002 AUDIO LINE DRIVER

Integrated operational amplifiers are not always suitable for applications where a high signal level ($U_o \leq 10$ V_{rms}) is required for driving a relatively low impedance ($Z = 50$—$600\ \Omega$). The amplifier described here is eminently suitable as a high dynamic range line driver or power buffer in public address systems and AF distribution amplifiers.

The input amplifier of the line driver is formed by a low noise opamp Type OP-37 from PMI. This ensures the following technical specification of the line driver: $U_o = 70$ V_{pp} max.; $I_o = 400$ mA_{pp} max.; $D_{tot} = 0.01\%$ at $U_o = 10$ V_{rms}, $Z_L = 50\ \Omega$ and $S/N \geq 90$ dB.

Regulators T_1-T_2 bring the supply voltage for the OP-37 down to ± 15 V. The complementary power output stage is formed by T_3-T_4. The amplifier has a standard negative feedback circuit R_1-R_2, which results in a voltage gain $A_V = -(R_2/R_1)$. A local feedback R_3-R_4 has been included to keep the output voltage of the opamp within safe limits, while capacitors C_1-C_2 serve to improve the stability. It should be noted that the value of C_1 and C_2 depends on the construction of the line driver: typical values are 680 pF for C_1 and 22 pF for C_2. In a prototype of the circuit, neither capacitor was required for the frequency response to remain flat (± 1 dB) up to 100 kHz.

Resistors R_B should drop just enough voltage for T_3 and T_4 to start conducting (class A-B operation). The quiescent current of IC_1 is about 3 mA, so that 150 Ω can be taken as a suitable starting value for R_B. The quiescent current in the power output stage should be between 20 and 50 mA. Higher values of R_B cause the quiescent current, and hence the power dissipation, to increase, resulting in less distortion. The power output stage is not protected against thermal overloading, so that due dare should be taken in adjusting the quiescent current.