

DESIGN SHOWCASE

Buffering Scheme Drives Large LCDs

To conserve pins, many LCD drivers triplex their drive signals—a technique that enables AC waveforms on three common lines and three segment lines to activate any standard character of a seven-segment display. But large LCDs of 1" or more exhibit a large capacitance between the common and segment electrodes (several nanofarads), which presents a problem for standard LCD drivers.

These drivers' high output impedance (50k Ω , for example) causes difficulty in driving capacitance, and the consequent AC-waveform distortion can produce ghosting and shadow segments in the display. The drive circuit of **Figure 1** solves this problem by introducing a buffer amplifier for each of the three common

lines. Each amplifier may be programmed independently for a quiescent current of 10, 100, or 1000 μ A. In this application, the bias network applies a voltage that sets the three quiescent currents to 100 μ A.

The display driver and triple op amp operate between 5V and ground, and the COM signals range from 5V to ~1V. To assure that these signals remain within the amplifiers' common-mode range, we attenuate the signals by one half and operate the buffers at a gain of two. The circuit drives eight 1" displays and is suitable for ambient temperature variations of 15°F or less. At the highest expected temperature, you should adjust R₁ so that no "off" segments are visible. **(Circle 4)**

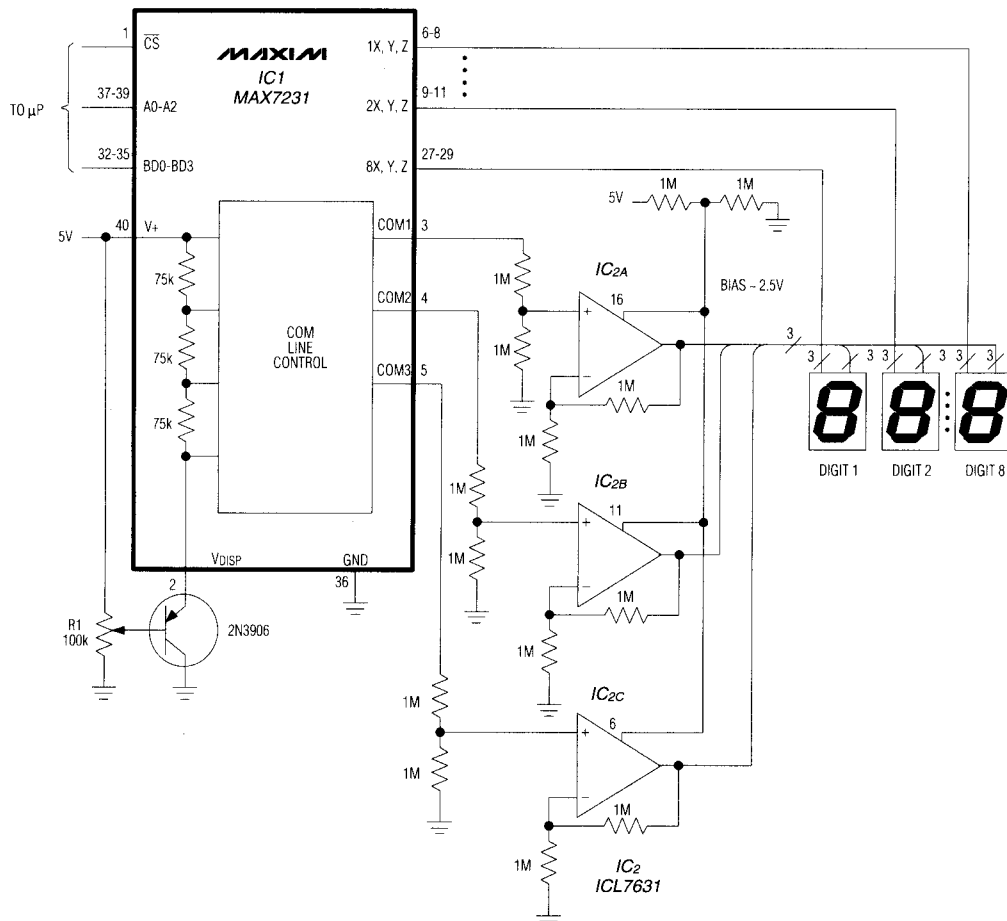


Figure 1. Three buffer amplifiers enable this standard LCD driver (IC1) to control eight large (1") seven-segment displays.