Octal Trimpots Offer Rail-to-Rail Adjustments

The octal D/A converter circuit of **Figure 1** operates on 5V and provides eight output voltages, each digitally adjustable from supply rail to supply rail (0 to 5V). Each output has a resolution of 20mV/LSB. The D/A chip (IC_1) requires 3.5V of headroom between its V_{DD} and reference voltages, but a voltage-doubler charge pump (IC_2) removes this limitation by generating an approximate 10V supply for V_{DD}. All the converter references are connected to the 5V supply.

IC_1, which appears as a memory to the controlling µP, draws less than 20mA of quiescent current. IC_2 is a high-current charge pump that normally operates as an inverter. Configured as shown, it doubles the 5V input to an unregulated 10V output and provides an output impedance of less than 10Ω. It can deliver 100mA, which allows the eight D/A converters to issue their maximum output currents simultaneously (8 x 5mA = 40mA).

(Circle 2)

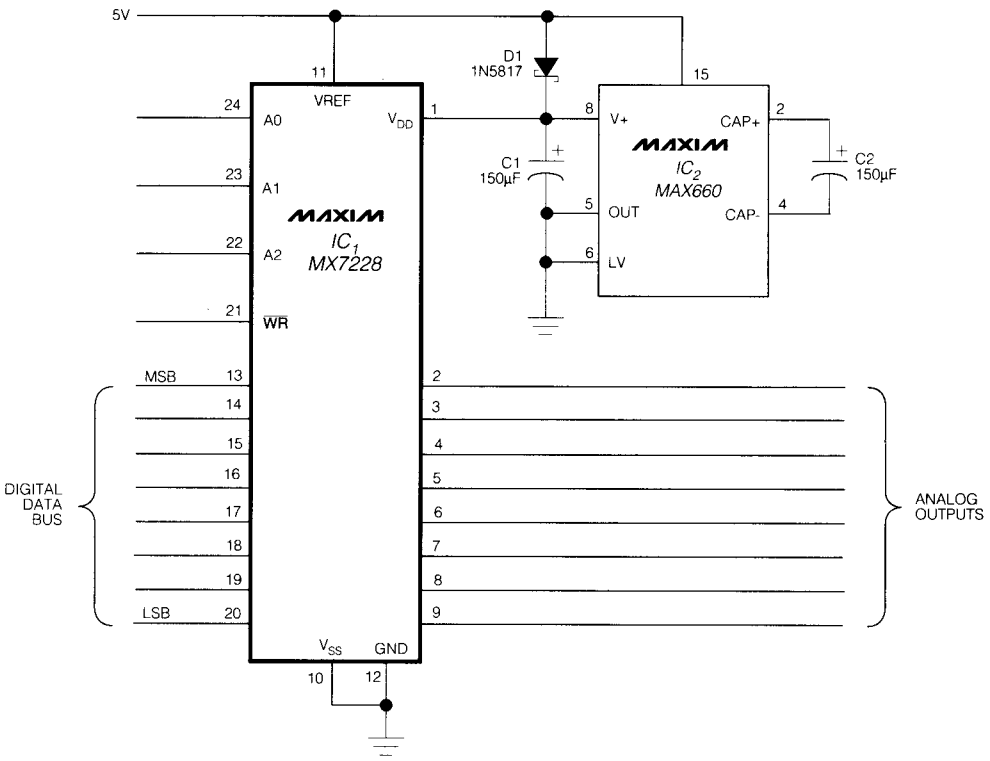

Figure 1. *Because a voltage-doubler charge-pump IC supplies 10V to the octal D/A converters' references, the converter outputs can range from rail to rail (0 to 5V) of the applied supply voltage.*