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tech tips

# How To Troubleshoot TV Blanking Circuits With Your SC61 And VA62A

Television blanking problems often become difficult to troubleshoot, especially because blanking problems can look like problems in other sections of the TV. This Tech Tip explains why blanking circuits are used, how they work, what goes wrong with them, and how to troubleshoot them with your SC61 Waveform Analyzer and VA62A Universal Video Analyzer.

## Why Internal Retrace Blanking Is Used

The blanking pulses included with the transmitted video signal are meant to bias the CRT off during vertical and horizontal retrace so retrace lines aren't visible. There are a number of reasons, though, why TVs must generate their own internal blanking pulses instead of depending on the blanking pulses arriving with the video signal:

1. If there is no video signal, or if the video signal is weak, the video signal blanking pulses are not of sufficient amplitude to completely turn off (blank) the CRT during retrace.

2. Without internal blanking, the adjustment of the brightness control is critical for correct blanking.

3. Color burst is not totally blanked by the video blanking pulses. If an internal horizontal blanking pulse is not used to blank the color burst, it spreads a yellowish-green haze over the screen during retrace.

4. If the DC level of the video signal is not perfectly maintained through the video amplifiers, the video signal blanking level changes as the picture changes.

## How Internal Blanking Circuits Work

There are two basic types of circuits used for internal retrace blanking. In each case, the blanking pulses are used to bias the CRT off during vertical and horizontal retrace.

Older receivers use a pulse from both the vertical and the horizontal circuits to feed either the CRT or a video amp. Blanking amps may be included in either one or both of these paths, or the blanking pulses may be combined and a common blanking amp used (Figure 1).

Late model receivers use a single IC for video/chroma circuits. These receivers usually combine vertical blanking, horizontal blanking, and sometimes delayed horizontal sync pulse (for chroma burst keying) into a common signal. This is done so these signals can all be fed into the video/chroma IC on a single pin. Inside the IC, the signals are separated and sent to the circuits where they are needed. This combined signal is called the "Sandcastle" pulse because of its appearance on a scope when viewed at the horizontal sweep rate (Figure 2).

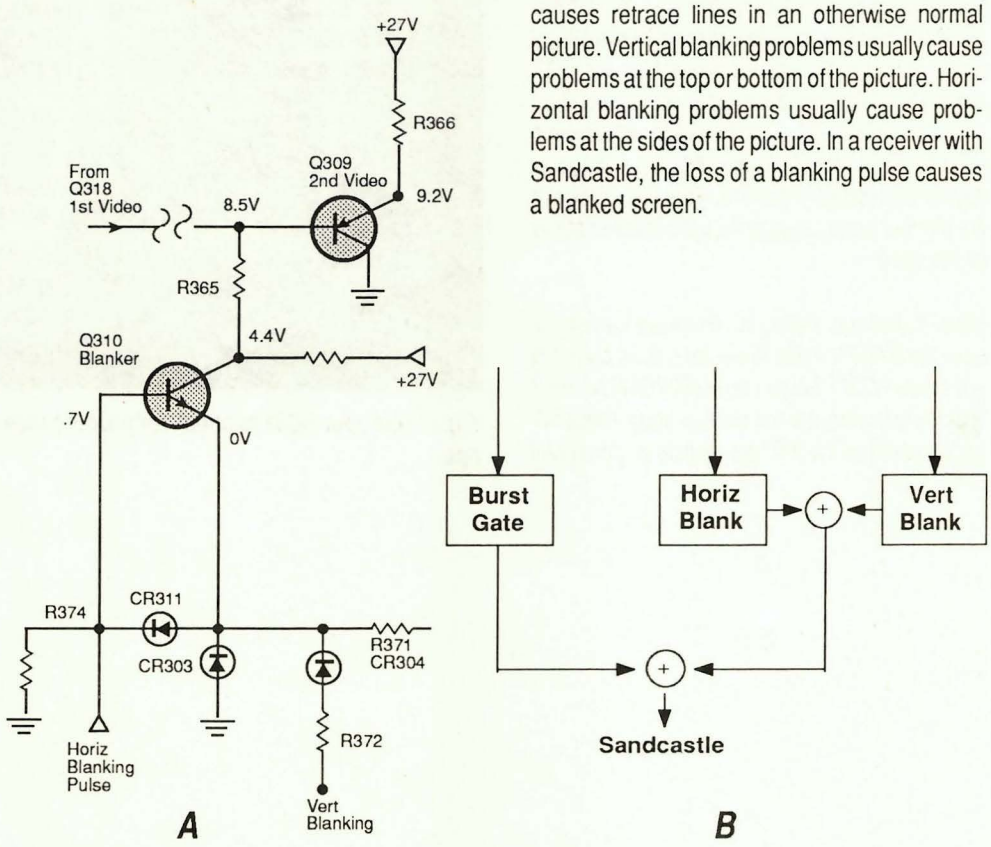


***Fig. 1: Older receivers (A) use a common blanking amp which combines vertical and horizontal pulses. Newer receivers (B) use the "sandcastle" pulse which combines vertical and horizontal blanking with burst gate.***

## What Goes Wrong With Blanking Circuits

When the blanking circuits aren't working properly, the symptoms you see depend upon the type of circuit and type of failure. In an older receiver (without Sandcastle), the loss of a blanking pulse, without upsetting the CRT's DC bias, causes retrace lines in an otherwise normal picture. Vertical blanking problems usually cause problems at the top or bottom of the picture. Horizontal blanking problems usually cause problems at the sides of the picture. In a receiver with Sandcastle, the loss of a blanking pulse causes a blanked screen.

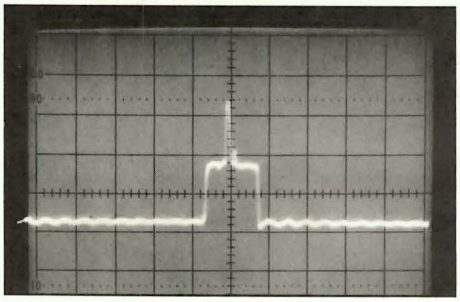

*Fig. 2: The Sandcastle pulse is made up of horizontal blanking, vertical blanking, and delayed horizontal sync used for burst keying.*

If the blanking pulses are present but not properly timed, you'll see portions of the picture that are blanked out or shaded. A defective blanking amp may produce an incorrect DC bias on the CRT that causes the brightness of the entire picture to be too high or too low (or blanked out entirely).

## How To Troubleshoot Blanking Problems With Your SC61 and VA62A

To troubleshoot blanking problems in TVs without Sandcastle, first use your SC61 Waveform Analyzer to check the waveform and DC voltage at the output of the blanker amp. Use the CRT display to check for the proper waveform, and use the digital display to check the waveform's peak-to-peak amplitude and the DC voltage at the blanker output (Figure 3). If the DC voltage at the blanker output is incorrect, the blanker stage is defective.

If the DC voltage is okay but the pulse is missing, use your VA62A Video Analyzer's drive output to substitute VERT SYNC or HORIZONTAL KEY PULSE to the input of the blanker stage (depending on whether the TV has vertical or horizontal blanking problems). If the picture improves (remember to keep the VA62A RF signal connected to the antenna terminals), the problem is before the blanker input, in the components that pick up pulses from the vertical or horizontal circuit.

Substitute at the output of the blanker stage if the picture doesn't improve when you substitute at the blanker input. If the picture improves now, the blanker stage is defective.

Blanking problems in TVs with Sandcastle show up as a blanked screen. Since other problems in the TV cause the same symptom, you need to first decide if the problem really is a blanking problem. To do this, substitute your VA62A's HORIZONTAL KEY PULSE at the video/chroma IC's Sandcastle input. If the picture returns, you know the problem is in the circuit that makes the Sandcastle pulse.

If a single horizontal line returns, the vertical sweep circuit is defective. If a raster returns without picture, an RF or IF stage is defective. If neither raster nor picture returns, but there is high voltage, there is a DC bias problem at the CRT or in a video amplifier stage. Troubleshoot these video problems using signal substitution and DC voltage measurements.

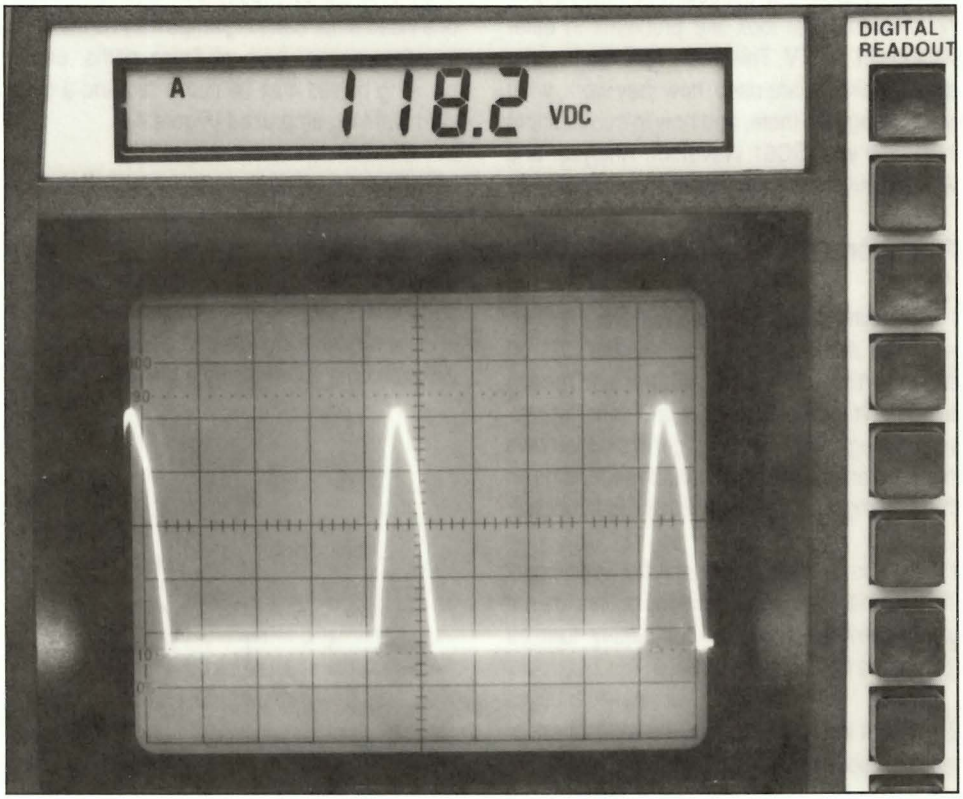


*Fig. 3: Use your SC61 to check for proper pulse waveshape and amplitude and correct DC voltage.*