Repair of Hybrid PreAmp in HP 8640B

One of my 8640Bs had low output on frequencies higher than 300MHz and after a longer period there was suddenly no output on all frequencies – a total blackout!

The reason could rather easily be found: An outage of the hybrid preamplifier. Feeding the final amplifier with a signal from another HP8640B gave full output on all frequencies – the bad guy was identified!

The failure of the preamps seems to be a known problem of the 8640B. The original hybrid is not available – or at prices like their weight in gold in the famous auction platforms!

VE7CA proposes to use a MMIC (MAV-11) and to modify the supply; see /1/ and /2/.

Luckily I had a another (and well operating) 8640B and checked some levels at the preamp:

Input: 600mVpp; Output: 6 Vpp; this is a gain of 20dB.

Checking the MMIC datasheets /3/ I decided to use an ERA-4, because it´s output and gain is higher and nearly reaches the data of the original hybrid preamp.

Picture 1 is the new scheme with ERA-4 soldered onto the base of the original hybrid.
The cap could only be removed by destroying it and the old hybrid could be removed from the base with a sharp screwdriver.

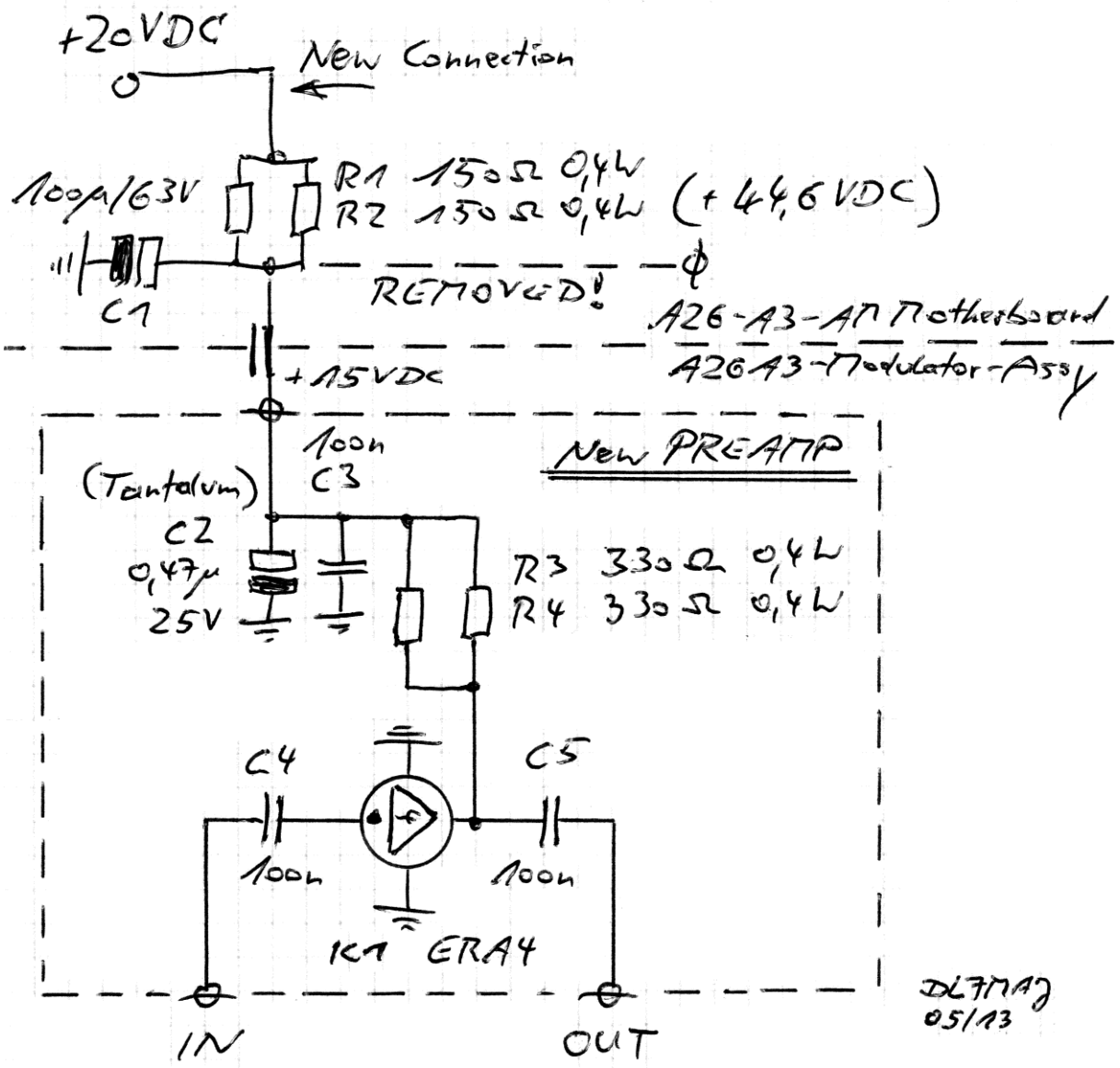
The new supply voltage is derived from the 20VDC via R1//R2 which results in +15VDC at the input of the new amplifier – the drawn current is constant app. 65mA.

The rest is "only" soldering (picture 2). Don´t forget to solder the ground to the center pin.
Due to the high mass of the hybrid it´s necessary to use a high-power soldering iron…..
Alternatively (to avoid possible overheating of the soldered components) you can use a separate pcb as proposed by VE7CA.
Keep the components flat on the base due to restricted space inside the module.

When all is operating well protect the circuit with a small cover against contact with the mesh inside the case of the module (picture 3). Thermal transfer compound is not necessary because the thermal losses in the new circuit are much smaller than in the original circuit.

Next step is the modification on the motherboard to replace the original +44.6VDC with the new +20VDC (picture 4):
- Remove the wire from +44.6VDC and bend it away
- Solder C1 to the feedthrough
- Solder R1//R2 between +20VDC and the feedthrough

For more details have a look into the manual /4/.

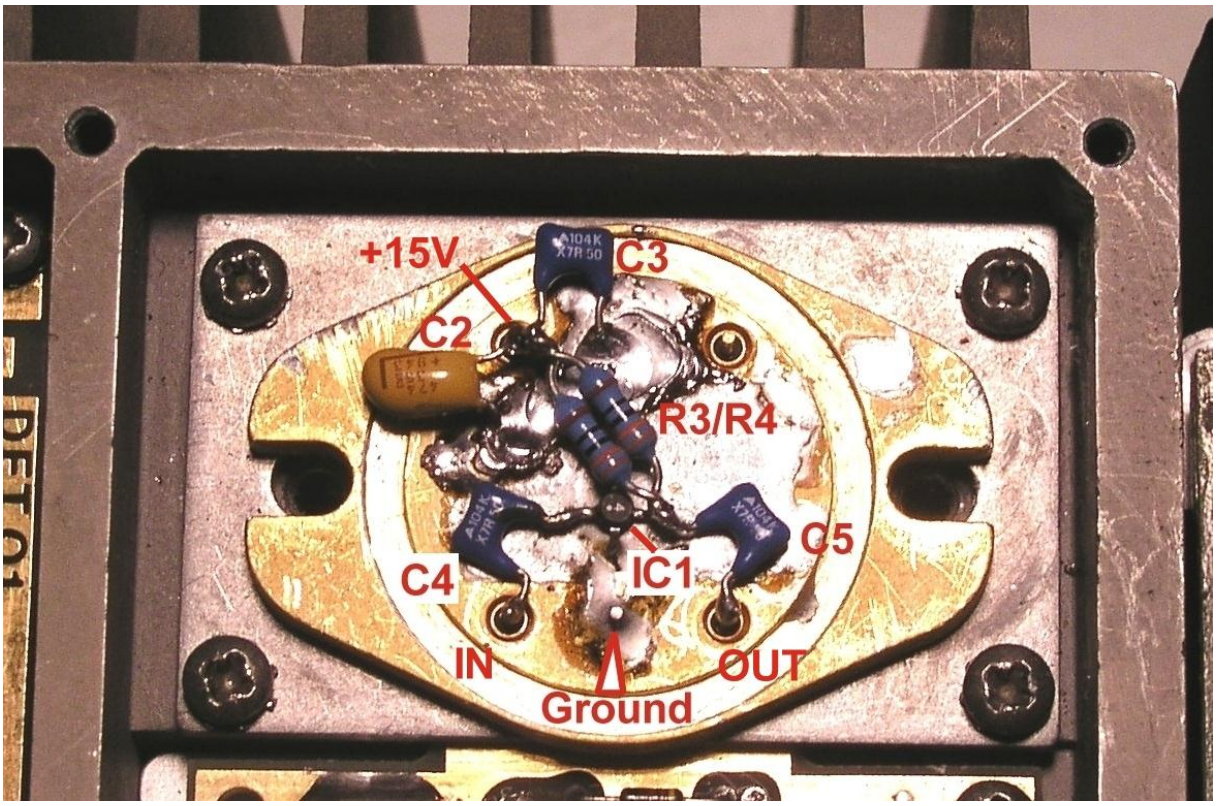


Picture 1: New PreAmp with ERA-4

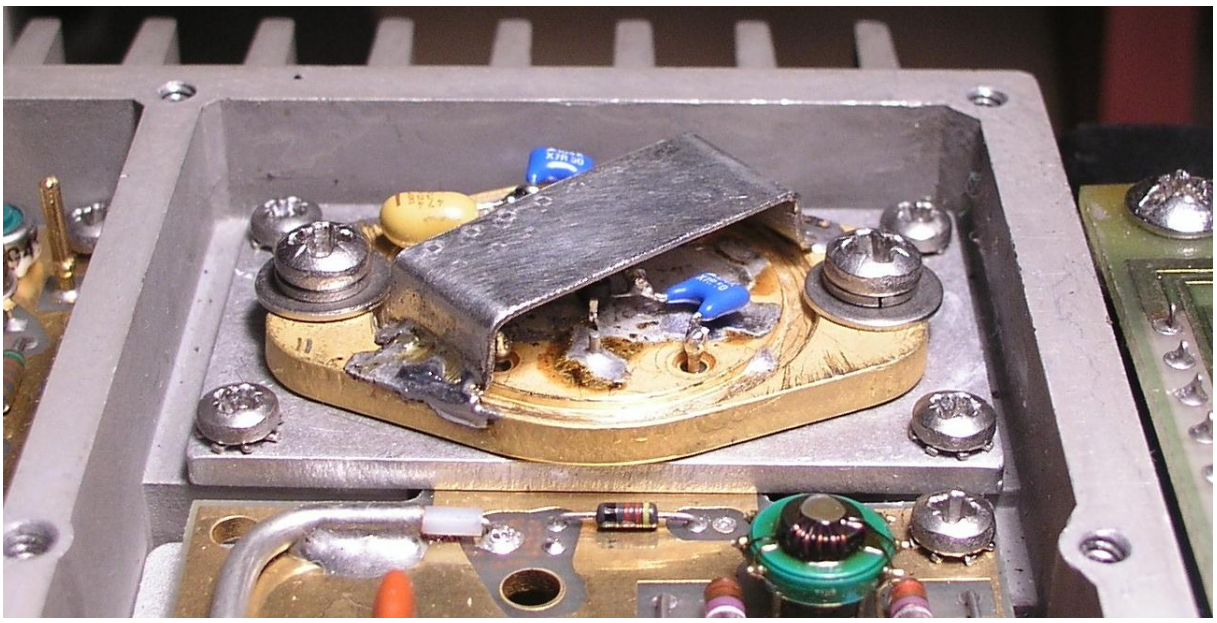
Without the new hybrid check that +20VDC are present at the pin of the hybrid inside the module – with load of 65mA the voltage will drop to 15VDC.

Insert the new module and check that the voltage drops to 15VDC!
If not there is a problem – check wiring and the circuit!

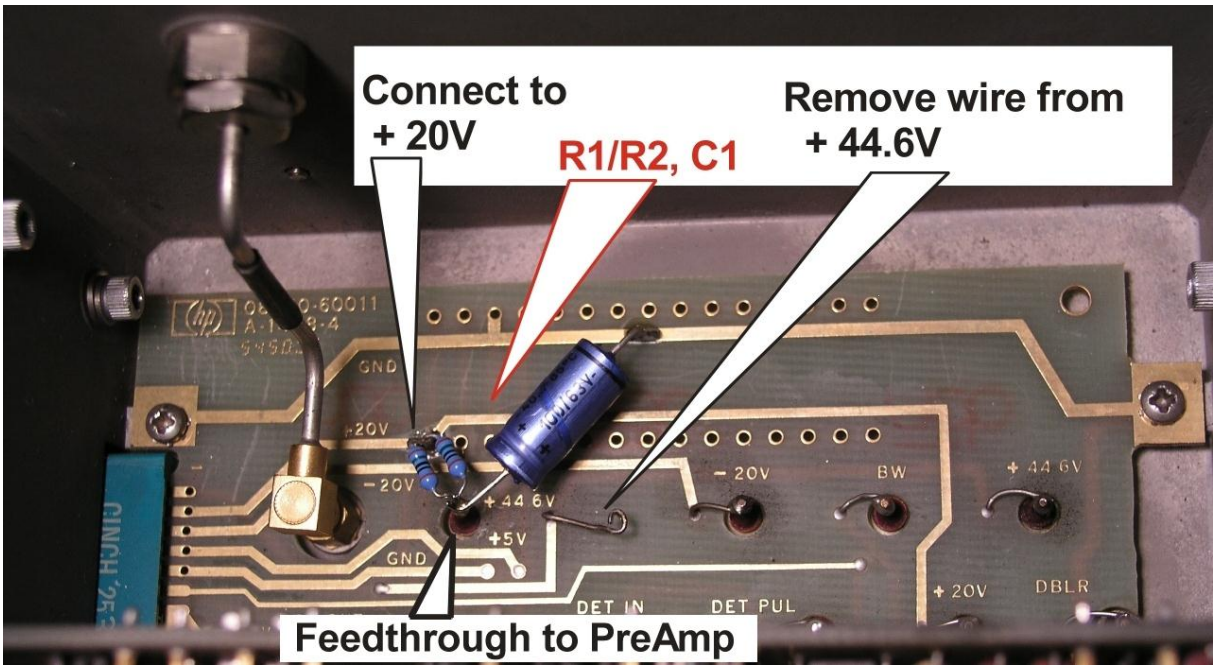
If you can see picture 5 - Congratulations!



Picture 2: New PreAmp



Picture 3: Cover



Picture 4: Modifications on the Motherboard A26-A3-AM

Picture 5: Full output again!

/1/ QEX - Jul/Aug 2004 page 18ff

/2/ http://www.ve7ca.net/TstM86.htm

/3/ MMIC datasheets

/4/ Service and maintenance manuals of the HP8640B

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