

By Jan Skirrow

Cooling the RCA CU-5069 Multicoupler

Quite a few of these multicouplers (actually made by TMC under contract to RCA) have recently come onto the Canadian surplus market. They are capable of connecting up to 32 receivers to a single antenna, and cover the frequency range of about 0.5MHz to 32MHz or more.

They generate a great deal of heat in normal operation, and although well ventilated and heat-sinked, there is a concern that the heat conducting compound used between the heat sink and transistor cases may have deteriorated over the years, thus creating an enhanced risk of heat-related failure.



Some buyers have advocated removing each of the heat sinks and renewing the compound. I found that the heat sinks on my two units were so frozen in place that there was a real risk of damaging the printed circuit board during removal. I also wasn't convinced that the operating temperature was excessive for the particular transistors used, and these units had been in 7/24 use for many years with little sign of repair work.



However, the electronics are aging, and prudence suggests at least some kind of forced air cooling. I don't like external fans, and didn't want to modify the multicoupler in any irreversible way. This is kind of a mantra around my shop!

The CU-5069 uses a hefty internal regulated power supply that delivers a nominal 24vdc. The multicoupler is organized with a driver amplifier feeding four banks of eight output amplifiers. Each of the eight amplifiers draws about 60 mA. Thus, by disconnecting one bank of eight, I could free up over 400 mA of power

supply capacity, and the remaining 24 outputs was far more than I needed anyway. And now one bank is sitting in reserve!

I was able to find some surplus 24vdc fans that were thin enough to mount inside the unit. The existing hole spacing on the cover was just about perfect, and the fans were fastened with 4-40 hardware. These fans are about 0.6" thick, are very quiet, and generate a respectable air flow. Each draws about 110mA at 24vdc. I decided that two fans would be enough, and positioned them to try to get the maximum effect on the remaining three output banks and on the driver amplifier. Photo 2 shows parts of two output amplifier banks, with the driver amplifier board on the left. The power supply pass transistor is also a major source of heat, and is mounted on the aluminum flange at the top of Photo 2. It is useful to position the fans so that some air is directed to this major heat source. Photo 1 shows the CU-5069 with the fans mounted on the top cover removed.

I operate the fans at reduced voltage to bring the noise level down. The fans themselves are very quiet, but the air being pulled through the cane metal sounds like a cloud of angry mosquitoes! So I dropped the voltage, using a single resistor of suitable value, until the sound level was acceptable. Tolerance for noise and the location of the multicoupler will vary the optimal operating voltage. Plan on dropping about 6 volts to bring the noise way down.

Photo 2 also shows the two feedthroughs that bring the operating voltage into the amplifier compartment. Four purple wires connect these to each of the output banks. I removed the purple wire to the bank on the right of the photo. I placed a single-point terminal strip under the existing screw that holds a cable clamp located on the outside of the compartment. My dropping resistor is between this terminal strip and a ground lug placed under a convenient mounting screw. A two wire cable then connects the parallel fans to the terminal strip and the feedthrough from which I'd removed the purple wire. Not shown in the photos, I also put a connector in the cable so that I could completely



remove the cover and fans.










With the fans operating at reduced voltage, the temperature of the remaining transistors drops dramatically. The power supply continues to be a major source of heat, but somewhat reduced due to both the reduced load, and some air flow. The cooling effect was sufficiently dramatic that I used a single fan with my second unit. While this isn't as effective as the dual fans, it is quieter and quite effective at reducing the temperature.

The fans seem to be unusual in the combination of voltage and thickness. Fans that are very much larger than the ones I used wouldn't fit within the compartment.

I've also installed three of these fans in a partially successful attempt to cool a Collins HF-2050 owned by a colleague. This is shown in Photo 3. These fans are operated from his CU-5069 modified as I've outlined, and with the voltage dropped to keep the total current flow within the amount freed up by disconnecting one output bank. A better solution to the HF-2050 cooling problem remains to be found!

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