1 Waveforms from a Hitachi model VK-S274R camera module

On 14 OCT 2001, a short test was made on the sync pulse and color burst values from a Hitachi VK-S274R series camera. This was done in response to SR 1-93084111 from NASA at Vandenberg Air Force Base (VAFB).

At VAFB there was a question as to the validity of the television signal output by an ExSite unit. The ExSite takes the output of the camera module, buffers it and sends it out directly. Testing with the camera module disconnected from the ExSite was done to eliminate all possible problems caused by the ExSite video signal buffering.

The results are that the signal leaving the camera meets NTSC video standards. Testing consisted of:

1. Talking to the customer that caused the SR to be generated.
2. Determining that all ExSite units on site were recent and came from the same delivery batch.
3. The "problem" that NASA was having occurred on any line of NTSC video. Not just those in the vertical sync or other special area.
4. The "exact" NASA configuration is that each ExSite had a "fiber module" installed inside the ExSite with a fiber line running to the control area. In the control area the signal is reconstitued and used by the NASA equipment. (I did not get the make/model number of the fiber equipment.)
5. I asked the customer to use the built in menu system on the ExSite to get the exact camera model and camera EEPROM rev.
6. The customer returned the requested information by e-mail with a note that said that all had the same camera model/EEPROM Installed.
7. I had an identical Hitachi camera model/EEPROM on my desk, so I connected the local Hitachi camera up to a "Hitachi Box" that provided camera power and camera video.
8. I then connected the video to a terminated monitor and a Tektronix TDS 224 4-channel Oscilloscope[6] that was calibrated on 03/23/10 by Pelco's calibration company.
9. Then I made several data captures of the video signal near the HSYNC pulse as follows:

[1] `$Header: d:/Binder08.Hitachi/SR1-93084111/RCS/test.tex,v 1.14 2010-10-14 10:54:37-07 Hamilton Exp Hamilton $`

[4] `tocdepth = 4`

[5] `$Header: d:/Binder08.Hitachi/SR1-93084111/RCS/NasaSR.inc,v 1.2 2010-10-14 11:37:47-07 Hamilton Exp Hamilton $`

[6] This is a Real-Time single color Digital Oscilloscope that is rated at 100 MHz at 1 GS/s.

10. The biggest problem in looking at the Oscilloscope pictures is that the digital nature of the picture quantifies the picture into discrete steps. On an analog Oscilloscope the picture is not shown as discrete steps, but rather as a "smooth" line.

11. The picture used was obtained by placing the camera with its lens directly down on a yellow note pad to produce an "almost black" picture. For the black level pictures a guess of the average point of the black level was made. (This guessing was only needed on Figure 7, page 6 and Figure 8, page 6.)

12. A total of 5 different data captures were made to emphasize different parts of the NTSC video signal.

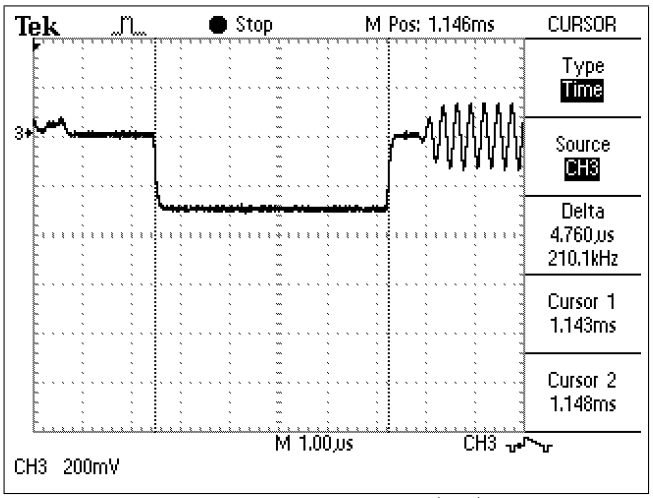

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Figure 1: VK-S275R `0501-0102`, HSYNC Timing, Capture #1

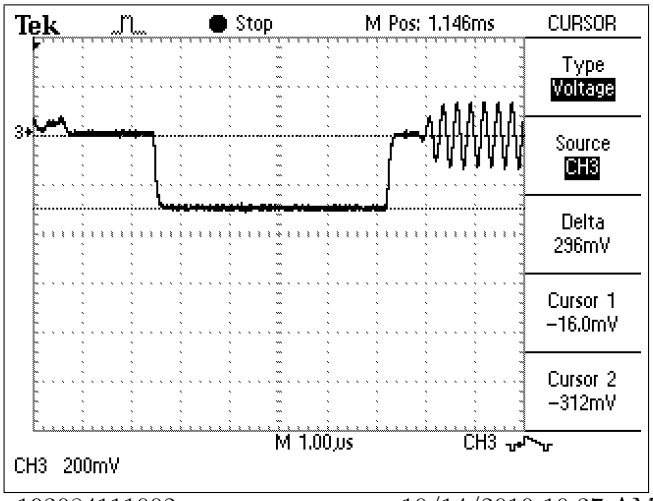

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Figure 2: VK-S275R `0501-0102`, HSYNC Voltage, Capture #1

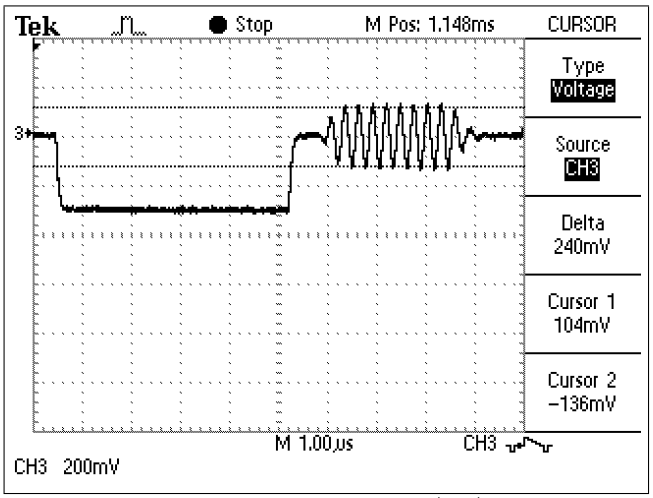

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Figure 3: VK-S275R `0501-0102`, Color Burst Voltage, Capture #2

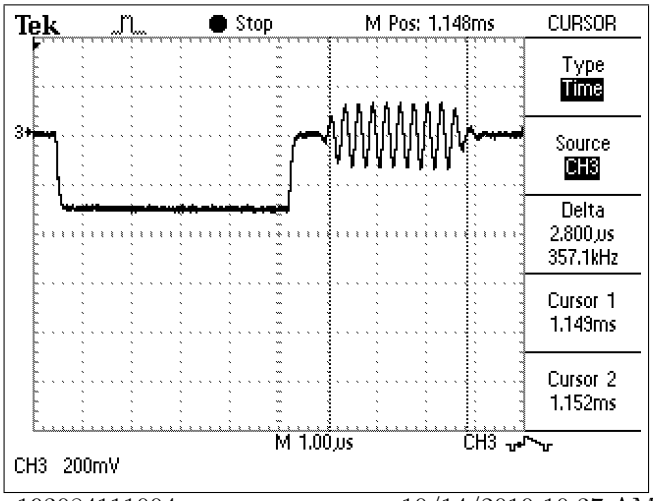

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Figure 4: VK-S275R `0501-0102`, Color Burst, Tining, Capture #2

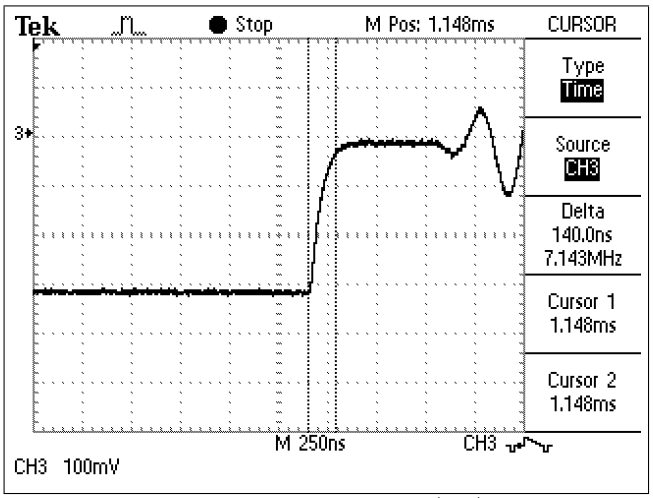

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Figure 5: VK-S275R `0501-0102`, HSYNC Trailing Edge Rise Time, Capture #3

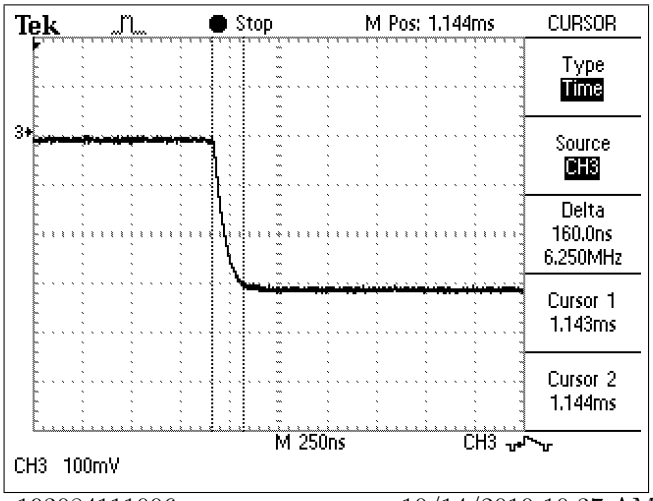

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Figure 6: VK-S275R `0501-0102`, HSYNC Leading Edge Rise Tiing, Capture #4

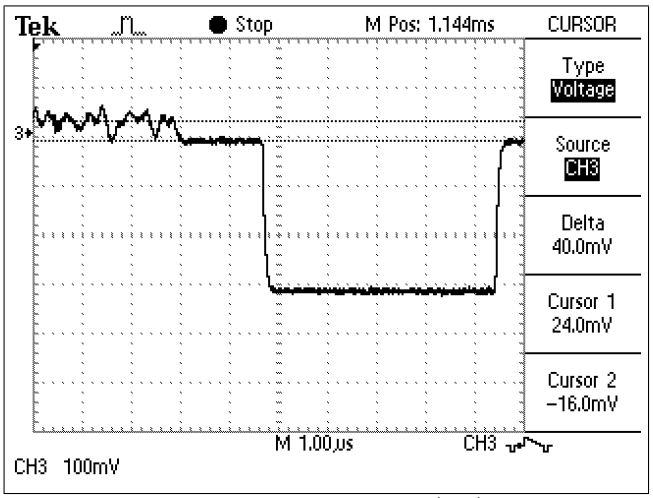

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Figure 7: VK-S275R `0501-0102`, Black Level Voltage to Blacker than Black, Capture #5

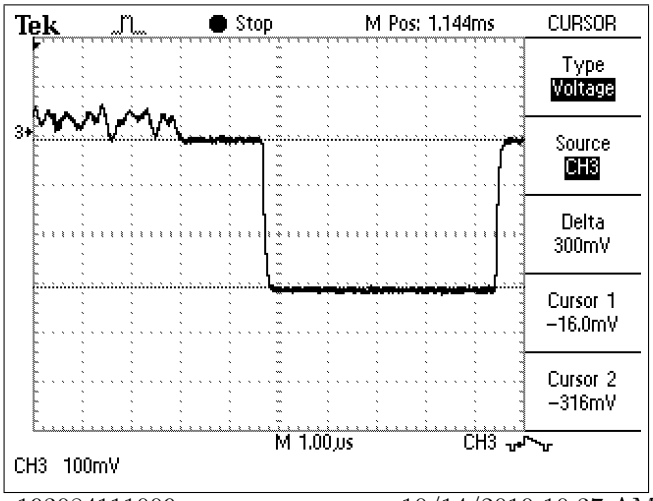

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Figure 8: VK-S275R `0501-0102`, Blacker than Black Voltage to Sync Tip, Capture #5