

Wireless Mains Voltage Tester

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This circuit can be used to test whether mains voltage is present or not without having electric contact with mains line. You can use this to test whether the electricity is available in the line. It is especially useful to all those electrical engineers and electricians who are engaged in difficult electrical circuit designing, repairing and fault finding jobs. A fault inside any AC electrical system is basically caused through a break in the continuity of specific wires and may result in a major breakdown of the whole system. These breaks in the wires are generally caused by aging, short circuits, or in some places rats could be the main cause of these malfunctions.

Our domestic AC mains (house wiring) voltage is made up of alternating currents that keep shifting phase from positive half cycle to negative half cycle. This happens very fast, normally 50 to 60 times per second. Due to this rapid alteration in its phase, alternating currents generate a fair bit of electrical disturbance in the air.

The proposed circuit is actually a very sensitive radio frequency detector and is able to pick even the slightest of electrical disturbance that may be present in the area surrounding it. It is also able to detect the presence of the mains AC voltage from quite a fair distance.

The CMOS IC CD4033 is the heart of this circuit. The CD4033 consists of a 5 stage decade Johnson counter and an output decoder for converting the Johnson

code to a 7 segment decoded output for driving 7 segment LED display. The clock input (pin 1) of IC is very sensitive and readily accepts energy from the electromagnetic radiation even from a long distance. This property of the IC CD4033 is exploited here to measure the intensity of radiation. The reset pin 15 of IC is connected to C1 and R1 to reset the IC after completing a cycle so that the functioning of IC continues till the input pulses cease.

A 10cm long insulated copper wire connected to the clock pin (pin1) of the IC serves as the sensor. The sensor wire has to be placed in the vicinity of the mains wire to be tested. When there is no voltage in the mains line, no voltage will be induced in the sensor wire and the display will show a random digit. When there is voltage in the mains line, a small voltage will be induced in the sensor wire due to electromagnetic induction and this voltage is sufficient enough to clock the CMOS IC CD4033. Now the display will count from zero to nine and repeat.

