

## DOUBLE THE OUTPUT CURRENT TO A LOAD WITH THE DUAL OPA2604 AUDIO OP AMP

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Headphones typically have an impedance of 40Ω to 300Ω. By using the dual OPA2604 and four resistors one can economically drive a 2.8V peak signal into the 40Ω headphones.

Figure 1 illustrates a circuit that can be used to drive loads that exceed the output current capabilities of an operational amplifier, but not enough to require the use of a power operational amplifier. The OPA2604 used in this application is a dual, FET-input operational amplifier that can typically sink or source 35mA on the output. By taking advantage of the fact that the OPA2604 is a dual, this circuit will sink or source 70mA. In addition, each operational amplifier has its own short circuit protection of ±40mA (typ), which makes the overall typical short circuit current of this application ±80mA.

One side of the dual OPA2604, A<sub>2</sub>, is in the feedback loop of the other side of the dual, A<sub>1</sub>. The current, I<sub>1</sub>, which is

supplied by A<sub>1</sub> is matched by the current I<sub>2</sub>, the output current of A<sub>2</sub>. The load will receive a total current of I<sub>1</sub> + I<sub>2</sub>. The ratio between the output currents, I<sub>1</sub> and I<sub>2</sub>, is equal to:

$$I_2 = I_1 (R_3/R_4)$$

Resistors R<sub>3</sub> and R<sub>4</sub> are set equal for equal output currents. Resistors R<sub>1</sub> and R<sub>2</sub> set the overall gain of the circuit. The transfer function is:

$$V_{OUT} = V_{IN} (1 + R_2/R_1)$$

The OPA2604 is a dual, FET-input operational amplifier designed for enhanced AC performance. Very low distortion, low noise and wide bandwidth provide superior performance in high quality audio applications. The OPA2604 is available in plastic 8-pin DIP and plastic 8-pin SOIC.

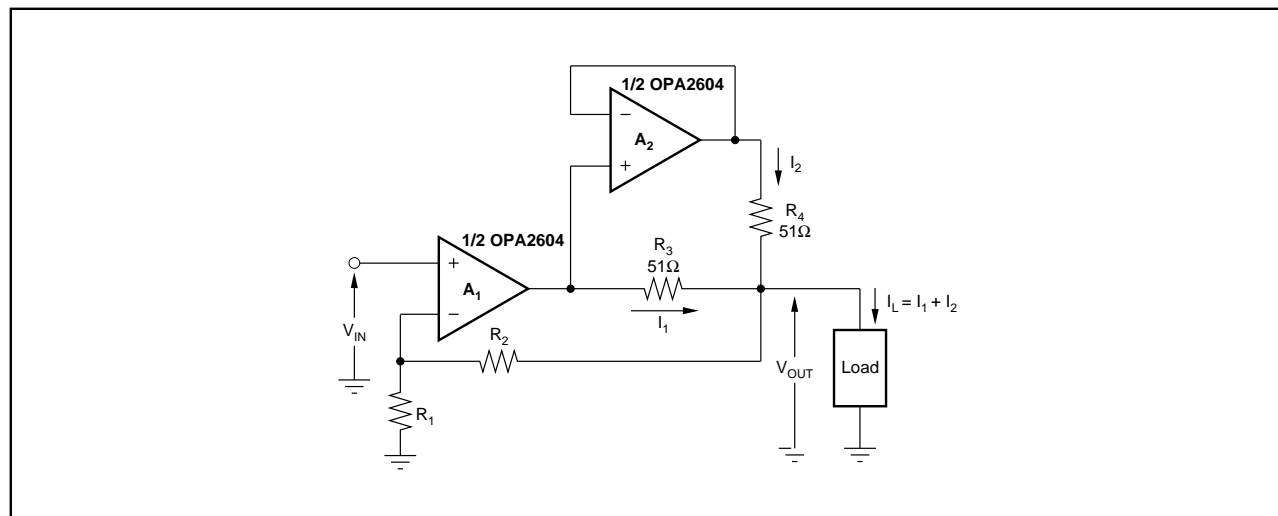


FIGURE 1. Using the Dual OPA2604 Op Amp to Double the Output Current to a Load.

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