FBTest

Detects shorted turns in Inductor or transformer.

When repairing television sets, most defects are accounted for by failure in the power supplies and signal chains Defective semiconductor devices and resistors are easily determined using a conventional meter, electrolytic capacitors - by measuring ESR.

But with conventional test methods such problems as inter-turn short circuits in Flyback transformers, deflection systems or pulse transformers are virtually impossible to detect.

It is to detect such defects that the FBTester was developed. It's based on the test technique designed by Bob Parker LOPT / FBT tester which was a Dick Smith model K7205 kit that's no longer made.

Since the FBTester uses a micro controller instead of discrete components it's smaller (65 x 40 x15 mm), lighter, draws less battery power (2.5 mA in active mode and 0.2 uA - in "sleep") and eliminates manual controls (i.e. has auto power on (clip to inductor) and auto power off after 30 seconds).

The test principle is called "ring testing". i.e. the ringing of an inductor after current is turned off. The open collector capacitance of the drive transistor plus the self capacitance of the transformer and the transformer primary inductance form a high-Q circuit. A pulse from the FBTester starts this circuit ringing and then counts the cycles of ringing as a way to determine the damping of the inductor while it's still in a circuit.

A good transformer will have many (at least 7) cycles before the amplitude decays to below 15% of the starting amplitude.

The presence of at least one short-circuited coil either in the primary or secondary will dramatically reduces the Q of the circuit and after 1-2 cycles the ringing will stop. (see Fig 1)

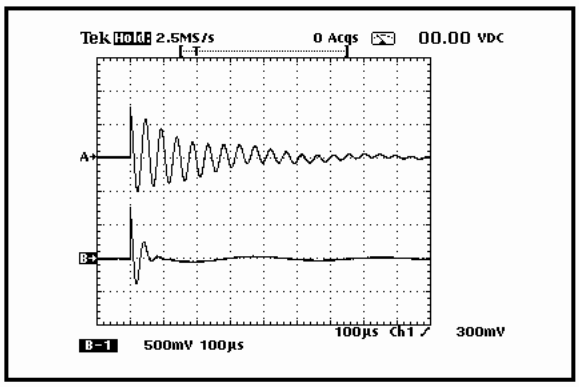


Fig.1: Ringing waveforms from 'good' (top) and 'shorted winding' line output transformers, in response to the tester's pulse.

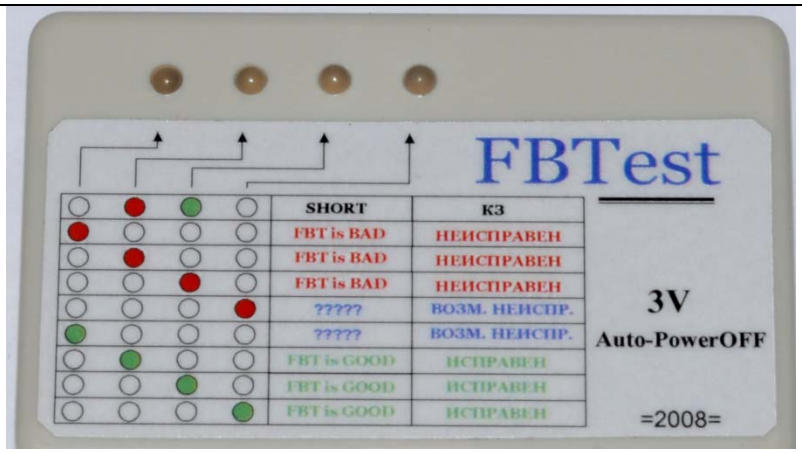
Operation

*Attention! * * Warning * *

All measurements must be made when the device under test de-energized!

The amplitude of the test pulse is about 0.5 V, so the test can done without dismantling the transformer from the board (the pulse amplitude is not enough to damage semiconductor devices that may affect the test results).

Measurement results are indicated by number and color of 4 LEDs (Table 1).



LEDs	~	Result	Bat
R G	0	Short	
R	1	Bad	
R	2	Bad	
R	3	Bad	
R	4	Bad	2.6
G	5	??	2.7
G	6	??	2.8
G	7	Good	2.9
G	8	Good	3.0

If the light is 1st, 2nd or 3rd red LED, the transformer is defective (1, 2 or 3 cycles). If the 4th red or 1st green LED, the transformer might be defective or good (4 or 5 cycles). If the 2nd, 3rd or 4th green LED, there are no shorted turns, i.e. it's good (>= 6 cycles).

It should be noted that shorted turns can cause problems in addition to fast damping, for example: failure of secondary circuits such as breakdown of one of the secondary rectifier diodes. Unfortunately such failure of transformers, as a breakdown of insulation, zapping of high-voltage diodes, etc. cannot be detected by theFBTester. Perhaps this is the only drawback of the device.

FBTest is simple to use. No on/off Button is needed. Just connect the probes to an inductor to wake it up. The initial LED indicates the battery voltage, and then all the LEDs are cycled on. When the unit is in operation mode and no inductor is connected the first red LED is on.

When an inductor is connected it's measured and results displayed automatically. If it's shorted (no ringing) both a red and a green LED are illuminated.

If the probes are connected to a short circuit, then the 2nd green and the 3rd red LED light simultaneously. This feature can be used as a continuity test.

The FBTester turns off automatically after 30 seconds of non use.

In addition to checking Flyback transformers, FBTest can be used to check other inductors and transformers and deflection yokes.

Battery

3-volt lithium cell CR2032.

Available From: http://www.prc68.com/P/Prod.html#El