

## How to Test CCFL Lamps in LCD TV and Monitors



**L**iquid 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! ●

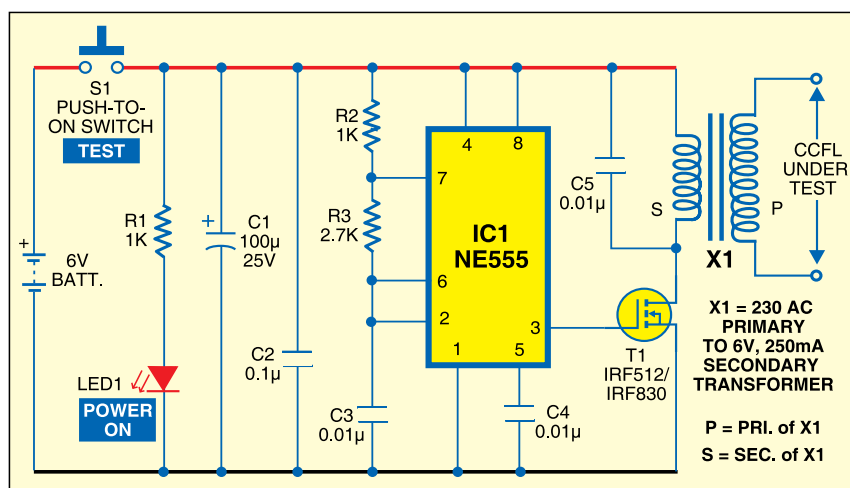


Fig. 2: Circuit diagram of CCFL tester