

BUILD A LOW-DISTORTION COMPRESSOR

By Rickard Berglund

Many circuit topologies are possible for use in tube compressors. Although most of these designs produce a high distortion level, the balanced topology presented here produces very low distortion.

As shown in Fig. 1, the input signal is fed to a line transformer. The transformer's secondary winding must have a center tap. The secondary impedance can be anywhere in the range of 600Ω–10kΩ. The input signal is

fed to the right part of tubes V1 and V2. The signal is also fed to the left parts of these tubes, although in opposite phase and at only one-tenth of the amplitude. The grid of the left part is normally held at -2.5V when no compression occurs. When compression occurs, the grid potential becomes positive, while the current in the left section increases and the current in the right portion decreases. The end result is a reduced output amplitude.

The signal from V1 and V2 is then fed

to the long-tailed pair, V3. The signals added to the long-tailed pair cancel the second-order harmonic, the most dominant source of distortion from tubes V1 and V2. The output from V3 is fed to cathode follower V4A.

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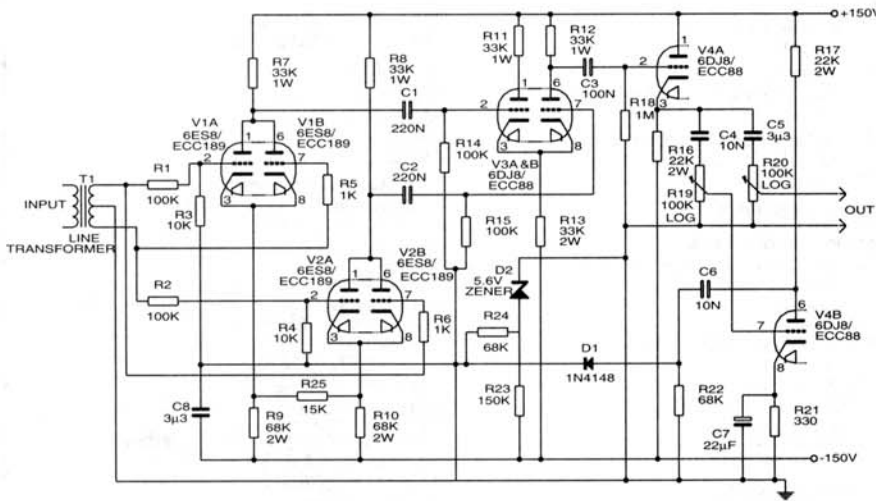


FIGURE 1: Low-distortion compressor circuit topology.

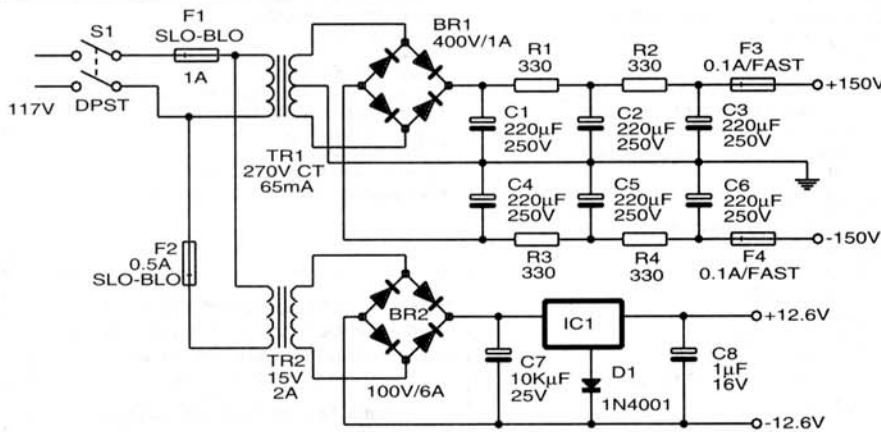


FIGURE 2: Power-supply schematic for a stereo compressor.

TABLE 1

PARTS LIST

COMPRESSOR

RESISTORS

R1, R2	100k
R3, R4	10k
R5, R6	1k
R7, R8, R11, R12	33k 1W
R9, R10	68k 2W
R13	33k 2W
R14, R15	100k
R16, R17	22k 2W
R18	1M
R19	100k log. potentiometer
R20	10k lin. potentiometer
R21	330Ω
R22, R24	68k
R23	150k
R25	15k

CAPACITORS

C1, C2	0.22μF
C3	0.1μF
C4, C6	10nF
C5	3.3μF
C7	22μF
C8	0.33μF

MISCELLANEOUS

BR1	1N4148
BR2	5.6V zener diode
V1, V2	6ES8/ECC189
V3, V4	6DJ8/ECC88
TR1	Line transformer

POWER SUPPLY

R1–R4	330Ω 2W resistors
F1	1A slow-blow fuse
F2	0.5A slow-blow fuse
F3, F4	0.1A fast fuse
BR1	400V 1A bridge rectifier
BR2	100V 6A bridge rectifier
D1	1N4001
C1–C6	220μF 250V cap.
C7	10,000μF 25V cap.
C8	1μF 16V cap.
TR1	270V 65mA CT transformer
TR2	15V 2A transformer
IC1	12V 2A regulator

Tube Compressor

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Potentiometer R19 sets the compression level, while the output level is determined by R20. The signal from R19, amplified by V4B and rectified by diode BR1, charges capacitor C8 during compression. C8 then discharges through the resistors R1, R2, and R24. The time constant for charging and discharging is approximately 10mS.

BALANCED OUTPUT OPTION

If you prefer to have balanced outputs, add another cathode follower from the left anode of tube V3. The input signal to the compressor should be in the 0.1V–1V range. If you'd rather not use a line transformer at the input, you can use op amps to balance the signal instead. The power supply, presented in *Fig. 2*, shows the filaments connected two-and-two in series to the 12.6 volt. ♪

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