

## 1.5 Testing with Light to reveal Quality of Reliability when utilizing Optoelectronic Circuits

### 1 Apply a Visual CHECK

- 1.1 Visual Check on wiring side of stripboard / Protoboard.
- 1.2 Visual check on Soldering side of Stripboard - Look for "cross-talk" between adjacent tracks.
- 1.3 Look for dry joints / suspect Protoboard connections.

### 2 Apply a Multimeter Continuity (up to 50 - 120 $\Omega$ ) Test

- 2.1 "Go for a Walk" down all tracks from Power Lines to lower tracks of circuit to check on null continuity.
- 2.2 Check on null continuity on BOTH side of each IC base.
- 2.3 Check null continuity on both sides of the IC Bases, and any other cut tracks.

### 3 Insert IC into Base DIL

- 3.1 Essential to wear wrist **GROUND LEAD** before opening IC storage tube.
- 3.2 Carefully place / bend IC legs to fit into IC Base.
- 3.3 Check all legs are in IC Base.
- 3.4 Press IC firmly into IC Base.

### 4 Connect all Testing Leads

- 4.1 Connect appropriate Power Leads.
- 4.2 Connect appropriate Input / Output Leads.
- 4.3 Connect Oscilloscope **GROUND** and + Red Test Probe.
- 4.4 Ensure that all Power Supplies have a **Common GROUND**.

### 5 Turn on Power

- 5.1 To Oscilloscope.
- 5.2 To Power Supply Unit / Batteries to ensure Power to the Stripboard / Protoboard .

### 6 Optoelectronic Circuit Test Probe Procedure

- 6.1 Look for Blue / Green / Red / Black Smoke.
- 6.2 "Feel" temperature of all ICs
- 6.3 "Smell" all ICs - you can **SMELL** Hot ICs
- 6.3 Check Voltage of Power Lines
  - 6.3.1 + V top Rail – keep Probe **continuously on** + 9 / 5 V SIL.
  - 6.3.2 – V third Rail – keep Probe **continuously on** – 9 / -5 V SIL.
  - 6.3.3 0 V Gnd Rail – **tap** Probe, to check on null Oscilloscope trace.
  - 6.3.4 + 5 V Rail – keep Probe continuously on + 5 V SIL.
- 6.4 Check on Voltage Inputs to IC - Check + V, GND, and – V Power arrives at ICs.
- 6.5 Check on Voltages **to all additional components, such as Photodiode, on circuit Board.**
- 6.6 Then and **ONLY THEN**, and **FINALLY**, Check on Inputs and Outputs to / from IC.
- 6.7 Check on variable outputs from any varying potentiometer settings.
- 6.8 Correct any necessary modifications evident from the Test procedure.
- 6.9 Record (in a Lab. Book) all numerical values, and trace shapes, from Oscilloscope screen trace.
- 6.10 Cut, trim, file, and round the corners of Fully Tested Optoelectronic Circuit Board.
- 6.11 Drill mounting holes in Stripboard circuit.
- 6.12 Mount Circuit on Project / Display Board.
- 6.13 Achieve a Personal Sense of Achievement from a Task and Test really well done that works precisely as planned and anticipated in the Project Design Specification.
- 6.14 Remember that ALL Inputs of ICs tend to Float HIGH, or Float LOW, when there is no actual Input Signal applied to an Input Terminal.
- 6.15 Hence, the importance of placing 1k $\Omega$  Resistors on Input Terminals – particularly true in Logic ICs and on Pin 4 Reset of any IC 555 Clock, if Pin 4 is being used to "turn-on" the IC 555.