Keywords: LCDs, LCD displays, LCD drivers, triplex, duplex, opamps, operational amplifiers, op amps

APPLICATION NOTE 415

Buffering Scheme Drives Large LCDs

Jul 09, 1998

Abstract: This application notes shows how to buffer the triplex backplane drive outputs of a LCD driver such as MAX7231 family to increase the capacitive drive capability. This enables a large LCD to be driven without ghosting and other artifacts due to backplane waveform distortion.

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

These drivers' high output impedance (50KΩ, for example) causes difficulty in driving capacitance, and the consequent AC-Waveform distortioncan produce ghosting and shadow segments in the display. The drive circuit in **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 1000µA. In this application, the bias network applies a voltage that sets the three quiescent currents to 100µA.

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 signalsby 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 R_1 so that no "off" segments are visible.

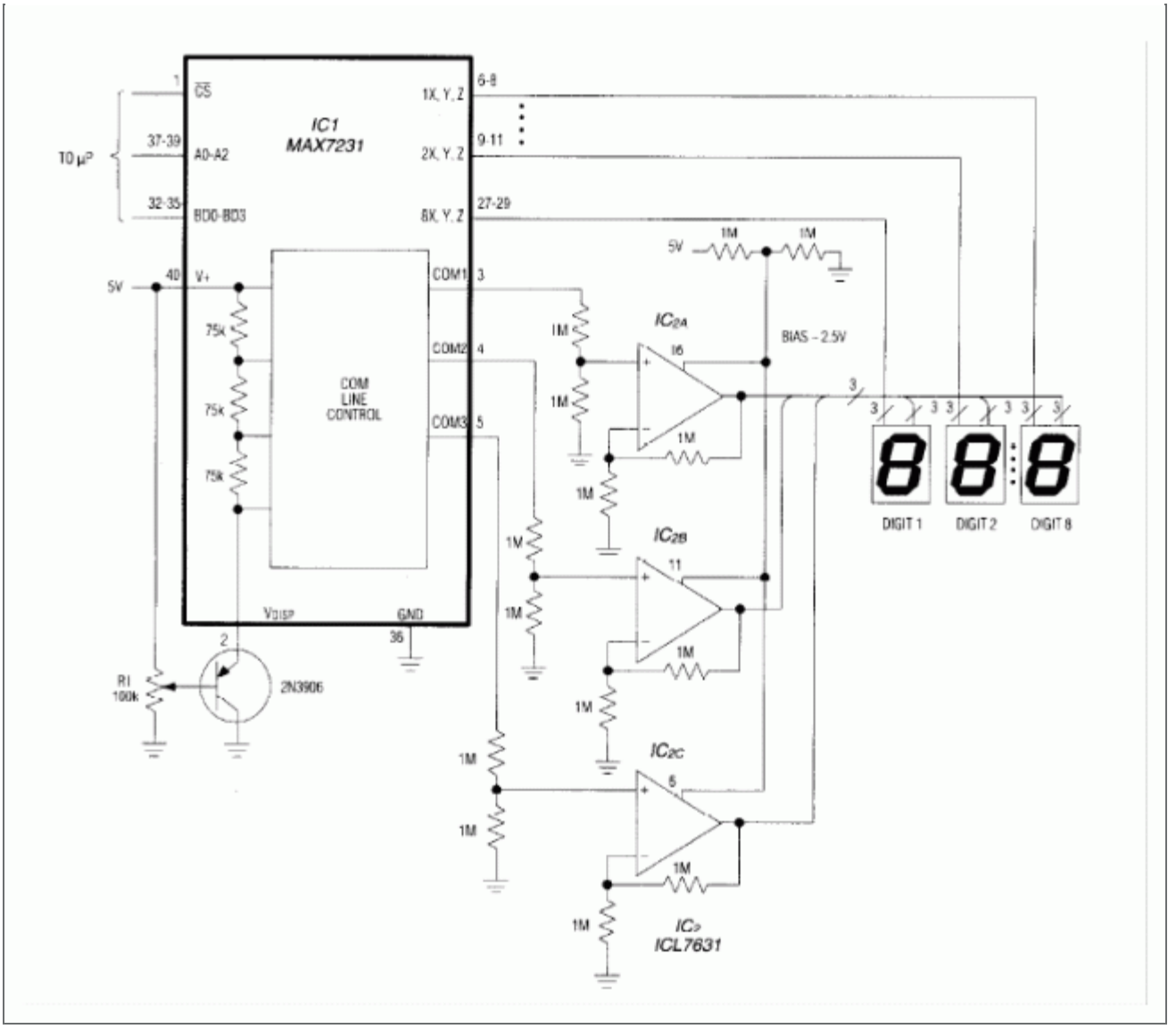

Figure 1. Three buffer amplifiers enable this standard LCD driver (IC1) to control eight large (1") seven-segment displays."

Related Parts		
MAX7231	8-Digit, Triplexed LCD Decoder Driver	Free Samples
MAX7232	8-Digit, Triplexed LCD Decoder Driver	Free Samples
MAX7233	8-Digit, Triplexed LCD Decoder Driver	Free Samples
MAX7234	8-Digit, Triplexed LCD Decoder Driver	Free Samples

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