

How to Test CCFL Lamps in LCD TV and Monitors



Liquid crystal displays (LCDs) are used in a wide range of products including flat-screen computer monitors, laptop computers, tablet PCs, PDAs, digital cameras and portable instruments. Compact cold cathode fluorescent lamp (CCFL)-based backlight (illumination source for the LCD screen) arrangement in these applications enables a well-viewable display in both dim and bright ambient light conditions. LCD

backlight mainly consists of a light source, diaphragm, light-leading board and plastic frame. It has high brightness, long lifetime and good uniformity features.

CCFL frequently employs fluorescent lamps, which have a phosphor-coated glass cylinder with cathodes at each end. CCFL tube is powered by a small electronic inverter (CCFL inverter) circuit that glows the screen electronically. The inverter circuit accepts a low-level DC input voltage and provides a high-level AC output to run the backlight CCFL tube(s).



Fig. 1: CCFLs for LCD

Fig. 1 shows the CCFLs for LCD. Often a need arises to check a faulty LCD backlight circuit for finding the dead components. Absence of backlight means either the CCFL inverter and/or the CCFL tube is in dead state.

Here is a simple circuit to test the CCFL tube in a LCD backlight unit, which might help the hardware technician

to speed up the repair work. This basic circuit (go/no go test) is portable, 6V battery operated and can be used to test almost all types of LCD backlight CCFL tubes.

The working of the CCFL circuit is shown in Fig. 2. A timer IC NE555 (IC1) is wired as an astable multivibrator (AMV) to drive a standard MOSFET T1 (IRF 512/IRF 830). Components R2, R3 and C3 determine the operating frequency of the AMV. MOSFET T1 switches the inverter output transformer (X1) to produce high-voltage AC supply at its output terminals. Here an ordinary step-down transformer is used as the inverter transformer by reversing its primary and secondary windings.

Assemble the circuit on a general-purpose PCB and enclose in a suitable cabinet. Fix the 2-pin connector on front side of the cabinet in such a way that the CCFL under test can easily be connected here. Fix the test switch on top of the frame. Keep the 6V battery in side the cabinet.

To test a CCFL, connect its terminals to the primary leads of transformer X1 and press test switch S1 momentarily. If the CCFL is good, you will notice a dim/bright glow in it (depends on the wattage rating of the CCFL under test). Always try to keep the test time as short as possible.

Warning. Repairing the LCD backlight unit is not an easy task even for experienced technicians. If you do something wrong you may permanently damage the LCD screen and have to buy a new one! ●

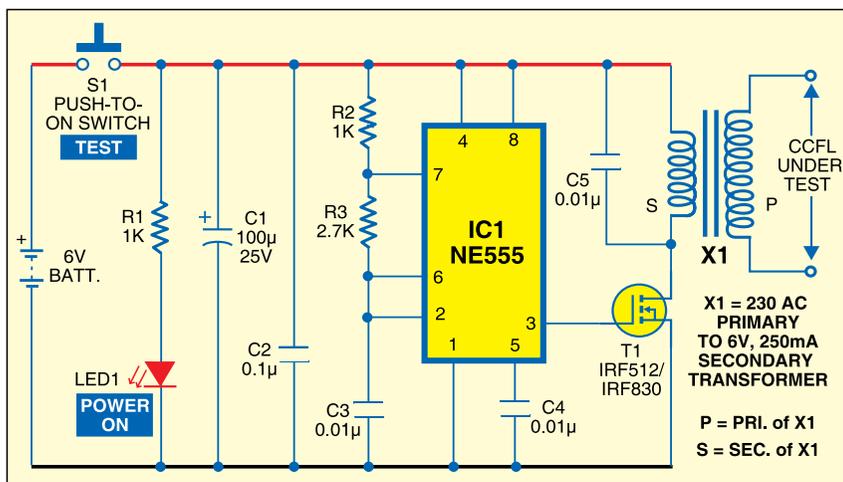


Fig. 2: Circuit diagram of CCFL tester