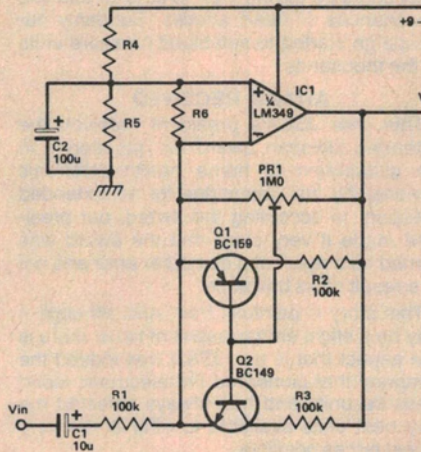


'Soft' limiter

One of the fundamental differences between valve and transistor amplifiers is their behaviour when driven into clipping. The valve amps go into so-called 'soft' clipping whilst their transistorised counterparts generate large quantities of harmonic distortion. The circuit shown simulates the soft clipping of valve amplifiers and is intended to be used between the power amplifier's input and the preamplifier's output.

Resistors R4 and R5, decoupled by C2, set a half supply reference for the non-inverting input of the op amp. Input signals are fed into the inverting input via the dc blocking capacitor and R1, the latter defining small signal gain and input impedance.

For small signals, the amplifier's output is an exact unity gain copy of the input. As the signal level increases however, the time will come when the voltage across the output and slider of PR1 will be sufficient to bias Q1 or Q2 on. When this occurs the feedback in-



R4, R5 = 4k7 R6 = 22k

creases due to the shunting effect of R2 and R3.

The net effect is that musical peaks above a certain threshold are reduced in amplitude to prevent the power amplifier going into hard clipping. As a result, distortion is noticeably decrease

whilst the subjective loudness appears unaffected.

The circuit is adjustable in operation between 130 mV and 10 V rms input sensitivity by means of PR1. To set the circuit up, simply set the slider so that it is shorted to the output of the amp. Play some music at high volume through the system and adjust until the harshness just disappears. It's easier to do than describe, says **J.P. Macaulay** of **Crawley, UK**.