TTL can generate composite video signals

by Kenneth P. Evans
College of Medicine, University of Cincinnati, Cincinnati, Ohio

Obtaining a composite video signal from discrete components is a difficult task. However, exclusive-NOR gates having open collector outputs and TTL compatibility end the problem since they eliminate the need to bias high-speed transistors or to interface digital and analog devices in systems where only character or graphics information is used.

The circuit (a) produces a quality composite video signal. The current through resistor R_1 determines the output voltage. When the sync pulse appears at the input, gate $U_{1\text{-}a}$ pulls the output to ground. During the display portion of the horizontal scan, the black output level of 0.25 volt results when the output of gate $U_{1\text{-}b}$ is held low. This voltage shunts the current through R_3. When the output of $U_{1\text{-}b}$ is high, the current from R_3 passes through diode D_1 to increase the voltage across R_1 to 1 V—the color white on the cathode-ray tube.

Additional features may be incorporated in the design as shown in (b). Reverse video is obtained by supplying a logic 0 to the input of $U_{2\text{-}b}$ when characters are displayed. Also, tying the outputs of $U_{2\text{-}b}$ and $U_{2\text{-}c}$ together enables the circuit to blank the characters. In addition, $U_{2\text{-}d}$ helps switch the character brightness between two levels. When the output of $U_{2\text{-}d}$ is high, the current through R_4 increases the amplitude of the video-dot voltage across R_1. The low output impedance of this circuit is compatible with the 75-ohm input of standard video displays. □

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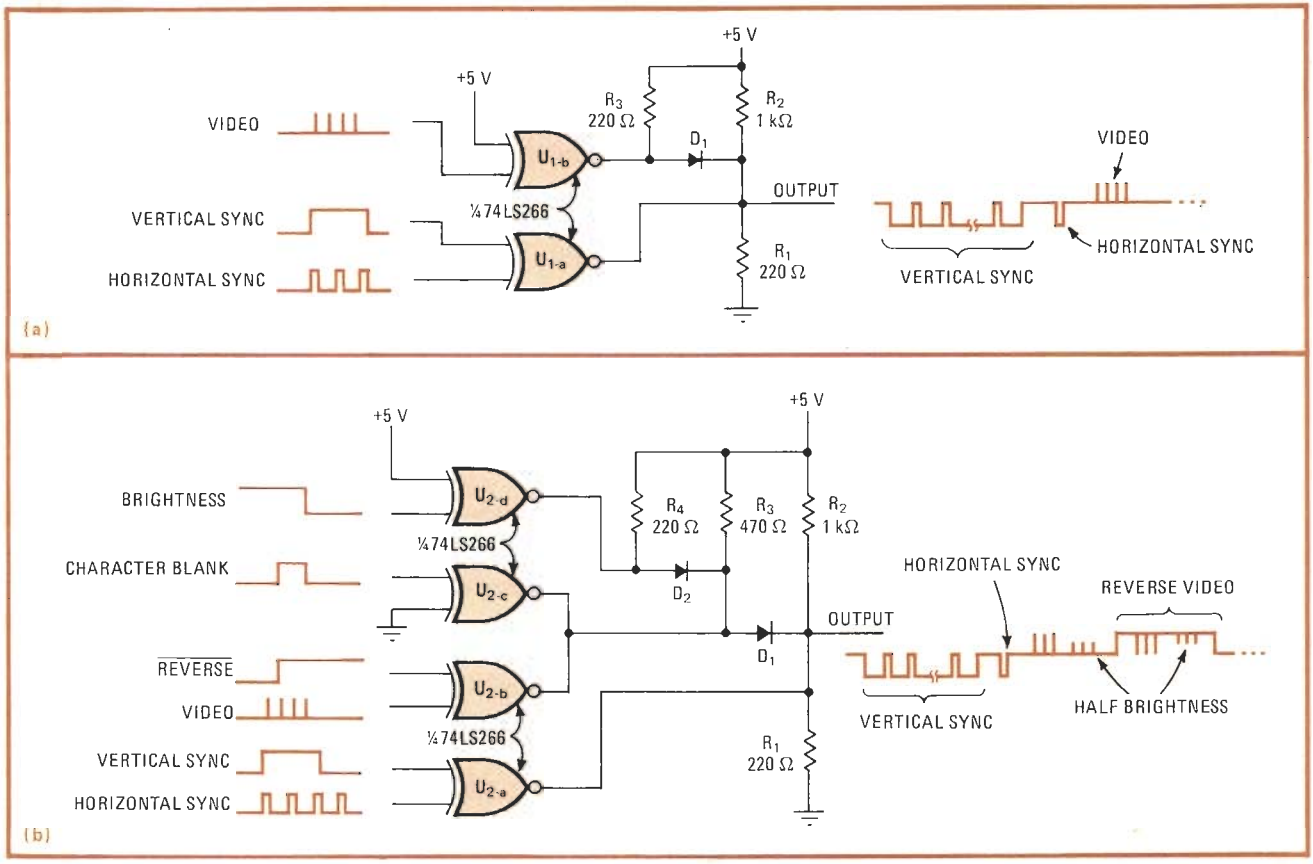

Composite video. Using exclusive-NOR gates with open collector outputs and TTL compatibility, the circuit (a) produces a quality composite video signal. The black output level is 0.25 volt and the white output level is 1 V. Adding more gates (b) provides such extra features as reverse video, character blanking, and two-level character brightness. In addition, the circuit's output impedance is low.