

## Op Amp Improves Supply-Voltage Tracking

Jerry Fitzpatrick

In the regulated, bipolar power supply of Fig 1, an op amp causes the  $\pm 15\text{V}$  outputs to track one another regardless of load conditions. In many designs, feedback adjusts the output of a slave supply to mirror that of a stable master supply. The master can't compensate, however, for variations in the slave output caused by heavy, changing loads, and output tracking deteriorates as a result.

The op amp in Fig 1 accomplishes bilateral tracking by monitoring both output-supply rails. You can apply this technique to various linear- and switching-regulator designs. When the outputs are equal, the op amp's output is zero and therefore has no effect on the circuit. This output becomes nonzero in response to load variations, opposing any tendency toward inequality between the two output voltages.

$R_1$  and  $R_2$  set the output-voltage magnitudes; you can add a small voltage-adjustment potentiometer in series with one of these resistors. The output-voltage accuracy depends directly on the matching between the sense resistors ( $R_4$  and  $R_5$ ). Only the op amp's slew rate limits the circuit's response to load transients; if you desire a slower response, add a capacitor across the feedback resistor ( $R_3$ ). Finally, note that you should provide electronic shutdown circuitry or a fuse to protect the circuit against output short circuits.

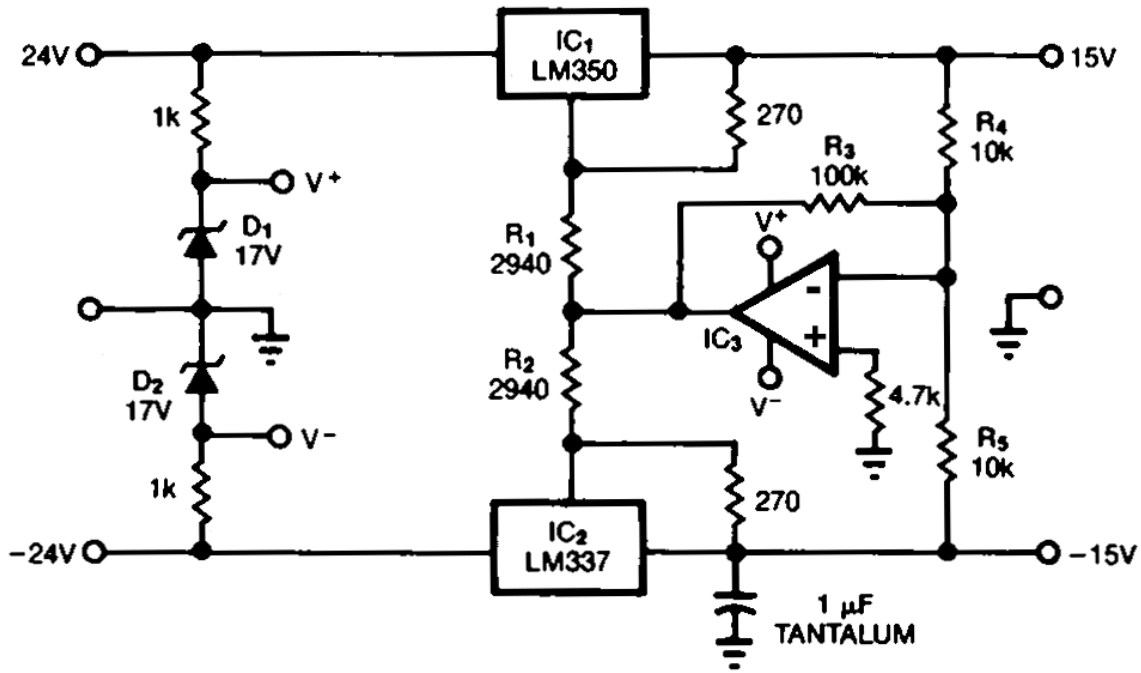


Fig 1 – This regulated, bipolar supply maintains equal-value outputs that track despite output load variations.