SENCORE®
Means Success In Electronic Servicing
tech tips

Troubleshooting Sandcastle Problems With Your VA62A Universal Video Analyzer

Many newer television chassis contain an integrated circuit that processes the luminance and chroma signals. This IC requires a unique input signal called the Sandcastle. The Sandcastle is a special signal used to inject three signals into a single IC pin. The three signals mix outside the IC and form the waveform shown in Figure 1. The IC separates these signals and uses them for various internal functions.

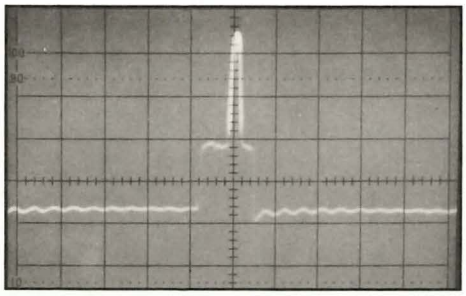

Fig. 1: The composite Sandcastle waveform

The three signals that make up the Sandcastle are:

1. Flyback pulse
2. Delayed horizontal sync pulse
3. Vertical blanking pulse

The three signals are mixed to form the Sandcastle signal as shown in the typical circuit of Figure 2. The top circuit path produces horizontal keying pulses needed to separate the color burst from the composite video signal. Some TV receivers use a pulse supplied by the flyback transformer to separate burst. TV receivers with the Sandcastle signal use a different method.

The horizontal sync from the sync separators feeds a delay circuit. The delayed sync pulses line up with the color burst on the back porch of the horizontal blanking interval of the composite video signal. The delayed signal then mixes with the two other signals.

The IC also requires a pulse from the flyback transformer, but this pulse is used for horizontal blanking rather than keying functions. The transformer pulse comes through the circuit in the lower, right-hand portion of the schematic in Figure 2.

The third path provides vertical blanking. A signal from the vertical oscillator feeds through the blanker transistor and mixes with the first two signals.

Isolating Sandcastle Problems

The luminance/chroma IC produces no output signal if the Sandcastle signal is missing altogether which results in a blank CRT. This same symptom occurs if the flyback pulse ("blanking" pulse) or the delayed sync pulse ("keying" pulse) is missing, even though the other two Sandcastle signals are normal. This one symptom applies to nearly any problem related to the luminance/chroma chip. Of course, other symptoms such as IF or detector problems cause the same symptom as a defective luminance/chroma chip .

Confirm the luminance and chroma signals are present at the IC before suspecting the Sandcastle. Feed the VA62A Color Bars pattern to the antenna terminals and note the results on the CRT. There will be a picture if only one of the two signals is missing, although it will lack either color or luminance detail. In the case of a blank screen, confirm

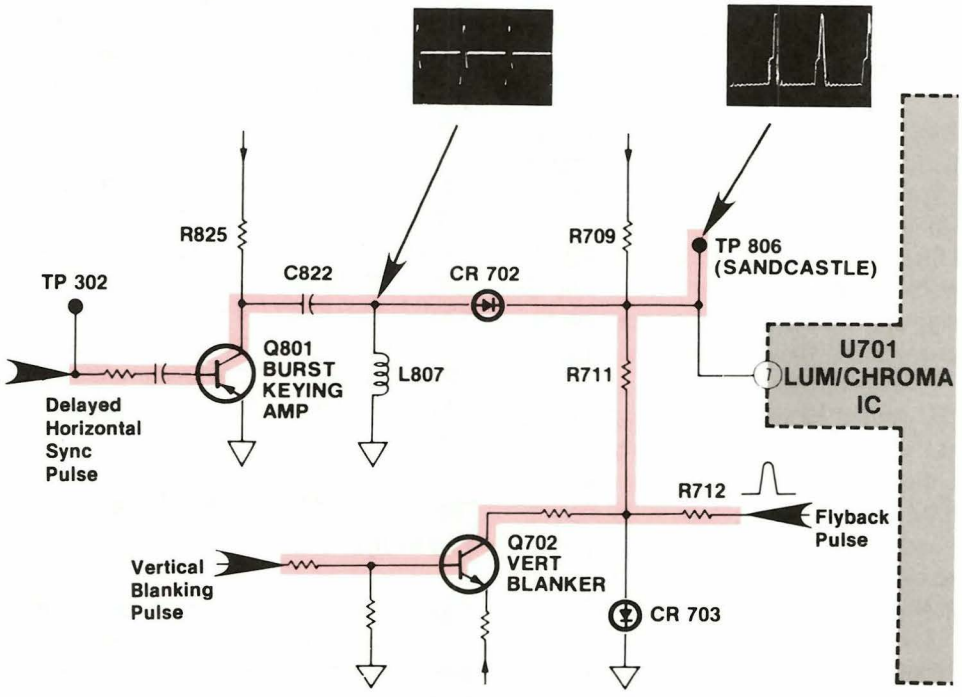

Fig. 2: The Sandcastle, named for its shape, is formed by flyback, vertical blanking, and horizontal sync pulses.

the signals are at the IC with an oscilloscope or the VA62A signal tracing meter. Do not troubleshoot the Sandcastle circuits if both the luminance and chroma signals are missing as you must have the two video inputs before the Sandcastle affects the IC. Use conventional signal injection or signal tracing procedures to confirm whether the problem is in the tuner, IF, detector, comb filter, etc. If, on the other hand, the signals are at the correct IC pins, proceed with the following tips for Sandcastle troubleshooting.

How To Isolate "No Picture" Problems

Whenever the VA62A's drive signals are used for signal substitution troubleshooting, the VA62A's RF signal must be injected at the antenna terminals (and have the VA62A and TV receiver tuned to the same channel). The antenna signal causes all of the good stages to operate normally while the substitute signal is injected into one suspected stage at a time. The sequence shown in Figure 3 gives the best troubleshooting efficiency in Sandcastle circuits.

One of the main symptoms associated with the Sandcastle signal is "No Picture". Start troubleshooting by substituting for the Sandcastle signal. This point is used first because the Sandcastle comes from three diverse circuits. Starting here eliminates more questionable stages than starting at the luminance input.

If there is a problem in the Sandcastle generator circuits, injecting the VA62A's signal in place of the Sandcastle signal will unblank the luminance/chroma IC putting a raster on the CRT. Simply inject the VA62A's "HORIZ KEY PULSE" at the Sandcastle input of the IC using positive polarity and the same peak-to-peak amplitude shown on the schematic.

NOTE: Do not be concerned about retrace lines that appear on the CRT when substituting the Sandcastle signal. The VA62A's "HORIZ KEY PULSE" signal does not include the vertical blanking signal normally supplied by the Sandcastle generator. Your first step is isolating the no-picture symptom.

If the picture returns, the luminance/ chroma IC works properly and the problem is in one of the Sandcastle generator circuits. Isolate the bad Sandcastle circuit by moving back one stage, substituting for one Sandcastle

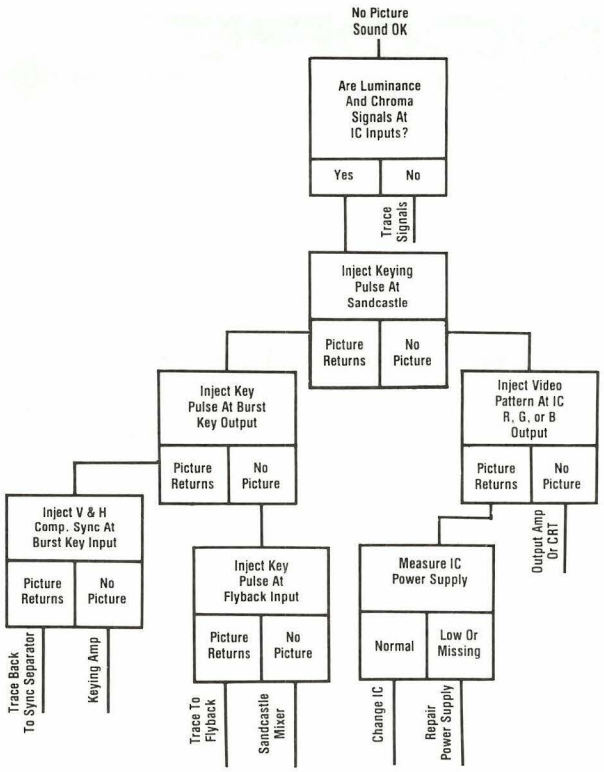

Fig. 3: Trouble tree for troubleshooting Sandcastle related problems

input and then the other (if necessary) to determine which path has the problem.

First, move back through the path that supplies the keying (delayed sync) pulse to see if it is the path with the problem. If the picture again returns, you know you have found the correct path because the substitute signal takes the place of the missing signal.

If the picture returned when injecting directly at the IC input, but yielded no change when substituting for the keying pulse, move your attention to the second Sandcastle generator input. Simply inject the VA62A keying pulse down the path that supplies the flyback pulse. Continue to inject signals at earlier and earlier stages until you identify the source of the problem.

How To Locate Retrace Line Problems

Another common symptom related to the Sandcastle is vertical retrace lines on the picture. These may be caused by a defective chroma/luminance IC or missing vertical blanking pulses in the Sandcastle signal. There will still be a picture if these pulses are missing.

Inject the VA62A "VERT DRIVE" signal, negative polarity, at the input of the vertical blanker transistor. If the retrace lines disappear, the problem is in the circuit feeding the transistor. If the lines remain, move to the output of the blanker transistor. If the lines disappear, the problem is in the blanker amplifier. If they remain, the problem is in the luminance/ chroma IC.

#120 #120