

## TS-940S FAN MODS

### K0ZL 11/08/2006

Note: Static control procedures and tools must be used in the execution of this work. If in doubt please enlist the help of a competent technician.

**PARTS NEEDED:** 1/4w resistors, 4.7K and 470 ohm, 1 each.  
Synthetic motor oil, one drop

The life of the TS-940 can be greatly increased with better cooling, especially of the 29 volt regulator transistors and their heat sink. Also, on some older 940s, the fan may not even turn on due to wear or thickened lubricant on the fan bearings. This will lead to catastrophic failure of the 29 volt pass transistors Q101 and Q102, and subsequent destruction of the expensive and hard-to-find driver transistors and zener diodes on the PA unit.

This mod will cause the power supply fan (the one towards the left side rear of the radio as the rig faces the operator) to turn on at a lower temp and to run slightly faster when it does turn on. Fan noise may be increased; this can be ignored, or the fan motor can be lubricated or replaced as desired.

(Note, lowering the fan turn-on temperature of the PA fan has not been noted to be of benefit, as most of the heat problem is generated by the regulator pass transistors. At any rate, this change is much more difficult)

Procedure: Allow the rig to remain unplugged and discharging for at least one hour prior to performing this mod. Remove the connectors, one at a time, along the back and right edges of the AVR unit prior to loosening the AVR unit. Remove all four screws on the AVR unit and fold out so that the solder pads are accessible.

On the AVR unit, change R11 from 390 to 470 ohms, 1/8 or 1/4 watt. This will make the fan come on at a lower heat sink temperature. Also change R17 from 10K to 4.7K, 1/8 or 1/4 watt. This will allow Q5 to drive the fan motor with a slightly higher voltage.

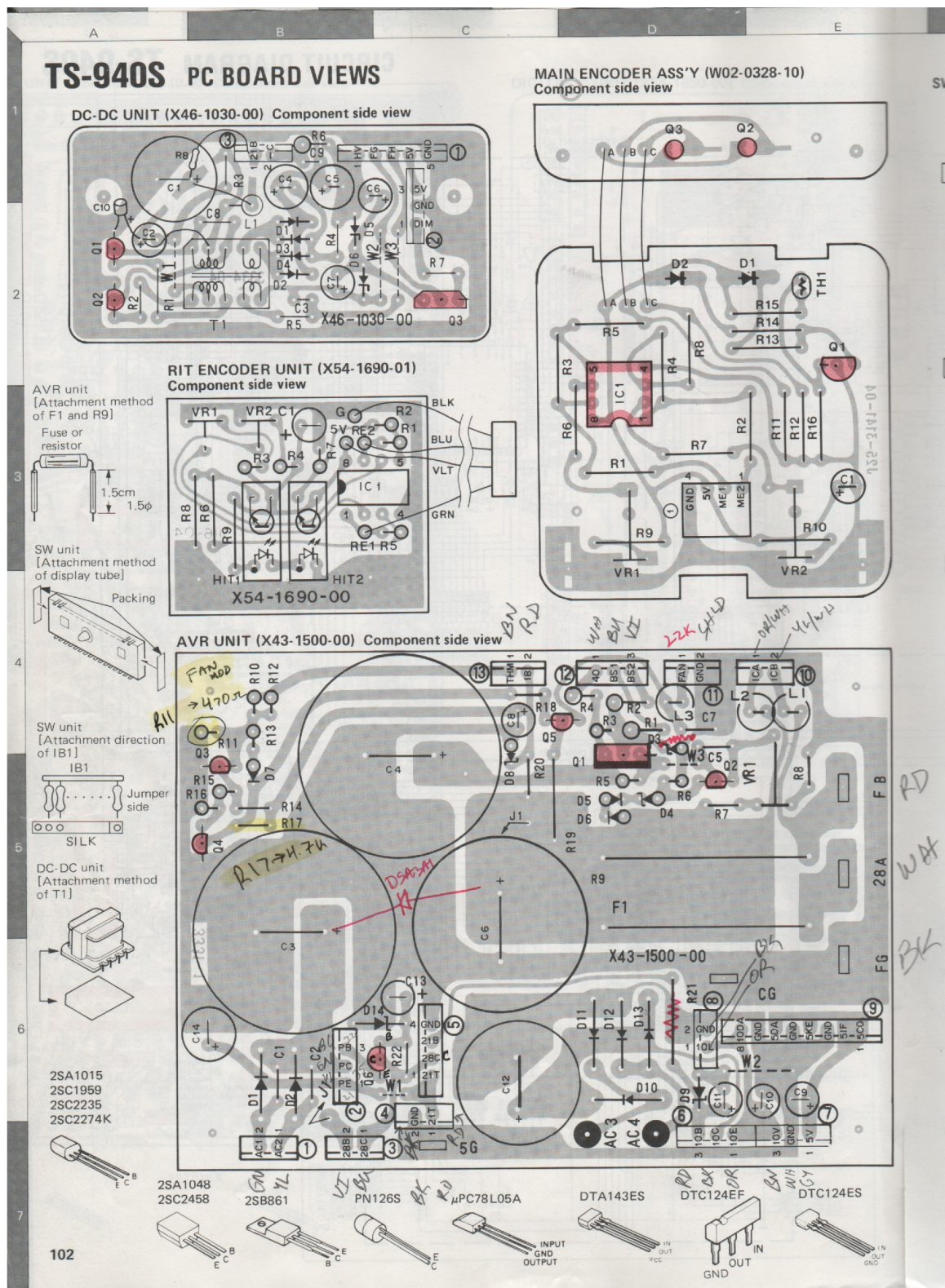
While the AVR unit is exposed, re-solder all suspicious solder joints, particularly on the power rectifier diodes and larger pass transistors where heat is an issue. Be very careful of solder bridges as these can destroy the AVR unit which is NO LONGER AVAILABLE.

After the mod and resoldering job, remove the rear fan and remove the fan on it's bracket. Put one drop of synthetic motor oil (5W-30 or 10W-30, either one) on the motor shaft where it enters the bearing. This will quiet the motor and help the anti-rattle spring last longer.

Side note: If replacement of the 29 volt pass transistors is necessary for some reason, it has been our experience that substituting for these will not be a good thing. Use the original 2N5885 (qty 2).







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