Film-Tech

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Dolby Laboratories Inc

Field Bulletin 224

Reverse Scan Digital Soundhead Readers
Reducing Playback Errors
CCD gain change and LED drive current change

- ☐ Modification Urgent
- ☐ Modification Recommended
- ☐ Modification Required on Early Units
- ☒ Modify Only if Problem is Present

Symptom

Insufficient light output from visible (660nm) Red LEDs in some digital inboard readers results in an increase in errors during playback. The following modification increases the overall gain of the CCD board by approximately two times, allowing LED drive current to be reduced.

No adjustment or modification is necessary if your digital reader is not indicating excessive errors on a known good film (or the video output level is approximately 4 V as measured on an oscilloscope).

Before continuing with the modifications outlined below, verify that the position of the LED bracket or reader bracket has been adjusted for optimum video level. See the manufacturer's adjustment instructions.

The reader LED does not usually stop emitting red light suddenly. If, after completing the modifications outlined below, the LED light output is insufficient to achieve an adequate video output level or there are still excessive playback errors, then the LED must be replaced. The LED is not at the end of its useful life as long as the light output can produce **a minimum video output level of 2.5 V** by adjusting the power supply current driving the LED.

Cause

Some inboard digital readers with red LEDs have the Cat. No. 654R CCD preamp gain jumpers set to 1X. To achieve a 4 V video output level with this gain setting, greater LED drive current is needed. With higher drive current, the LED runs hotter, reducing the light intensity more quickly over the life of the LED.

In normal operation, the LED exhibits gradually reduced light output over its life. In order to maintain the required video output level, periodic adjustment to the power supply current driving the LED may be necessary. Switching off the LED when not in use, for example, by connecting its power source to the Projector Motor Start may extend both the time between adjustments and the life of the LED.

Dolby

Signal Processing and Noise Reduction Systems

100 Potrero Avenue
San Francisco, California 94103-4813
Telephone 415-558-0200
Facsimile 415-863-1373
www.dolby.com

Wootton Bassett
Wiltshire SN4 8QJ
Telephone (44) 1793-842100
Facsimile (44) 1793-842101

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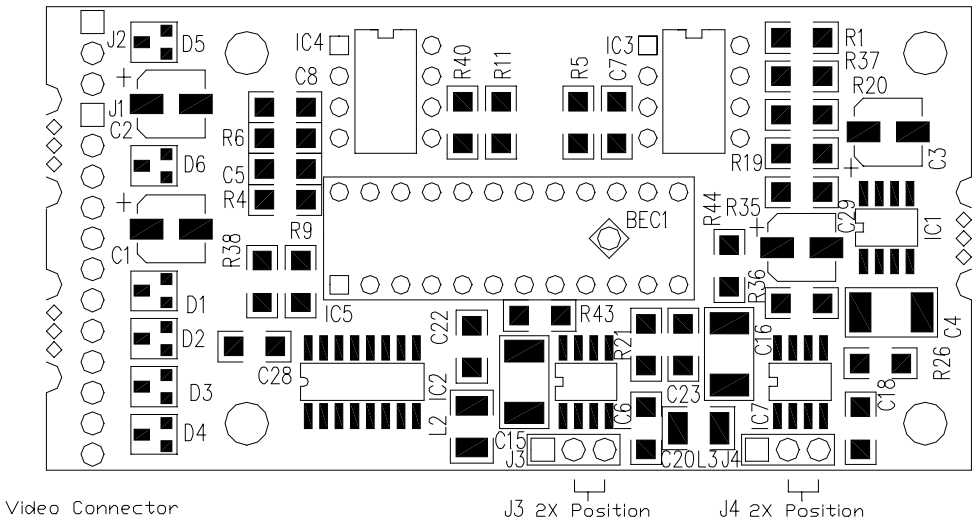
Modification

Perform these two modifications:

- On the Cat. No. 654R CCD board, place jumpers J3 and J4 in the 2X gain position as shown.
- Adjust the power supply current driving the LED in order to achieve 4 V video output level.

If the jumpers are already in the 2X position, increase the power supply current driving the LED in order to achieve 4 V video output level by following the steps below.

See the figure below for J3 and J4 location.



Class 2 LED Product per EN 60825-1:1996. Do not stare into the red LED beam. Do not attempt to view the LED beam with any type of optical device.

1. Connect an oscilloscope (20 MHz minimum bandwidth) to test points on the video acquisition card (Cat. No. 670).

a) Connect Channel 1 to the **Video** test point (TP1). Connect only this probe's ground to the V**Gnd** test point (TP2). Ensure that the probes are X1.

b) Connect Channel 2 to the **Clamp** test point (TP3).

c) Set both channel vertical input sensitivity controls to 1 Volt/div, DC coupling. Set the vernier to **calibrated**.

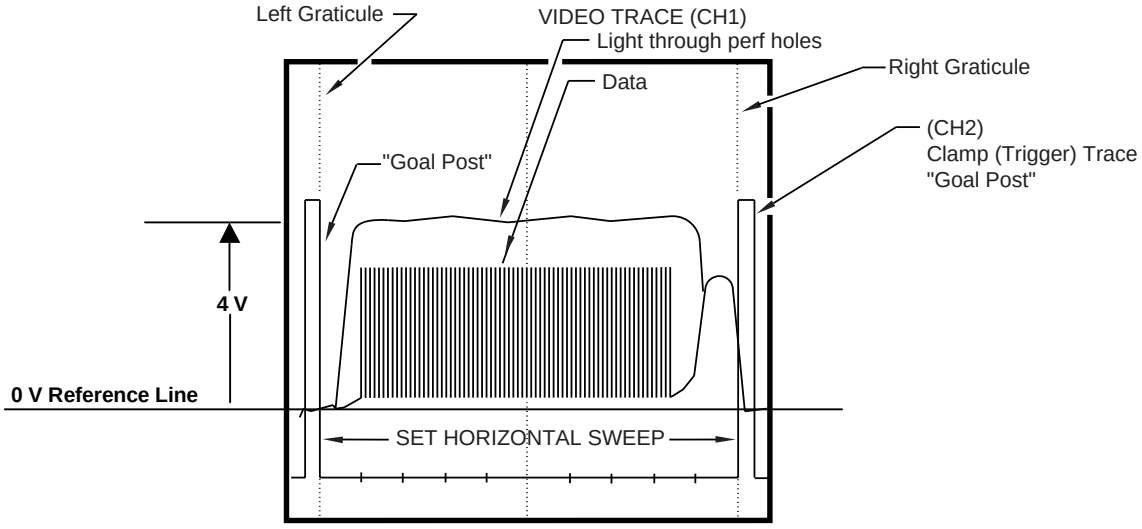
d) Set horizontal sweep rate to 2 µsec/div.

e) Set the trigger source to Channel 2 and positive polarity.

2. Set the oscilloscope display

a) Thread and play a Cat. No. 69T Dolby tone test film loop.

b) Display only Channel 2, and adjust trigger level to lock on to the clamp signal.



c) Adjust horizontal position to line up inside edge of left clamp signal ("goal post") with left screen graticule.

d) Adjust the time base sweep vernier to line up the inside edge of right goal post with right screen graticule.

e) Select Channel 1 display.

f) Temporarily switch the scope channel 1 input (video) to GND and adjust the vertical position to coincide with a horizontal screen graticule. This is the 0 V reference baseline.

3. Adjust the LED Current

Switch the Channel 1 video input coupling back to DC, and adjust the power supply current driving the LED to achieve the correct signal voltage. The correct peak video signal voltage (unobstructed light through the perf hole) is between **2.5 V** and **4 V**, measured from the 0 V reference baseline to the **upper trace**. If the top of the video waveform is not reasonably flat (± ½ division), then check for proper LED alignment (see the manufacturer's adjustment instructions). If the LED cannot produce adequate light output to achieve the 2.5 V minimum, then the LED must be replaced.