

Strange Scope Hum Update

(8 Bit ASCII Graphics use code page 437 or 850)

By G8MNY

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I have been working on an old Telequipment D61 scope. It had a few minor problems which I have fixed OK but one seems to baffle me...

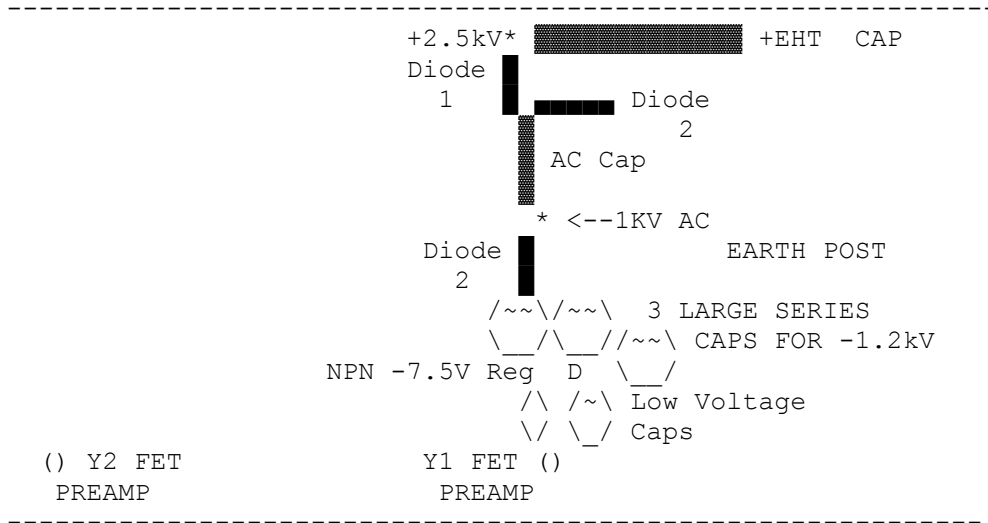
It has a hummy Y1 trace on max sensitivity with the input open circuit (1MΩ impedance) WHEN HOT, it goes if you earth/terminate the input into lower than 10KΩ. You can see the smooth 50Hz hum on the Y1 FET amp with a 2nd scope. There is nothing nearby to cause it as I can see. The hum is much bigger than the circuits supply rails etc. Heating the PCB greatly increases the hum level.

Y2 preamp is on the far corner of the PCB & does not suffer this problem.

Breaking the circuit up, I found the hum is on the PCB, in fact any land at high Z has hum. (plug in transistors use in this kit make testing easier!) So I did some further testing, the 1kV AC for the +2.5KV doubler & -1.2KV rails is also on the same PCB, but 5cm away & well screened with a wall of soothing caps.

What surprised me more is the 1kV AC is the reverse phase to the hum pickup!

PCB LAYOUT



FURTHER TESTING

Removing the 1kV AC & hum goes on the 2nd scope. Cooling the PCB the hum goes. So I conclude the hum is travelling inside the PCB & the out of phase pickup is some strange capacitance field (static charge) effect.

FIXES?

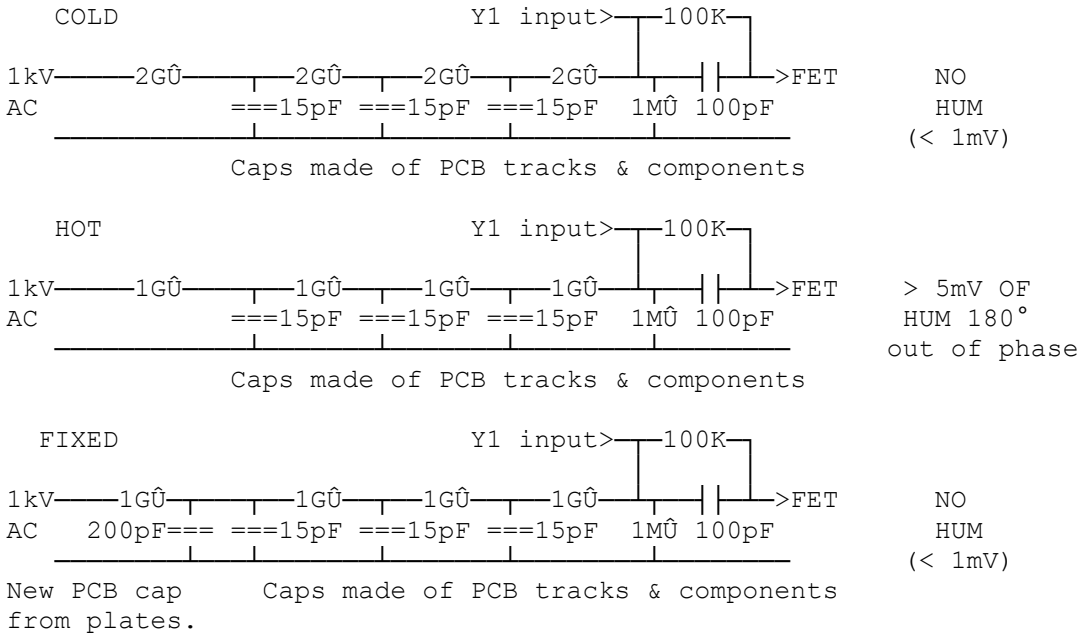
- 1/ I tried an insulated earthed screening plate to no avail, as my scope probe investigations already showed me there was little electric hum field in the air around the FET preamp!
- 2/ I cleaned the PCB, both sides removing dirt from the high voltage area, but there was no hum level change.
- 3/ I noted the maker had punched anti-tracking large holes in the PCB under diodes 1 & 2, so I drilled another one under diode 3. Some hum reduction,

4/ Then I added 2 metal plates from the earth post to clamp the PCB & take away some of the PCB electric field near the AC source. This does seem to have fixed it.

WHAT HAPPENING?

I think the old PCB is slightly conductive, why it should be so heat sensitive I don't know.

I think it electrically looks like this according to my computer model...



QUESTION

Could this be an aging/carbonising PCB problem? I can't imagine they left the factory like this?

Any other thoughts on this phenomenon? Feedback welcome.

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP