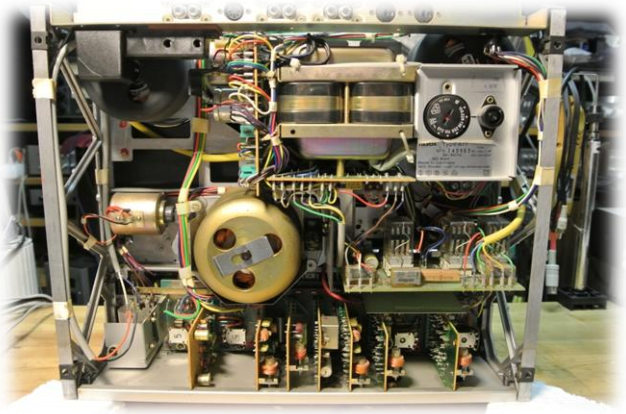
18-10-2014; picking up the ReVox

Normally there is always a story behind each piece of audio I am going to pick up but this time there was only a simple reason. I still had 10 pcs 26 (cm) reels with tape of studio quality with 2-track recordings that I did not appreciate so they had to be deleted. However, I had no 2-track recorder so I searched for one on an e-marketplace. There I found this ReVoX A-77. I know the A-77 of the overhauling of my 4-track Dolby version and I am quite charmed about it, so I placed a bid. The bid was accepted and on 18 October 2014 I picked up the recorder in Nijverdal. The story: the recorder was found on the attic when the new residents moved in. Three reels with tape and a dust cover came with it, no power cord, operation condition unknown. The recorder looks good and complete. I loaded it in my car and went back home.

27-10-2014; the ReVox on my working bench

The recorder had to wait about one and a half week before it could on the workbench, there still was a Philips N4512 on the workbench with a broken print. The first findings of the A-77 were not disappointing: heads are neat, complete, lettering is still intact, no major damages. A small damage to the woodwork on a corner, an advertising sticker on the front, the plastic supports under the Cabinet are missing so on the bottom some light scratches, too bad but we will find an alternative for that. For the rest the recorder looks nice and dusty as usual.

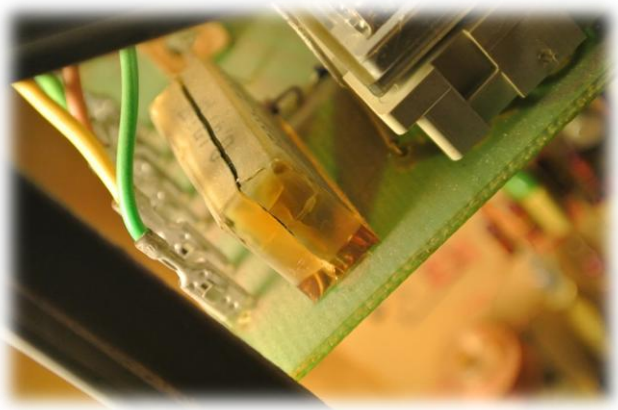
27-10-2014; removing the Revox from its cabin



Unfortunately no amplifier prints, that is disappointing, I hoped that they were there. For the rest the recorder looks perfect on the inside, a little to no dust, no nicotine tarnish, everything seems original which is generally a good sign. The counter belts need to be replaced. According to the sticker on the bottom the recorder has been adjusted in 1987 by "Edmund sound", which is already 27 years ago so a fresh service job seems to be in place.

Connected the remote control dummy plug, made some dummy plugs for the net security and connected the recorder to a variac with a 220 (V) lamp in series to see if there is any short circuiting. Slowly increased the voltage to 80(V), scale lighting and light bulb optical stop start lighting up, so there is still life in the ReVoX. After 5 (min) increased the voltage to 160(V), capstan motor starts running, winding motors also run. Another 5(min) later increased the the voltage to 220(V) everything responds well, also the relays, so overhauling is worth it.

Important is when starting up an old ReVoX A77 you have to keep an eye on the RiFa metalized paper capacitors. It turned out that this is often the cause of failures. There are several known cases they can explode as a result of drought of the material, which in that case can cause short circuiting. That is also the case with this A77, the RiFa's swelled already pretty bad and started to show cracks. Immediately I switch of the power and the first thing is to replace all of the RiFa's.



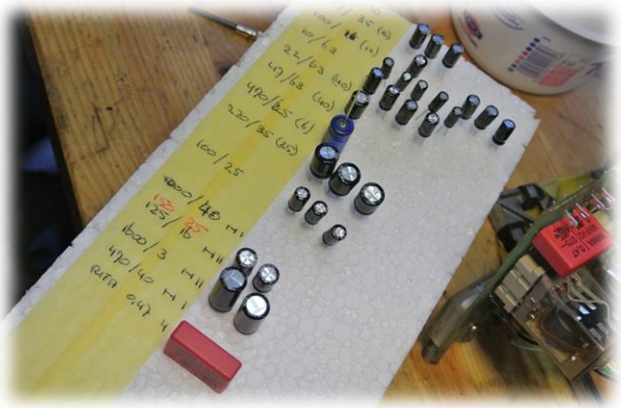
30-10-2014; order new parts

At first I made a list based on the Service Manual which I had downloaded from the site of Studer Revox. Next I compared the required capacitors with the capacitors in the recorder itself. And also in this case it shows that there are differences between reality and the Service Manual. I always retain the original values as in the recorder itself. In case of the building types (axial or radial) I always retain as much as possible the original type but sometimes you have to replace axial by radial because axial is not available. For all the weak setup potentiometers (well-known problem of the A77) I ordered new Piher potentiometers. And of course 4 pcs new WiMa MKP-x 2-0.47 µ F/275VAC capacitors for replacing the RiFa's. And then it is waiting until the parts have arrived.

31-10-2014; preparing the overhauling

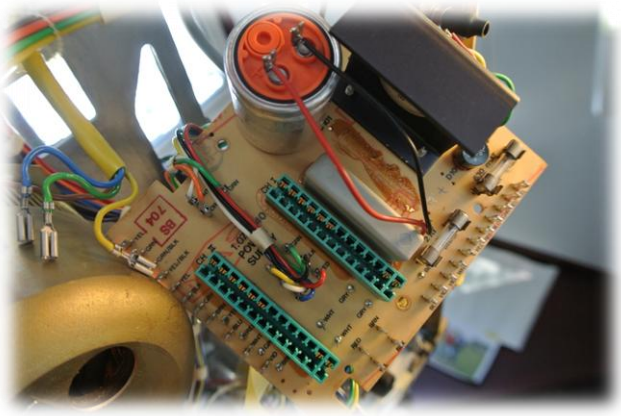
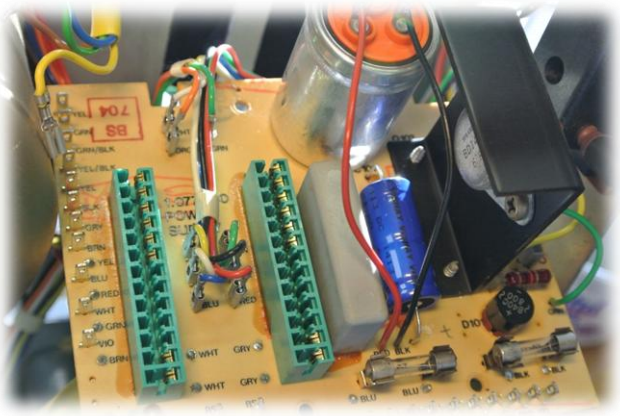
In the mean time I start the preparation for the overhauling: I removed all plug-in PCB's (Printed Circuit Board), I numbered the PCB's and I also noted these numbers on the recorder itself so later on I know where they belong, this saves up time by replacing them. All fixed PCB's will be disassembled if necessary. Wire connections are disconnected, I always make a lot of pictures and also make drawings of the wire connections. When the PCB's have replaced I can check the wire connections. I don't trust the Service Manual on that.

5-11-2014; new parts have arrived, sorting the parts



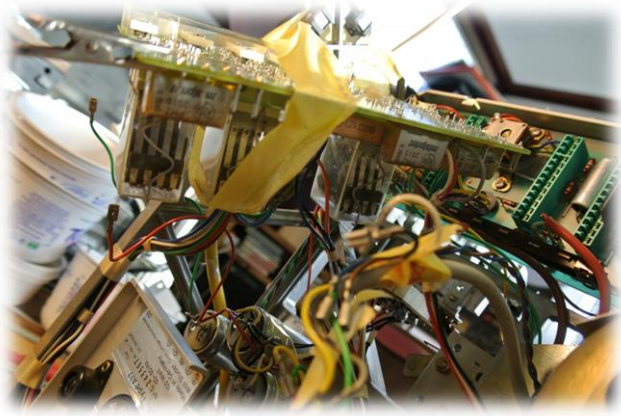
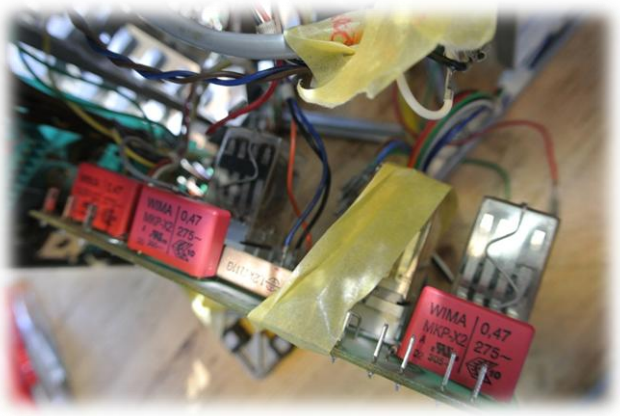
Always nice to get such a package with new parts with an overhauling in prospect. Right here the capacitors are sorted, this way you save up yourself a lot of time to searching during overhauling.

8-11-2014; overhauling the Power Supply PCB

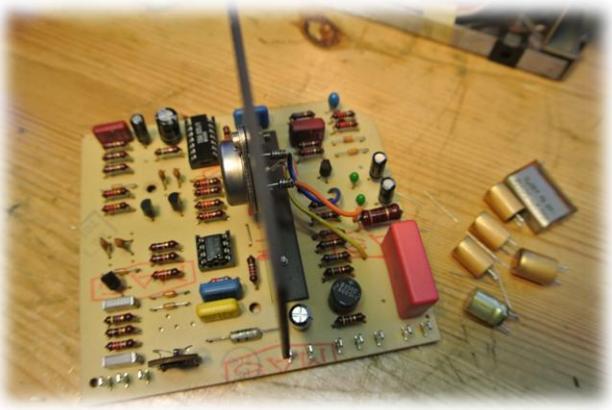
Replacing the axial capacitor on the power supply PCB. I have disassembled the print and with a little extra effort the old elco can be de-soldered and the new one can be soldered in its place. On this PCB also the potentiometer, P-106, has been replaced.

8-11-2014; overhauling the Tape Drive Control PCB

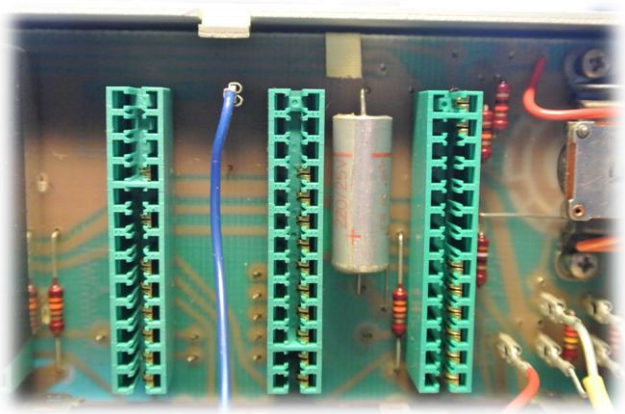
On this PCB I replaced the three RiFa's and an elco.

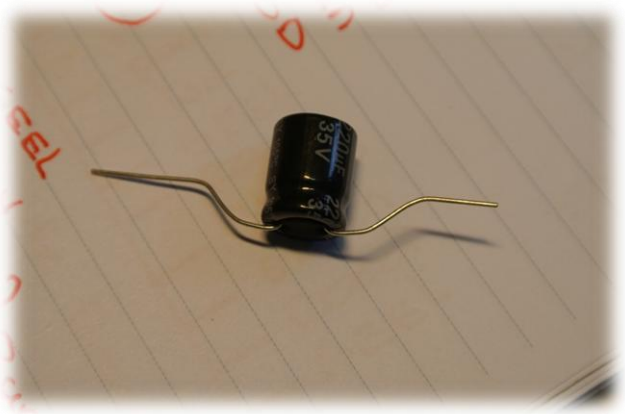
8-11-2014; overhauling the Capstan Motor Control PCB



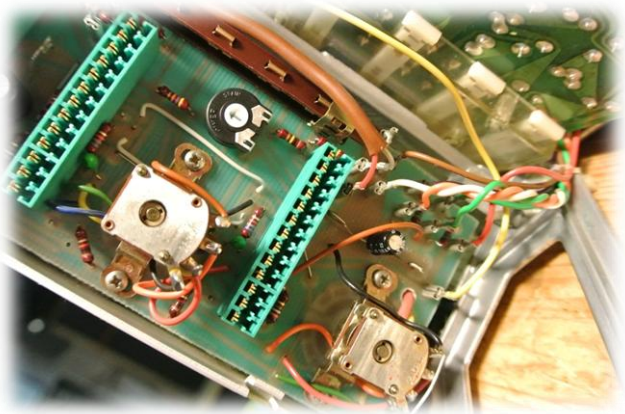
I disassembled this PCB completely from the recorder. Overhauling is a lot easier that way. The RiFa and the electrolytic capacitors are replaced. The setup potentiometer turns out to be a solid type, so probably replaced before.

8-11-2014; overhauling the Switch Board PCB

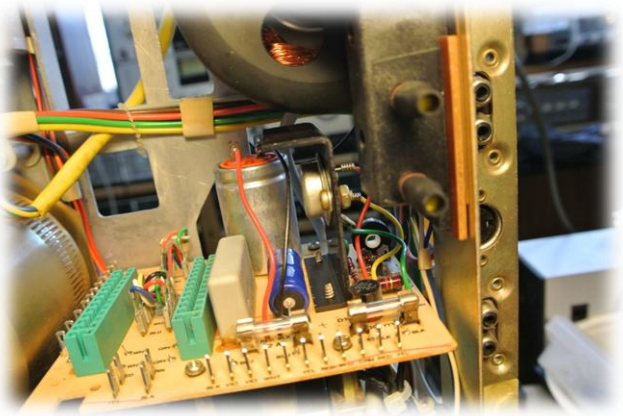





This needs an alternative approach, because the switchboard is not accessible on the solder side unless you want to disassemble the recorder completely. So I cut out the axial electrolytic capacitors and soldered the new radial capacitors to the connections of the old capacitors. Make sure that the old connection will not be heated to long and loosening the connections on the solder side of the PCB. On the Switch Board there was also a setup potentiometer with a weak runner and is replaced as well.



8-11-2014; assembling the fixed PCB's



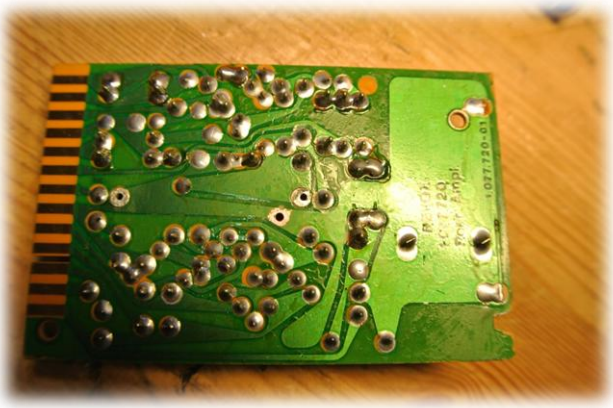
Before I continued with overhauling the plug-in PCB's I first mounted all fixed PCB's back in the recorder. The photographs and sketches that I had made of the wire connections came very useful for this job.

8-11-2014; overhauling the plug-in PCB's

Next I overhauled the plug-in PCB's, all capacitors and weak set-up potentiometers are replaced. Sometimes the runners of the original set-up potentiometers came of spontaneously.

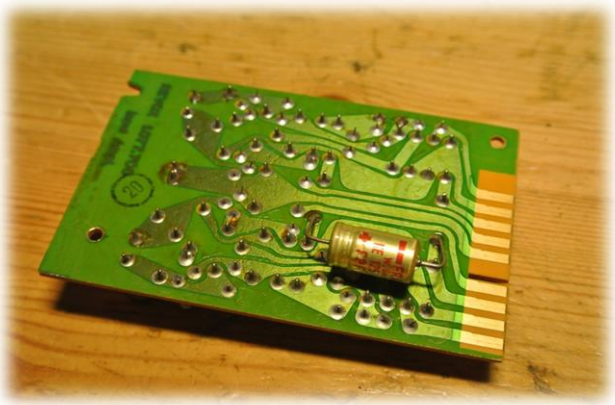
I measured the original setting of the old potentiometer, next I set the new potentiometer to the same value before soldering the new potentiometer on the PCB. Now I know that the setting is at least in the right direction.

8-11-2014; Playback and Drive Amplifier PCB



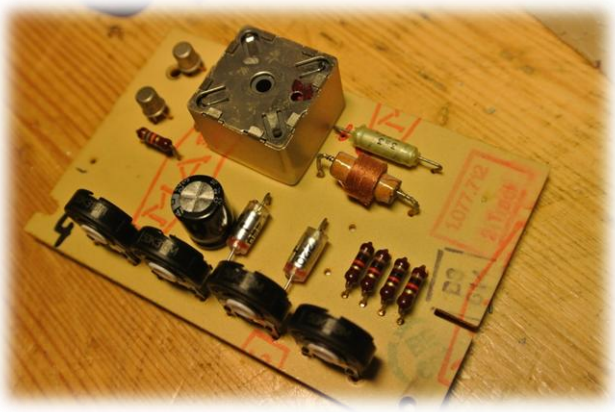
There are two of them in the A77, they are identical, the large axial electrolytic capacitors are replaced by radial types. For a neatly mount on the PCB I drilled a new hole in the PCB. One of the capacitors is mounted above other components, I insulated the connecting wires, just in case. I also replaced the setup-potentiometers.

8-11-2014; Input Amplifier PCB



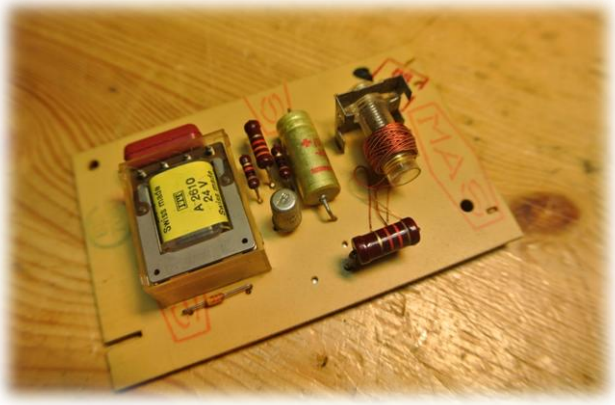
At the Input Amplifier there is an axial capacitor on the back side of the print, the reason for that is entirely unclear to me. This axial electrolytic capacitors have been replaced by a radial type and I have mounted them both on the front of the print. Of course I also replaced the other capacitors.

8-11-2014; Oscillator PCB



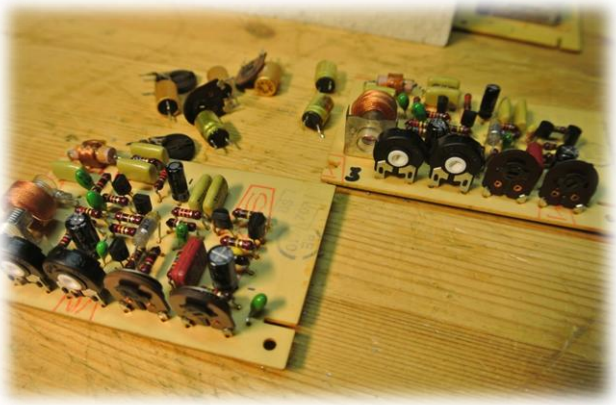
On the Oscillator PCB I replaced the axial elco by a radial type, also in this case a new hole was drilled in the PCB for better mounting of the elco. Replaced 4 setup potentiometers, all settings of the old ones copied and set the new ones on the same value. PCB looks great with the new parts.

8-11-2014; Record Relay PCB



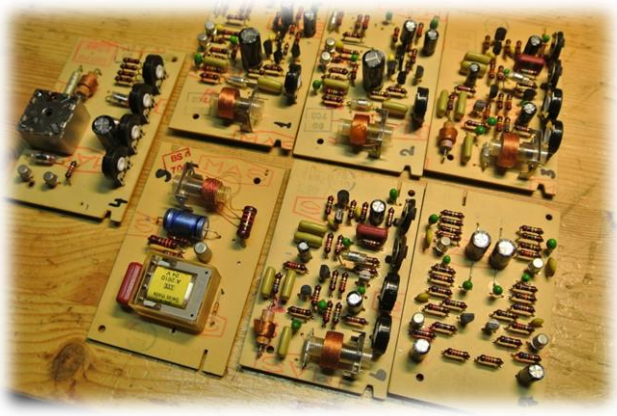
On this PCB only one axial elco to replace, in this case replaced by a new axial one.

8-11-2014; Record Amplifier PCB



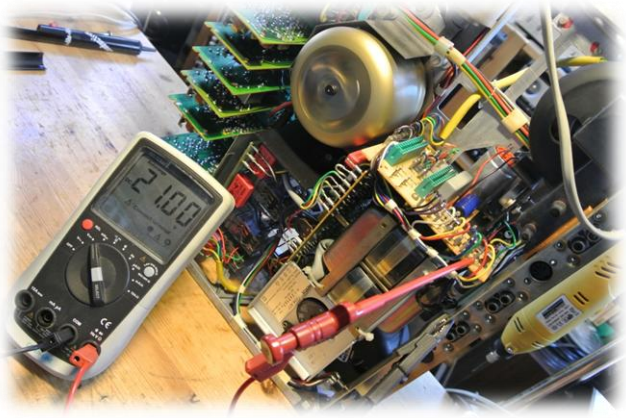
The last two plug-in PCB's. All capacitors are replaced and I replaced on each PCB two setup potentiometers, the other two were already replaced before by a good and sound type. Less beautiful to look at, but replacing good parts is not necessary in my opinion.

8-11-2014; all the overhauled plug-in PCB's



A group picture of all the rebuilt PCB's. Next replaced the PCB's back in the recorder.

8-11-2014; first tests



Because I copied al the settings of the setup potentiometers that I had replaced, I dared to connect the recorder directly to the net and start testing the functions of the recorder. But unfortunately....., the capstan motor would not run. Generally speaking this means a power supply problem. Studied the schematics in the Service Manual, first the 21 (V) on the Power Supply PCB, measuring on ED1 value set with P106, no positive result. Measured the other power supplies from the transformer, everything is in order, sigh ...., what can I do..? Hey what is this ... while I touched the fuse F102 with my probe the capstan motor starts. Taken of the fuse and measured it, it is in order. It appears that the connectors of the fuse are a little bit too wide. I fixed the problem by putting the connectors a little tighter, fuse in it, power on, and yes ..... the capstan motor is running again, I am happy...., it is always a beautiful moment to see the life return in such a recorder of about 40 years old.

9-11-2014; first checks

At first I check if all functions are working correctly. All functions appear to work fine, play, winding left, winding right, record, brakes, no problems at all. Some creaking of the switches fixed with an IPA treatment. There is also a clear volume difference between source and recording, but that was to be expected given almost all setup potentiometers have been replaced. So the next step is to adjust the recorder in accordance with the service manual.

14-11-2014; adjustments of the recorder

Adjustments according to the Service Manual are executed in the order as described in the Service Manual. Some steps I skipped because I did not consider it necessary to adjust the settings. An example of this is the adjustment of the heads, the wear tracks on the heads are straight and the heads are still in factory settings, the varnish on the nuts is still undamaged. Pay attention when running the settings because there is a "supplement to the adjustment instructions" in the Service Manual that gives customized values for, among other things, to measure "output and input voltage" at various situations (1.55(V) instead of 2(V) and 155(mV) instead of 200(mV)). For the input signals I always use a tone generator on the PC and for measuring the output voltages a multimeter. For adjusting the Bias there must be a Δ(V) be set which is, depending on the kind of tape, mentioned in a table in (dB). I determined the Δ(V) with the multimeter connected to the tone generator which is set to the specified value. Reducing the tone generator according the indicated value (dB), you can determine the Δ (V) on the multimeter.

The following adjustments were made:

- Balance adjustment
- Playback level from test tape
- Bias
- Record level
- Record equalization
- VU meter calibration

15-11-2014; cleaning the cabinet

After the adjustments were made I cleaned the cabinet and repaired the damaged corner and I neatly polished the cabinet. Cleaned the front panels, removed the sticker at the front and cleaned the buttons with a toothbrush.

17-11-2014; new supports

The Cabinet provided with two new supports, not original, I know but the height is the right size and it looks acceptable in my opinion.

17-11-2014; replacing the A77 in its cabinet

The cabinet is ready and the recorder can be replaced in its cabinet. Replaced bottom plate, removed service pins, removed dummy plug of the remote control and gently placed the recorder back into the cabinet. The mounting screws back in and the recorder can get back on his back. We are not done yet.

17-11-2014; new counter belt

Two new belts mounted for the counter. To mount the long belt the break unit has to be removed. The little belt is originally a toothed belt, but the counter works also fine with a round belt without teeth. It may be not as precise but it works fine for me.

17-11-2014; front panels back on

Finally, the front panels and buttons mounted back on the recorder, two reels, one with tape and we can play. Everything is working fine again, sounds fine to me, no audible difference between source and recording and it looks neat again. I am very satisfied with the result and can enjoy this ReVoX A77 for many years again.

17-11-2014; the last detail pictures on my workbench

THE END