

# Spectrotek Services

7 August 2015

## Engineering Change Order – SPA4-1

Units affected: SPA4 - All units, v1.00 and v1.01.

**It is strongly recommended that this ECO be applied.**

This ECO will improve the stability and performance of the SPA4 amplifier.

### **PROBLEM**

Under some operating conditions, a strong RF signal from the plasma tube may be picked up by the various wires connected to the SPA4. This unwanted signal pickup may cause the amplifier to malfunction.

Common symptoms of problem are:

- + Distortion of shape and duration of the output modulation waveform.
- + The duty cycle meter may show instability and/or wide changes in modulation percent as the DC power supply voltage is varied.
- + Difficulty in properly adjusting the duty cycle to the desired value, especially when operating in the X2 mode.
- + Sudden failure of the STW20NK50Z in the SPA4 for no apparent reason. This usually happens at initial power-up of the amplifier when the power supply voltage is at 100 volts or higher.
- + The problems are worse when the SSQ-BAT plasma tube is used. This is because the larger tubes have a more powerful RF field.

## SOLUTION

In order to reduce or eliminate this interference, it is necessary to add some components to the SPA4 circuit board. These are:

+ A new 470 Ohm  $\frac{1}{4}$  watt metal film resistor is connected across the **Input A** terminal connections. This resistor improves the modulation waveform stability.

+ A new 0.1 uF capacitor is connected across the **SW3 – TTL / RF** terminal connections. This capacitor suppresses RF feedback that can cause a sudden, chaotic, upward shift in the frequency of oscillator U4 which may destroy the STW20NK50Z.

+ A total of three 2.2 mHy common mode RF filters must be added, one to each of the following terminal positions:

**Input B**  
**A GAIN**  
**X1/X2**

These common mode filters reduce or block RF pickup that sometimes occurs with unshielded or long wires that run between the SPA4 and the various controls. The common mode filters are available assembled as part number **CMC-1** on a small circuit board with screw terminals.

Three complete **CMC-1** filter boards are required for each SPA4.

The part number for the common mode filter less the board and terminals is **2R2HCMC**.

No soldering is required to install the **CMC-1** filters, but soldering will be required to install the 0.1 uF capacitor and the 470 Ohm resistor.

**A complete upgrade kit, part number SPA4-RFR, consisting of three assembled CMC-1 filter boards, one 0.1 uF 50 VDC capacitor, and one 470 Ohm resistor, is available for \$15.00 plus shipping.**

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