

EQUIPMENT REPORT



flyback & yoke checker

Portable transistorized tester spots bad flybacks and yokes in a hurry

By WAYNE LEMONS

QUITE A LOT OF RATHER UNUSUAL CIRCUITRY is incorporated in this DOSS model D150 checker. It has a transistorized power supply, two relaxation oscillators, keyed damped-wave readout, and a unique neon bridge null indicator called a "Neon-O-Meter" that is almost a story in itself.

The power supply delivers about 100 volts negative, measured at the output of silicon diode D1 in Fig. 1. The frequency of the power oscillator circuit is approximately 15,000 cycles. C1 filters the ripple from the output.

A relaxation oscillator—R10, C8, and NE3—is used to pulse the inductance under test. This pulsing causes the inductance to "ring" producing a damped wave as in Fig. 2-a if the inductor is good. A method of reading the damped wave output will give a good indication of the condition of the inductor. But since a partially shorted inductor will often ring for a cycle or two after being excited by a strong pulse, Fig. 2-b, it is essential that the

readout circuit does not respond to the initial pulse nor for an instant thereafter.

Arranged in the common end of NE3 is an RC network made up of R8 and C4 (flyback test). So when NE3 fires, a negative voltage is established on its lower side. This back-biases (keys) D2 to prevent a read-out voltage of the initial pulse and the first few cycles of the damped wave. When the back bias decays to a low value, the damped wave is rectified by D2. This charges C5 in a positive direction and

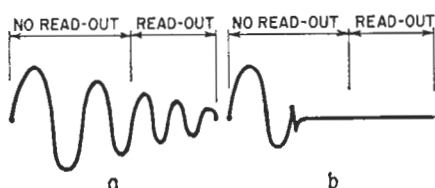


Fig. 2—Wave patterns produced by pulsing good (a) and defective (b) coil. By damping out the beginning of the wave, errors in readout are eliminated.

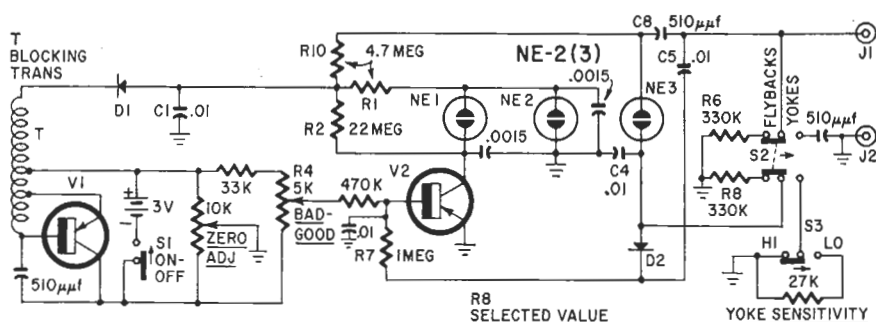
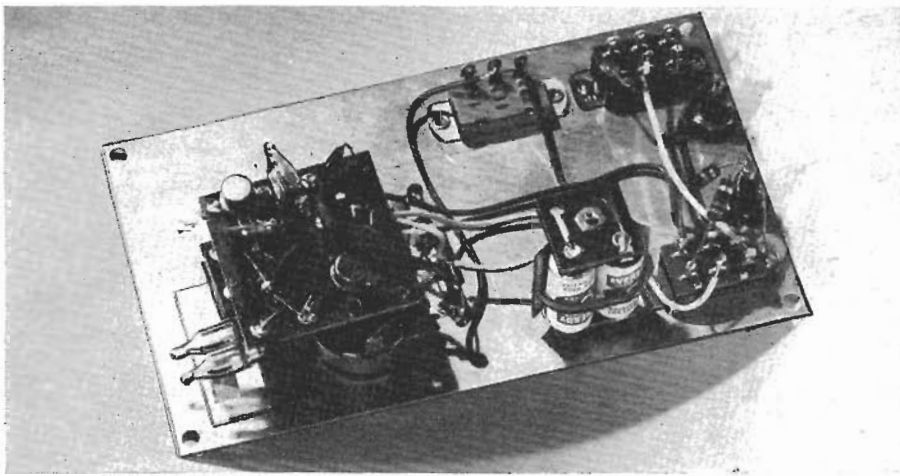


Fig. 1—Complete circuit of the Doss D-150 flyback and yoke checker.



All components are fastened to the front panel.

the resultant voltage is fed to V2's base through R7.

Keying the circuit this way adds to the sensitivity of the instrument since wide ranges of inductance are pretty well equalized and there is not much variation in where the GOOD reading occurs on the dial with either high or low inductances. A 330,000-ohm resistor (R6) is placed across the winding to further equalize the read-out.

If the inductance has a shorted turn, the damped wave is short or non-existent. Therefore the keyed circuit will have nothing to rectify and no charge will be developed on C5.

The readout circuit

R1, NE1, NE2 and C9 constitute another 60-cycle (approximate) relaxation oscillator, but this oscillator has an entirely different purpose. But first let's look at the overall readout circuitry.

Note that the bottom end of NE1 is tied to the collector of transistor V2 which in turn is tied to -100 volts through a 22-megohm resistor (R2). The bottom end of NE2 is tied to ground. The exact ionization point of NE-2 neons varies as much as 10 to 15 volts. This fact is used here. A lamp with an ionization voltage about 3 volts less than NE2 is used for NE1. With V2 forward biased (negative on base) the collector voltage is almost zero because of the drop through R2 and the neon with the lowest ionization

point (NE1) will fire. When it fires, the voltage drop across R1 prevents NE2 from firing.

However, as the main dial of the bridge (R4) is adjusted to provide a zero or slightly positive voltage to V2's base, the transistor is cut off and the collector voltage rises to about 10 to 15 volts negative. This lowers the voltage across NE1 and turns NE1 off and NE2 on. But this is only because of the 60-cycle relaxation oscillation.

Since NE1 (or NE2) is being turned off and on about 60 times a second, the neon with the most voltage across it will ionize and "lock out" the other one because of the voltage drop across R1. If it were not for the relaxation oscillation, however, NE1 would ionize (with zero transistor collector voltage) and would not relinquish its hold on the circuit unless the voltage across it were lowered enough to completely extinguish it. With this circuit, the lamps switch with less than a half volt change in collector voltage at the critical crossover point. Therefore, it can be used as a bridge null indication.

NE1, NE2 and V2 are selected as a group in production.

A positive voltage developed by the charge on C5 will bias V2 to cutoff and R4, the bridge dial will have to be rotated up into the GOOD part of the scale in order to again balance the bridge. If, however, there is no rectified voltage through R7, the bridge will balance in the BAD part of the scale.

Yoke test

The same test circuit is used except that the keying signal is unnecessary because comparative inductance readings are made. (A keying resistor is used but only as a convenient means of adjusting the yoke sensitivity measurement).

Yoke windings are measured separately. If you are measuring a horizontal yoke, you measure one half and then compare with the other half (Fig. 3). The two sides should be identical. This comparative test is a good one since the instrument does not have to be calibrated for different yoke inductances. Also, it is almost impossible for a yoke to develop an identical fault in each half of the winding. END

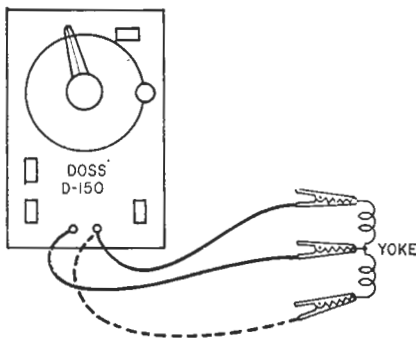
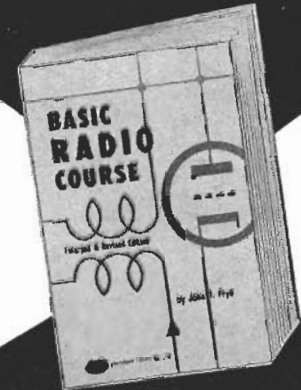


Fig. 3—Compare each half of deflection yoke for identical readings. They will not be the same if either half has a defect.

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About the author

Everybody knows John T. Frye. This technician's technician conducts regular departments in two electronics magazines and contributes often to many others including *Radio-Electronics*. His impressive knowledge and genial nature are reflected on every page he writes.

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