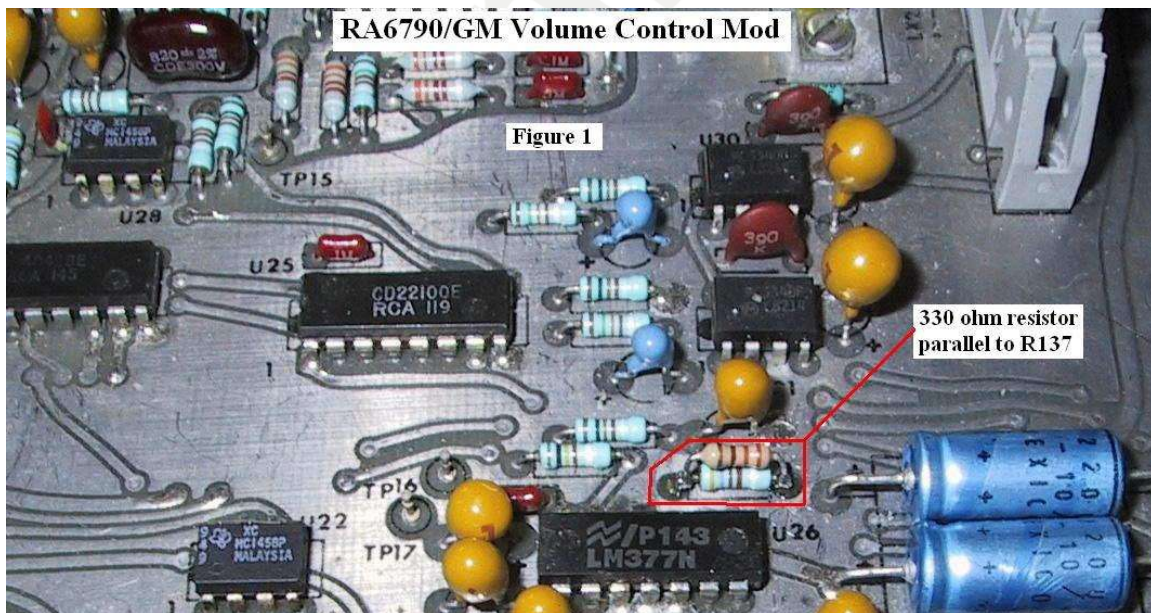


RA6790/GM Volume Control Mod

Dallas Lankford, 3/18/05

I must confess that having owned Racal RA6790/GM's for about 15 years, it never once occurred to me that the useful range of the volume control was compressed into a range of about 30 degrees of rotation of the volume control until yesterday. While testing a new elliptic low pass audio filter design of mine with a 6790 I noticed that the audio sounded distorted even at rather modest volume control settings. I looked at some steady 400 Hz modulated signals on my scope and sure enough, the signals were clipped when the volume control was advanced hardly 30 degrees through its range.

The audio output amp (for speaker or headphones) of a 6790 is half of a LM377, which according to web information is equivalent to a LM1877. The LM1877 data sheet states that with a 12 volt DC power supply the LM1877 is capable of 1.3 watts output at 10% harmonic distortion, and with a 14 volt supply is capable of 1.0 watts at 0.05% harmonic distortion. According to my observations, the 6790 audio output began to clip slightly beyond the 1 watt level, which agrees with the data sheet information. The input impedance of the LM1877 is about 1 Meg ohm and may be shunted with a 1 Meg ohm resistor per the data sheet. Racal reduced the audio input to the LM377 by using a 4.7 K ohm resistor, R137. But they didn't reduce it enough. By trial and error, using a signal generator and a scope, and paralleling smaller resistors across R137, I determined that 330 ohms was about optimal for obtaining nearly complete volume control rotation without clipping. A photo of the finished mod is shown below in Figure 1.



Figures 2 and 3 below show examples of the modified 6790 output with the volume control set for maximum output.

