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playback amplifier for cassette deck

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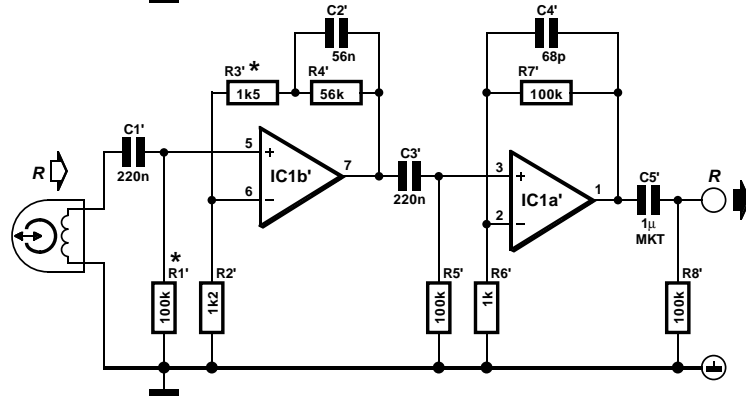
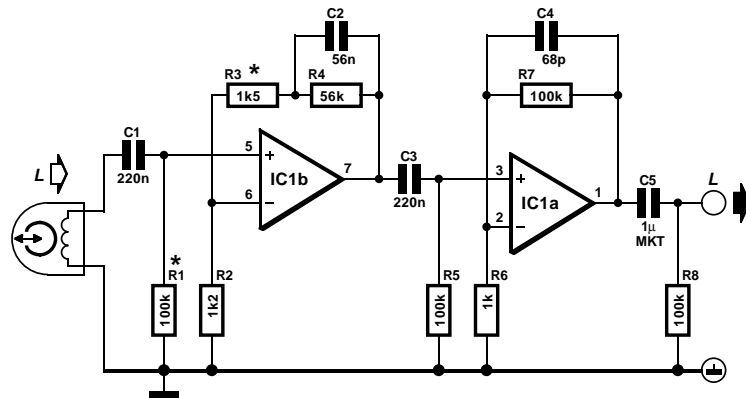
For some time now, there have been a number of tape cassette decks available at low prices from mail order businesses and electronics retailers. Such decks do not contain any electronics, of course. It is not easy to build a recording amplifier and the fairly complex magnetic biasing circuits, but a playback amplifier is not too difficult as the present one shows.

The stereo circuits in the diagram, in conjunction with a suitable deck, form a good-quality cassette player. The distortion and frequency range (up to 23 kHz) are up to good standards. Moreover, the circuit can be built on a small board for incorporation with the deck in a suitable enclosure.

Both terminals of coupling capacitor C_1 are at ground potential when the amplifier is switched on. Because of the symmetrical $\pm 12\text{ V}$ supply lines, the capacitor will not be charged. If a single supply is used, the initial surge when the capacitor is being charged causes a loud click in the loudspeaker and, worse, magnetizes the tape.

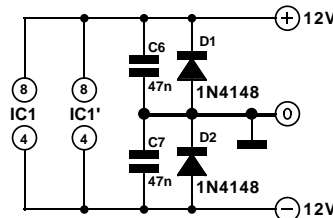
The playback head provides an audio signal at a level of 200–500 mV. The two amplifiers raise this to line level, not linearly, but in accordance with the RIAA equalization characteristic for tape recorders. Broadly speaking, this characteristic divides the frequency range into three bands:

- Up to 50 Hz, corresponding to a time constant of 3.18 ms, the signal is highly and linearly amplified.
- Between 50 Hz and 1.326 kHz, corresponding to a time constant of 120 μs , for normal tape, or 2.274 kHz,



* metal film resistor

IC1, IC1' = NE5532



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corresponding to a time constant of 70 μs , for chromium dioxide tape, the signal is amplified at a steadily decreasing rate.

- Above 1.326 kHz or 2.274 kHz, as the case may be, the signal is slightly and linearly amplified.

This characteristic is determined entirely by A_1 (A_1'). To make the amplifier suitable for use with chromium dioxide tape, add a double-pole switch (for stereo) to connect a 2.2 k Ω resistor in parallel with R_3 (R_3'). The output of A_1 (A_1') is applied to a passive high-pass

rumble filter, C_3 - R_5 (C_3' - R_5') with a very low cut-off frequency of 7 Hz. The components of this filter have exactly the same value as the input filter, C_1 - R_1 (C_1' - R_1'). The second stage, A_2 (A_2') amplifies the signal $\times 100$, that is, to line level (1 V r.m.s.).

Capacitor C_4 limits the upper frequency range to avoid r.f. interference and any tendency of

the amplifier to oscillate.

The amplifier needs a symmetrical ± 12 V power supply

that can provide a current of up to 0.5 A. The greater part of this current is drawn by the motor of

the deck; the electronic circuits draw only 15 mA.

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