

More power from the High-End Power Amp

Dear Editor — I believe the relatively low output power of the High-End Power Amplifier from the March 2005 issue is mostly owing to the enclosure used. In other words, if a larger cabinet is used, more space is available to step up the power supplied by the amp. For example, the transformer voltage can be increased from 18 V to 25 V. After rectification, this results in about 31 VDC. The modifications I carried out at the component level are:

Power supply:

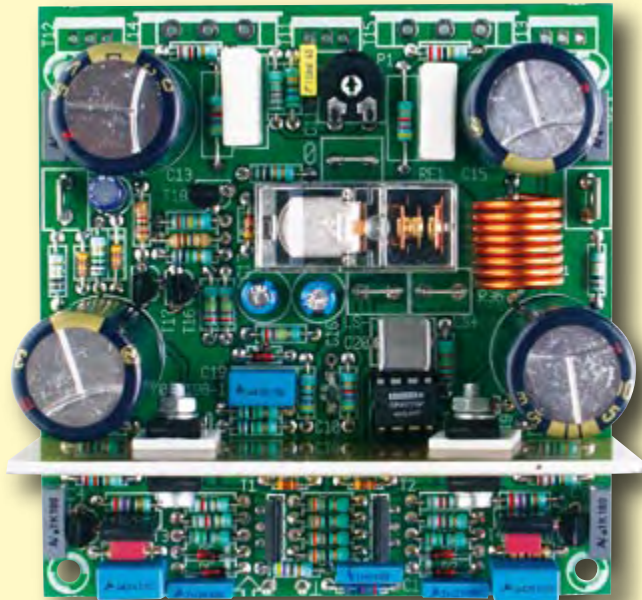
225 VA toroidal transformer,
2x22 V
C5, C6, etc.: 10,000 μ F 35 V
Fuses: 1.5 A
Two NTCs in series with the mains voltage

Amplifier board:

R18: 10k
R42: 220k
R45: 220 Ω
D14;D15: 12V
Heatsink: 2 x Fischer SK 155, 75 mm (0.9 K/W)

Indicator board:

R16;R17;R33;R34: 330 Ω
R5;R22: 820 Ω



R6;R23: 10k

P1 and P2 allow the gain of the indicator board to be adjusted between 9 and about 13.7 times. I selected the Monacor (Monarch) type UC-204/SW case which has a size of 437x82x235 mm. Because of the larger output power, the indicator board is no longer required, hence I did not fit the LEDs on the front panel. Because the feedback is reduced, I fear the distortion goes up while damping is reduced. Lacking high-end test equipment I am unable to say if my modifications reduce the amplifier's performance in any way.

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Our audio design specialist Ton Giesberts confirms that his High-End Power Amplifier design has potential for higher output power. The supply voltage may be increased to 35 V maximum, but not without major surgery to the existing design. For example, a larger heatsink must be used on the driver stage, and the resistor with the relay (R45) has to be adapted, as you have done. The sensitivity also requires adapting — it is now fairly low at 1.5 V for full drive. We confirm that it can be done by using 10 k Ω for R18, but stress that the modification modifies the carefully designed feedback response, which is likely to result in instability. This part of the modification really calls for a redesign. We recommend the use of an oscilloscope and a protected power supply if you want to stay on top of any tendency to oscillation.

The OPA177 has a maximum supply voltage spec of 22 V, hence is hard pushed in the original design already. Zener diodes of at least 12 V (D14; D15) are recommended at the suggested supply level of 31 VDC. At a supply voltage of 35 V, the zener diodes should be exchanged for 15-V types.

Regarding the output power, at a supply voltage of 31 V, about 50 watts can be delivered into 8 ohms, while the minimum load impedance goes up to about 3 ohms to keep the power transistors within their safe operating area.