

**Application Note:**

**KLI-5001G Device Upgrade from KLI-5001E**

**Eastman Kodak Company**

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**Rochester, New York 14650-2010**

**Revision 0**

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## 1. Introduction:

Customers familiar with the KLI-50001E device and upgrading to the KLI-5001G device should be aware of the design changes and subtle differences between the two devices. The differences are encountered when plugging a KLI-5001G into a circuit designed for the KLI-5001E.

Changes in ESD protection have been made to improve reliability and robustness.

The design changes were made to be indiscernible to the KLI-5001E end user.

## 2. Changes:

### 2.1 Electrostatic Discharge (ESD) Protection:

ESD protection circuits have been added to the following signals:

IG, SG, IDA, IDB, Ø1, Ø2, Vdd, (3) N/C

Note:

The signals already protected on the KLI-5001E device are still protected on the KLI-5001G device:

ØC, VG, OG, RD, Vss, ØS

Warning:

ØR could not be protected due to its signal swing. Strict ESD protection practices for Class 1 devices are still recommended.

### 2.2 Pull-Up Resistors to IDA and IDB Pins:

These resistors which were used to prevent possible electrical injection into the CCDs have been removed.

Reason:

When devices with these resistors were powered up, resistive heating increased dark current and noise.

## 3. Observations During KLI-5001G Characterization:

The bias on pin 21 (NWL), Scavenger/Light Shield, may drop below the recommended minimum value listed in DC Conditions of the Device Performance Specification. This shift is attributed to the removal of the IDA and IDB resistors.

The capacitance values for the phase clocks have slightly changed. Clock values should be examined for undershoot and overshoot. A -0.7V undershoot could reverse bias the ESD diode and cause problems with the video output.

Caution is required to avoid overdriving these signals. It is recommended that a series resistor be used between the clock driver and the CCD. This series resistance should be less than 50ohms. (e.g. 10 ohms.) Another option is to add a small capacitance to the clock signals on the clock driver output to ground.



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