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As the digital world encroaches into analog territory, signal conditioning circuits are required to prepare analog signals for digital processing. The standard composite video signal is an analog signal and generally AC coupled in video systems to prevent circulating DC currents. The following circuit demonstrates a method of conditioning a composite video signal for an analog to digital converter. The design example as depicted in Figure 1 consists of two main sections, a DC restore amplifier and a clamping amplifier. The DC restore amplifier clamps the back-porch of the video signal to a fixed reference and the clamping amplifier removes the sync portion of the video signal.

The video signal first goes into a sync separator, the EL4581, and at the same time into a DC restore amplifier, the EL4089. The EL4581 outputs a CMOS logic low signal into hold control input of the EL4089 during the back-porch section of the video signal. When the hold control input is low, the servo loop in the DC-restore amplifier forces its output to the reference level. A necessary offset voltage is

placed across the sample and hold capacitor to create the proper input to output voltage shift. In the design example, C1, the AC coupling capacitor doubles as a sample and hold capacitor. Photo 1 shows the analog video input and the sync separator back-porch output waveforms. The back-porch output is used as the control signal for the sample and hold clamp signal. The combination of the EL4581 and EL4089 clamps the back-porch of the video signal to the ground level. Note that the sync tip of the video signal remains untouched.

All CMOS ADCs have a parasitic latch-up problem when subjected to negative input voltage levels. Since sync tip contains no useful video information and it is a negative going pulse, we can chop it off. The EL2157 stage limits the negative excursion to the ground level. The input and output range of the EL2157 is 0V to 3.5V. Its fast 7ns of negative over-drive recovery makes it ideal for clamping applications. Photo 2 shows the incoming video signal whose back-porch is clamped to the ground level and the amplifier output signal with negative going portion of the sync tip chopped off.
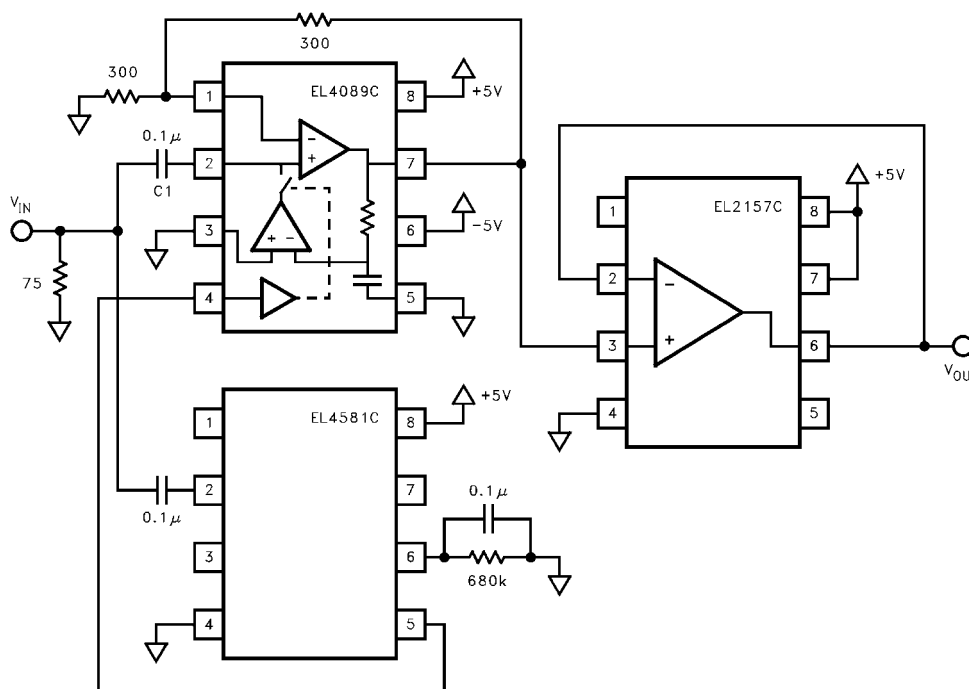

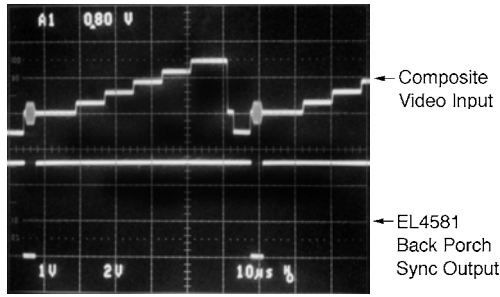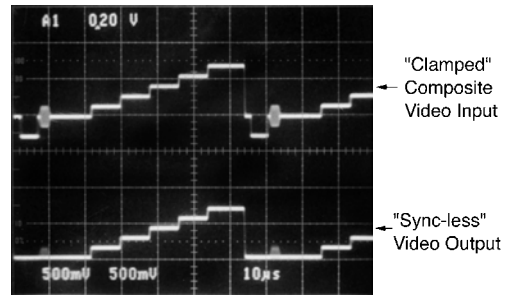**FIGURE 1. DC-RESTORE SYNC REMOVER**

PHOTO 1. DC RESTORE

PHOTO 2. "SYNC-LESS" VIDEO SIGNAL

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