FT290/690/790 mk1 PLL fault

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(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

The fault symptoms on one of my FT290 are impulsive noise on FM that kills Rx packets & it is not so noticeable on SSB until the fault is really bad. Turning the rig off & on fixes it for a while (usually days). I have a similar fault before years ago, but I don't know what was done to fix it.

FAULTING SAGA

Tuning in to a beacon & testing in SSB, it look like the 1uF ( ▒▒ ) C34 in the PLL filter was breaking down, warming or cooling that area changes the fault (OK cold & hot, bad at room temp!), but changing the capacitor (connections buried under soldered in PCB underside screen cover) has no effect. :-(

 PLL Box

Further investigating found the PLL IC MN6145(uPD21819C) itself seemed to be the culprit as heating/cooling caused the fault to change. re-soldering up all 18 pins had no effect.

Connecting a 10:1 scope probe to local Xtal Pin 2 & 3, or the buffered osc drive Pin 11 had no effect, so it was not RF levels that were low.

But putting the probe on the IC Pin 1 (+5V), I found caused the PLL noise to increase, as this is decoupled with 2 caps I was surprised. So I concluded the 10uF (c) C55 may be low in value, & as the it was difficult to remove I put in a small 2u2 on the track side on pin 1 directly. This solved the probe noise effect & made the hot & cold effect on the IC less apparent, but still there!

I then tried an additional voltage drop diode (5.6V is fed via a diode post (*) to this IC for 5V) in series with the IC supply diode giving it only 4.28V, this worked OK & I can't reproduce the fault thermally now.

Result, my ageing IC does not like the supply volts, & becomes unstable at a specific temperature range. Changing the +5V to 4.2V has fixed this.

See my Tech bul on "CW/SSB Rig Frequency" & also "FT290/690/790 DC Power mod" Why Don't U send an interesting bul?

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