Video equalizer sharpens VCR images

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Video signals from a VCR lose sharpness, resulting in a flatlooking image. The effect is especially noticeable when copying from one tape to another, as you do in a video-editing system. High-quality recorders minimize this effect, but they are expensive.

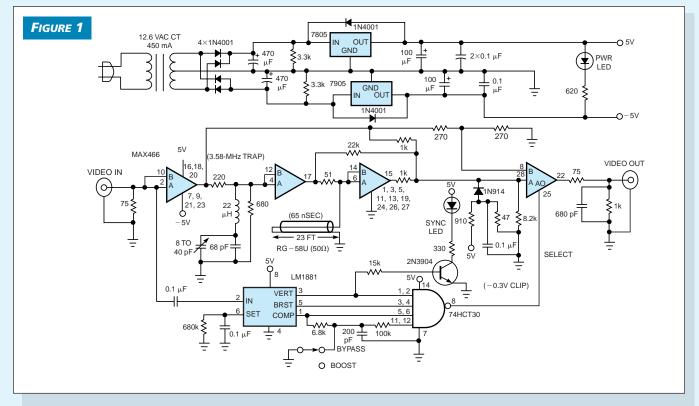
The circuit in **Figure 1** sharpens picture images without introducing the shadows, ringing, and noise often observed with commercial video equalizers. The key to this improvement is the coaxial delay line, which replaces the typical LC network in other equalizers.

The circuit applies the video signal to a MAX466 quad video amplifier. The first amplifier drives a sample of the original video into a resistive summing network and a second amplifier through a 3.58-MHz trap. The trap deletes the chrominance-color signal from the original video. The second amplifier applies the remaining luminance-brightness video signal to the shorted coaxial delay line. This amplifier also applies a sample of the luminance signal to the resistive summing network. The total round-trip delay of the delay line is 65 nsec, about half the typical rise time of a VCR output for typical VHS or 8-mm VCRs.

The output of this delay line drives a third video amplifier, which recovers the edges of picture images. The enhancededge output of this third amplifier combines some of the original video signal from the first amplifier, some of the luminance video signal from the second amplifier, and the enhanced-edge video signal from the third amplifier into an improved video signal.

The 1N914 diode and associated resistors clip the video to –0.3V, which differentiates the enhanced video from being confused with normal sync signals. The resulting video signal drives one input of the fourth video amplifier. The second input of the fourth video amplifier is the original video signal, including sync and color burst. The LM1881 video-sync detector and the 74HCT30 NAND gate-switch this fourth video amplifier so that the original sync and color burst from the first amplifier go directly to the output, and the enhanced video signal from the summing network goes to the output during active video time.

The 680-pF capacitor across the video output suppresses switching transients generated in the fourth amplifier when switching between sync/color burst and enhanced video but does not degrade the enhanced video. The circuit also contains a power LED, a vertical-sync-indicator LED, and a bypass/boost switch. The power supply is a conventional linear design. The circuit is built on a double-sided copper-clad pc board.(DI #2251)



Using a delay line in place of the typical LC equalizer network allows this circuit to sharpen VCR images without introducing the artifacts commonly produced by commercial equalizers.

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