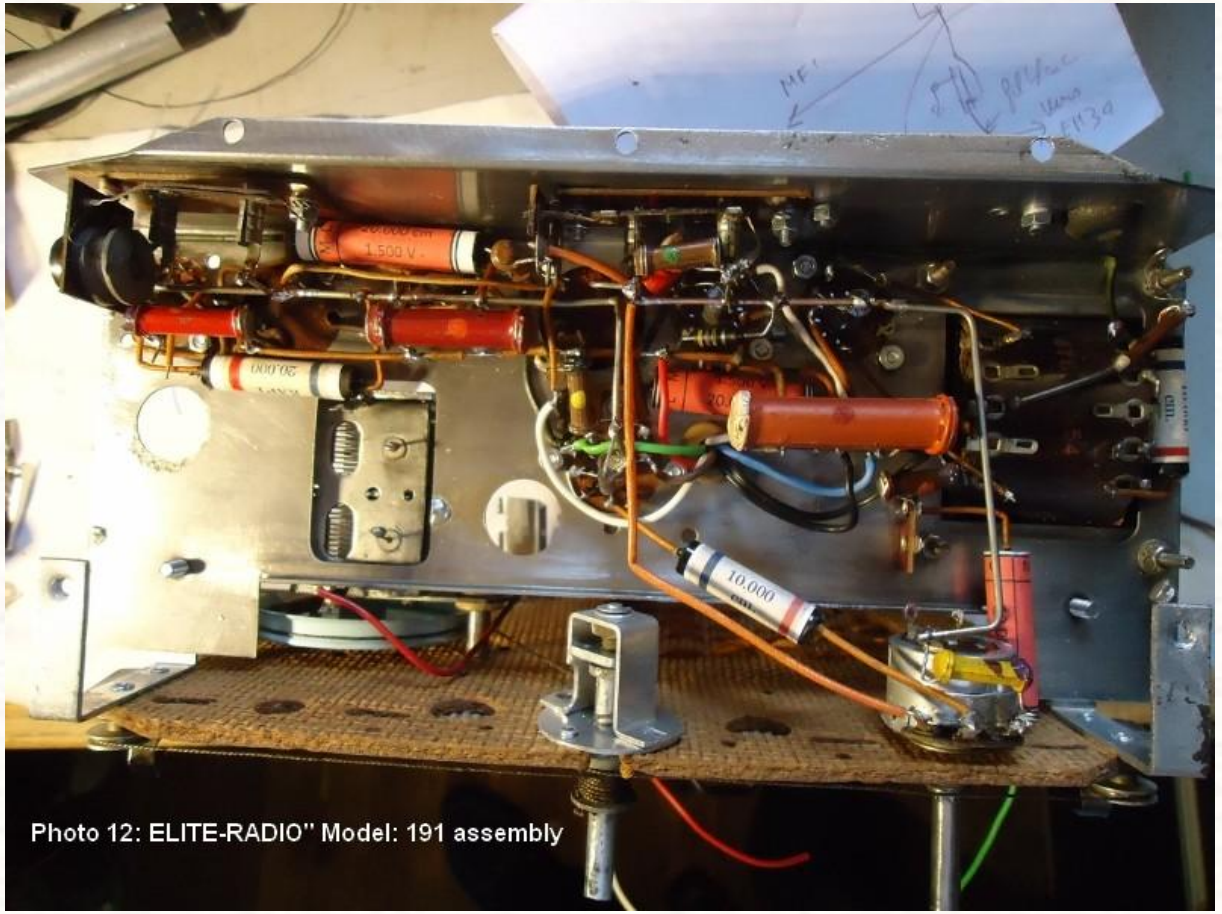


Photo 12: ELITE-RADIO'' Model: 191 assembly

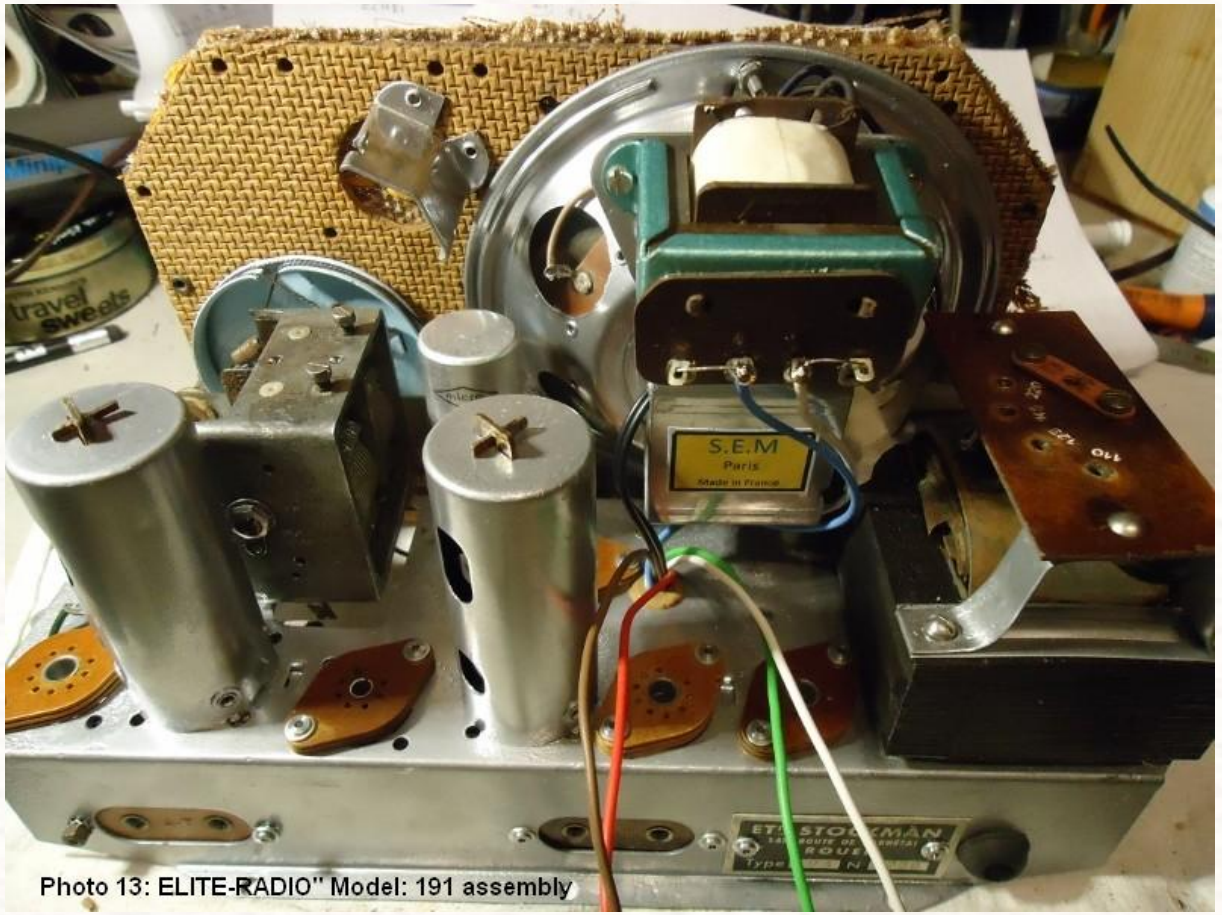


Photo 13: ELITE-RADIO" Model: 191 assembly

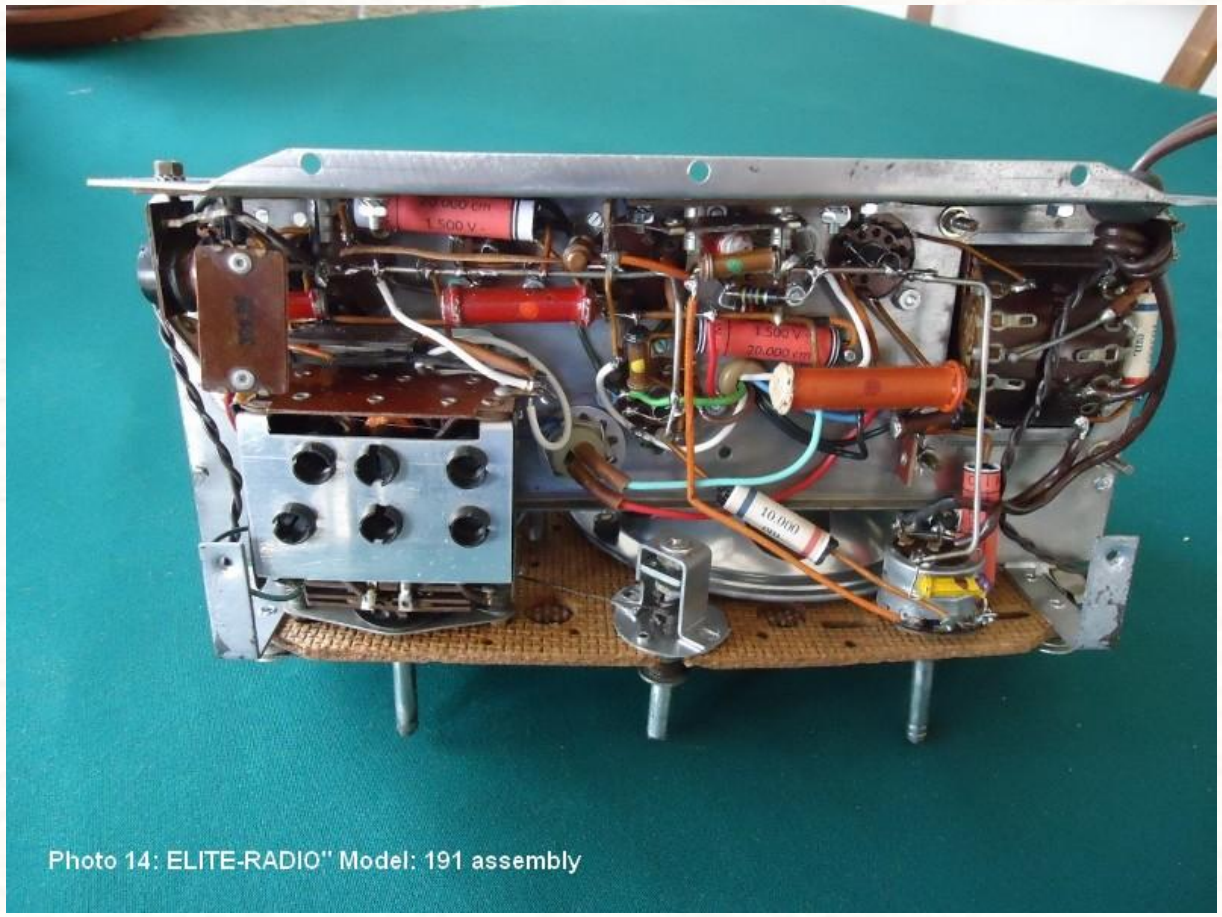


Photo 14: ELITE-RADIO" Model: 191 assembly

- The reassembly was made in the same order as the dismantling, that is by beginning with the audio amp, then the IF section and finally the HF part. Because a lack of space, it was not really easy to reinstall the 5 last mica capacitors. At each step, I made a function test by injecting a square signal with a signal tracer.
  The most boring work, and it will amaze nobody, was the reinstallation of the double strings for the variable capacitor and the needle.

And finally

Photo 15: ELITE-RADIO'' Model: 191 After restoration

- One month of intensive work, but a strong satisfaction when, connected to a good antenna, at the power-on time, and after a few minutes of suspense due to the heating of the lamps and searching for a station, the loudspeaker began emitting a pleasant and harmonious sound. (Photos 15, 20)

Photo 20: ELITE-RADIO" Model: 191 After restoration

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