Broadcast Concepts Inc:

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MOSFET TRANSISTOR REPLACEMENT PROCEDURE

If you are purchasing a transistor to repair one of our amplifiers please consider returning the amplifier to us for repair. We do not charge labor on repairs for amplifiers that we manufacture.

(1) Remove bad transistor. This generally requires 2 professional soldering irons and solder-wick. (Soldering irons purchased from radio shack do not have enough heat and can damage the circuit boards.)

(2) Verify bias circuits are working. Most of the RF power mosfets require a bias voltage between 1.0 and 5.5 volts. Using a digital volt meter adjust the bias voltage to its lowest possible level before installing the new transistor.

(3) Clean transistor mounting area with alcohol. The transistor mounting surface must be perfectly clean. Remove all old thermal compounds and apply new thermal compound to the transistor. Compound should be .001 to .002 inches thick.

(4) Using a precision torque wrench tighten the transistor mounting screws to approximately 5 inch-pounds. (These wrenches sell for around $250.00 USD and they are necessary). Improper torque can cause the transistor to overheat and burnout.

(5) Using a current limited voltage variable power supply slowly increase voltage to the amplifiers rated voltage. If the amplifier begins to draw excessive current adjust bias voltage or check for oscillations. The amplifier should be terminated in 50 ohms and monitored with a spectrum analyzer during this procedure. A small bench top power supply like the BK precision 1667 is useful for this procedure because it does not have enough current capability to damage a transistor. If there is a problem elsewhere in the circuit, a current limited power supply will prevent the new transistor from being destroyed.

(6) Verify amplifier performance with a vector network analyzer if possible.

(7) Transistors are biased according to idle current and not bias voltage. For example a BLF278 might require 3.0V on the gates for 100ma bias; however, the BLF278 that was in the amplifier originally may have only needed 2.6V for 100ma bias. (this varies with the manufacturers production lots) If steps “2” and “5” are not followed as described here the new transistor can be destroyed instantly when placed into the circuit. It is at this point where the customer contacts us and claims that the transistor that we sold them is defective. Nothing can be further from the truth. Repairing RF power amplifiers requires special tools, skills and experience. If you don’t have the tools and experience to do the job let us do it for you.