Part IV

Schematic diagram of the power supply

Power supply pictures

Urfa 610 [(= 6 volt at 10 mA), when broken, what often is the case; or eventually to save the Urfa from being blown-up, by means of a bridged zener-diode of 5.9 volt

Part V
(Deo volente, ready about November 2007)
dealing with:

Photos of details of the tuning capacitors (part V)

Some additional tips (Part V)

Transformator details (Part V)

Explaining what Urfa is about, to caption of photo 50 (why external negative to g1 is essential) These subjects are covered in part V.

Part IV

The power supply module (Netzteil)

Photo 52

Shown is the rear view of the Köln's power supply module, which can be accessed from outside, even when the housing (Gehäuse) is regularly fit. Let us follow briefly from left to right what is visible. On the far left, we see the two mains fuses of both 1000 mA. Then the ac. mains connector, which is today still a kind of standard (Schukostecker). The black Bakelite strip is to connect ac. mains wires, without using a mains plug. The next section is the battery vibrator part, which allows operation from a 12.6 volt car battery. The switch above the exchangeable vibrator-module MZ 6001 is to select between ac. mains (Netz) or Battery operation (Batterie). The two pins socket is to connect the 12.6 volt battery (Akku). The Bakelite device above the battery plug is to connect eventually the two battery wires. Spannungswähler is to set the correct ac. mains voltage. S4 is a 10 amp fuse for battery operations. S1 is a 100 mA fuse for HT of the receiver. Rö 14/15 are both full-wave rectifier valves type RG12D60. W92 is type URFA610, which is a 6 volt@10 mA regulator device. Rö13 is a (dual) metal/ceramic neon voltage regulator tube type MSTV140/60Z = LK121 (140 volt 60 mA, **M**STV = **metal** stabilovolt-type regulator)(see next schematic).

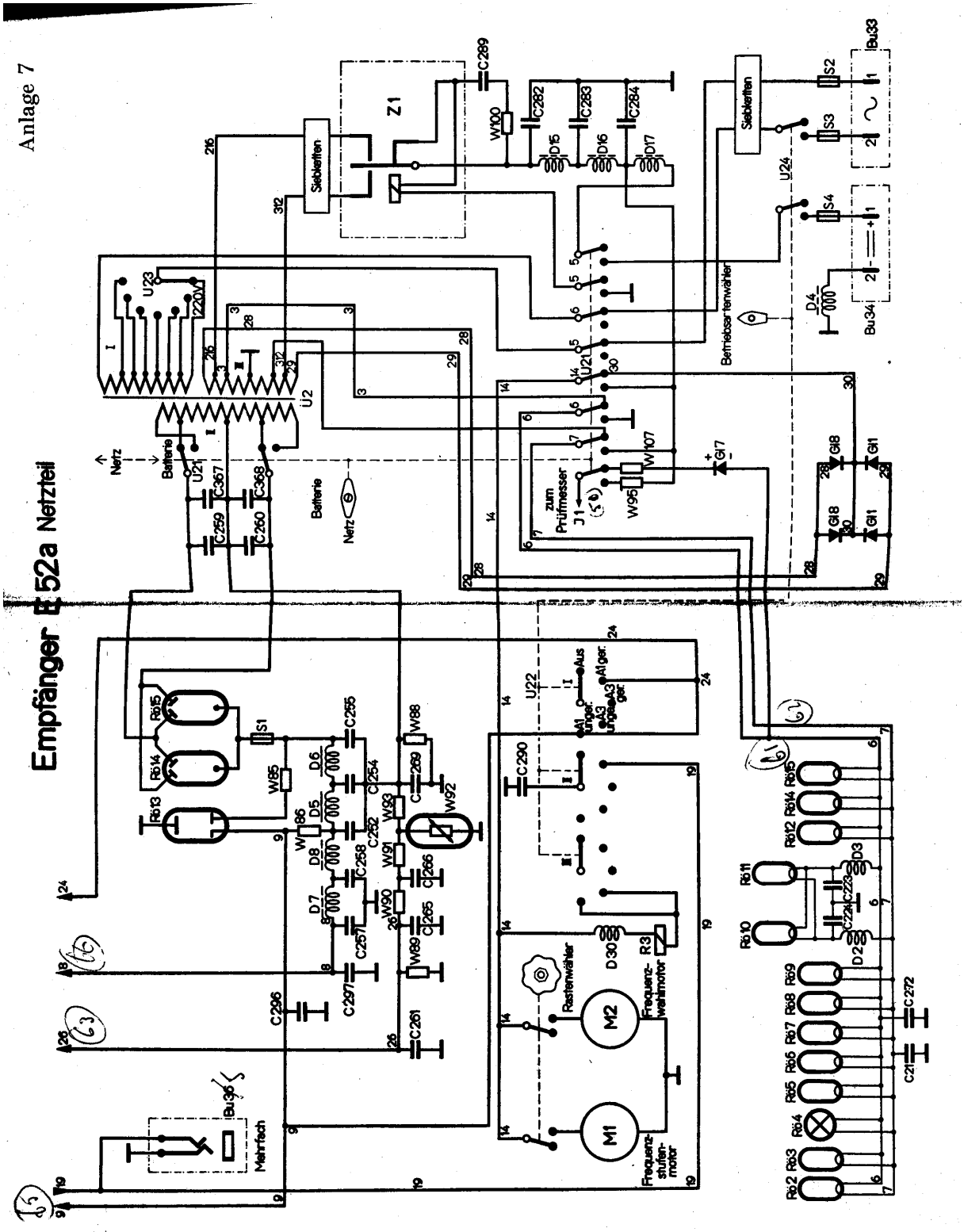

Photo (illustration) 53

Simplified schematic diagram of the power supply unit.
'Mehrfach' is the AGC output, which is used when diversity reception is concerned. Switch U21 is to select weather ac. mains or 12.6 volt battery operation. U22 is the mode-setting switch for A1 – A3 with or without AGC. M 1 and M 2 are the two tuning motors, which are not an integral part of the power supply module (see photo 28). W92 is Urfa 610 (Urdox = uranium-oxide resistor regulator). What should be done is, put a 5.9 volt zener-diode parallel onto it. The cathode should be connected, for this occasion, onto ground and the anode should be connected to the junction of resistors W91-W92 and W92. What might occur is, that when, for what ever reason, a high tension overloading happens, that resistor W 88 might blow-up.

The full receiver current will flow now via W92 from earth to the minus circuit of the Köln receiver. As the Urfa 610 is designed for regulating 10 mA at 6 volt only, the zener-diode will now limit the voltage across the URFA regulator. Rö13 is a dual neon voltage regulator MStv140/60Z. The hand written numbers correspond with number of the “mother-board”. Z 1 represents the power vibrator MZ6001.

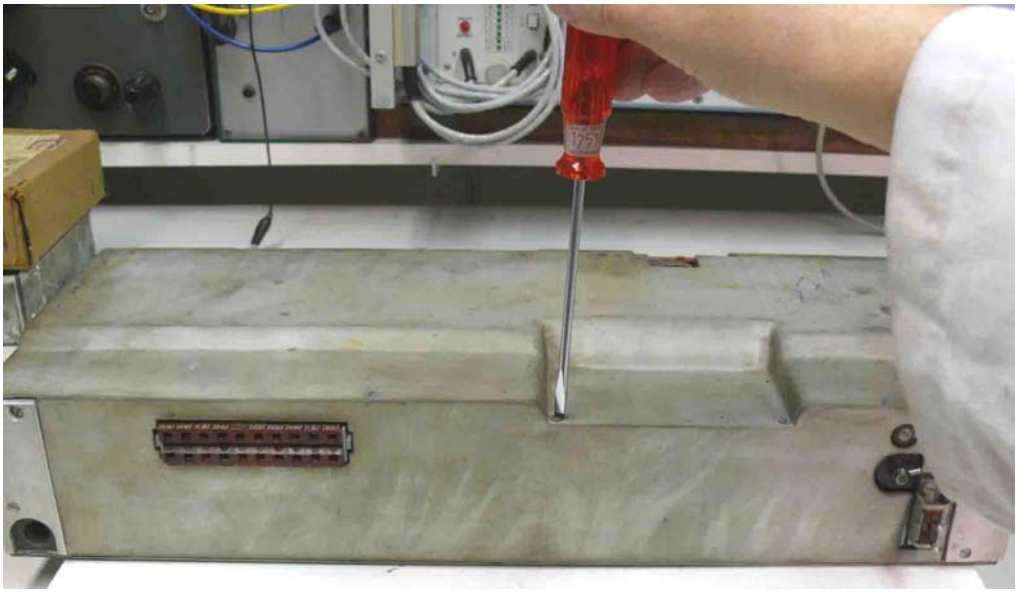

Photo 54

Let us continue with first opening the power supply module (unit). The rather massive cover plate feels like it is made of ‘die cast’. To optimise electrical screening, many screws have been used. The brown contact block on the left is the female-connector onto the “mother board” (regard photos 29-31)

Photo 55

After the cover plate is removed, we can take a closer look what this module looks like. The transformer is placed about in the centre of the module. Without further explication, it is evident that its construction is very compact and neat.

Photo 56

The same side of the power supply module, though looking now from its rear. Its proper construction is even better visible. All capacitors are of the sealed-off type. Which are ceramic/soldered as to prevent any contact with environment, this technique guarantees very long live cycle of components. It has to be said, though, that the Germans used after say mid 1943 often less reliable types (less expensive). These were like common Allied practice, sealed-off by means of pertinax (strips or disks). They encounter similar defects as have most Allied capacitors. However, the Germans used until the "bitter end" high class components in Köln receivers and some other high-end apparatus. The entire receiver employed only one (dual) electrolytic capacitor and this is in the smoothing circuit of the 12 volt vibrator. As high value capacitor-blocks would have occupied much more space than did an electrolytic type capacitor (Elko). By the way, the Germans used hardly any electrolytic capacitors at all in their military apparatus

Photo 57

The power supply bottom view. Right from the exchangeable vibrator plug-in (MZ 6001) we see the smoothing filters for 12 volt operation. Siemens & Halske may have been then the world's leading firm in the fields of "man made interference rejection" (filtering). They developed high class components which were especially designed for interference rejection (smoothing). Please notice, for instance, the rather heavy wires from the smoothing capacitors on the right of the three RF chokes. Guarding and controlled "earthing" was very well understood and being practised regularly. Siemens possessed a wide range of patents in this special field. The rectangular metal plate left of the vibrator unit is to screen-off the ac. mains filter section. (consider also Patent DE)

Please go to the next page

Photo 58

The brown rubber wires on the right belong to the already mentioned (dual) electrolytic capacitor. The quality of this rubber is even today still good, owing to the fact that the Germans used extensively synthetic rubber (Buna)*, which does not suffer from natural rubber deterioration (decline). Nowadays we hardly will find Allied wartime rubber artefacts in good (mint) fashion. The brown tube socket in the down centre is for the Urfa610. The zener-diode across it, is in fact wired parallel onto it. Thus wired from the junction W91-W93-Urfa610 and ground. The cathode (marked with a black line) is connected to ground and the other end onto the junction W91-W93 (schematic 53). We have, though, to notice that valve grids need a negative voltage, thus ground (earth potential) does represents +. This negative potential originated not from a separate power source, but is resulting from the product of: resistance W88 x I_{rec}. The regular HT current is also (mainly)flowing through resistor W88. Urfa610 is connected via W93 onto W88's negative potential. What can occur is, that, for what ever reason, the receiver HT is crossing a certain current limit and W88 may burn-out. The HT current tries to flow now via Urfa610 also known as W92 to ground (*de facto* it flows from ground to W91-W93). As we have already seen, it should regulate 6 volts at 10 mA. The receiver is then consuming at least five to ten times that value and our Urfa is dead within not jet a second. The zener-diode of say 5.9 volt (5.6-5.8 volt types will do too) is securing that our Urfa will not die from this sort of nuisance. I don't know why, but seemingly 90 % of all Urfa610s found are mechanically defect. Often at one end separated (open) from its mounting bridge. I believe, that the nature of the very thin 'uranium-oxide wire' might not have bound correctly with its welding(soldering) onto the carrying bridge (see comments to photo 58). Just left of the brown rubber wires, we see the switch or jumper-like switching arrangement 'U25', which provides weather HF/DF operation (Peilbetrieb) or regular receiver usage (regard also: Luftboden-Programm)*they had no access to natural rubber

Photo 58

On the left we see the Osram Urdox type 610 (by the way, Osram is originally a German firm, ‘British Osram’ became a “war trophy” after WW I, as was Siemens Brothers and Persil as well as many others). On the right, we see the tinny black wire between the two bridging wires (tiny black line just a bit right of the centre). It might be, that the ‘uranium-oxide wire’ had been soldered (welded?) and that this did not fit well (bad amalgamation?).

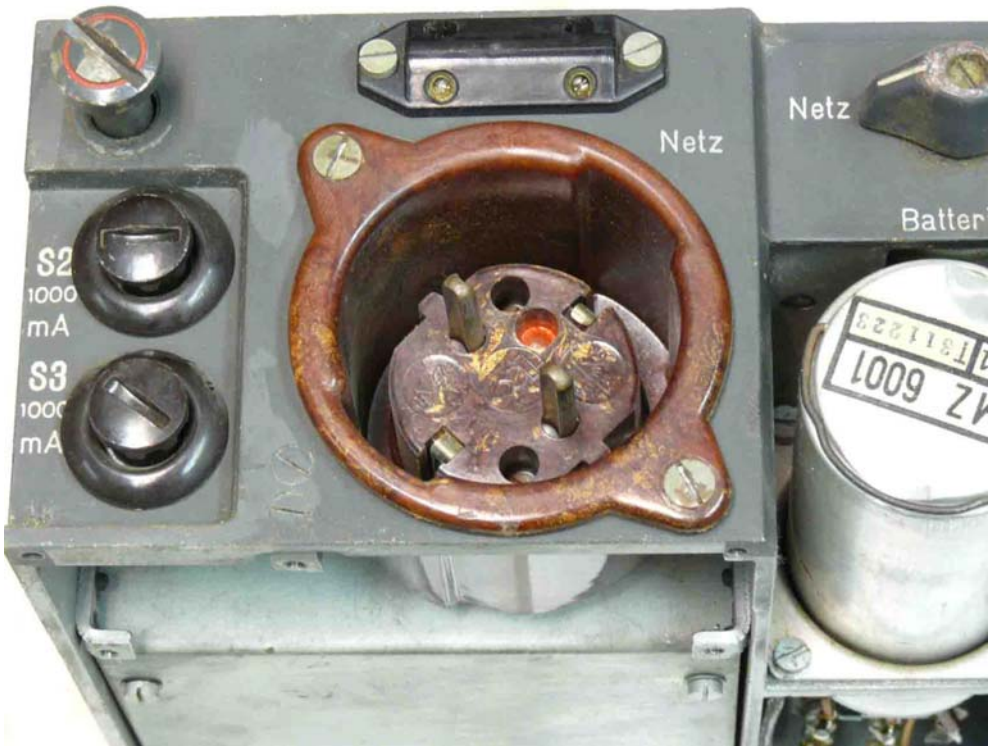

Photo 59

A closer look at the far rear left-hand side of the power supply module

Photo 60

Closer look at the battery section at the rear

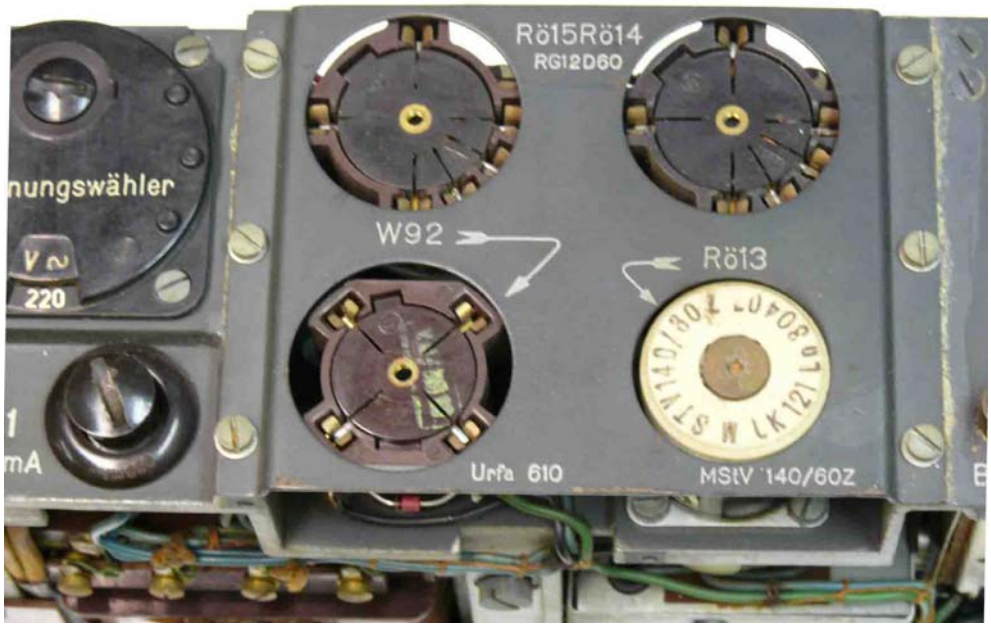

Photo61

Telefunken cleverly positioned valve sockets in such a way, that replacement of all valves was easy, without the necessity of removing the housing of a Köln receiver, though, only by lifting a covering lid. (The additional 5.9 volt zener-diode is just visible)

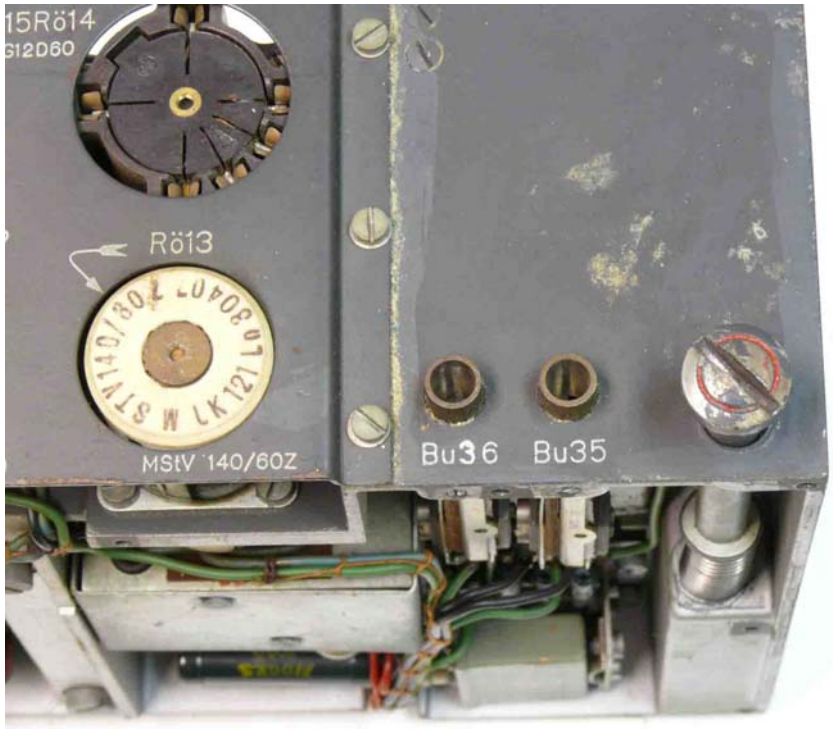

Photo 62

The most (rear) right section of its power supply module. Jack plug Bu 36 is providing LF(audio) output and Bu35 is to feed AGC (AVC) signal-levels onto diversity systems. (see schematic illustration 53). I myself use Bu35 as to link (connecting) a blocking signal onto the receiver circuit