

## Complete Flyback/IHVT Testing

Some customers have expressed concern that they have found defective flybacks that pass the Sencore ringer test. This is because flybacks can fail in several different ways. The purpose of this Tech Tip is to show how a flyback fails and give a procedure to properly test a IHVT or flyback for all of its failure modes.

When checking out a flyback, don't overlook the obvious. An ohmmeter should still be used to make quick checks to find open windings and dead shorts. However, when the ohmmeter shows no failure, use the following test methods to dynamically check the flyback for all of its failures.

### The Ringer Test

The ringer test is a quick, easy, and dynamic way to check a flyback for shorted turns. This is a common IHVT failure, but not the only failure. The ringer test switches an impedance matching capacitor in parallel with the coil under test to form a tank circuit.

On older Z-Meter models, the ringer test had to be manually switched to match the impedance of the coil. On recent models, the switching is done automatically. The Z-Meter then sends a pulse to excite the

coil and counts the number of rings. If the rings are 10 or better, your transformer has no shorted turns. All windings on the transformer do not have to ring 10, some secondary windings will never ring 10.

The primary coil is usually the best place to ring a flyback. However, if you get 10 rings or better on any winding, your flyback doesn't have any shorted turns. See Fig. 1.

A flyback with a shorted turn or turns becomes very inefficient. This will cause the amplitude of rings to decrease very rapidly and the rings will read below 10. See Fig. 2.

If your readings are marginal (8-12), wind some solder around the core of the IHVT and redo the ringer test. A good flyback will read a low number (0-4), but a bad flyback will read about the same as the first ringer test.

### The Leakage Test

Another common way that an IHVT can fail is arcing or shorting from winding-to-winding. This is usually caused by overheating of the flyback which leads to cracks in the plastic. These cracks can cause external or internal arcing which

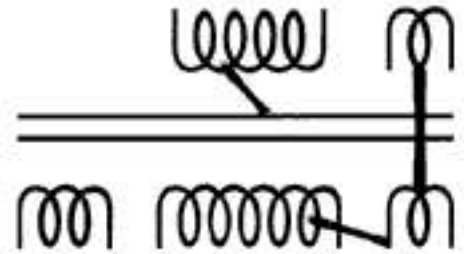


Fig. 3: Example of possible leakage paths in the IHVT.

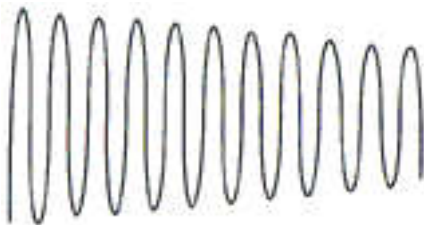
will break down a flyback's insulation and cause windings to short.

This can be tested with a Sencore Z-Meter. You first need to find two separate windings on the IHVT. Then hook up the leads (one to each winding) and select a capacitor type (doesn't matter which type). Enter the highest voltage amount your Z-Meter will allow and push the leakage button ("00.00" should be displayed). It may take a couple seconds to read out. If any leakage is found, the windings are breaking down and the IHVT is defective. Fig. 3 shows examples of possible leakage paths in the IHVT.

This procedure is also effective on yokes. Leakage from the vertical to the horizontal yoke can be detected from the yoke plug using this method. These test procedures are sometimes referred to as a high-pot test.

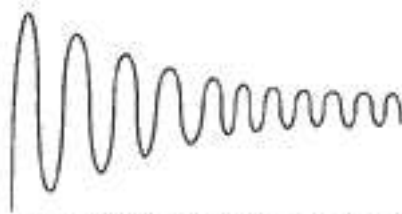
### IHVT Drive Test

An IHVT contains multiplier diodes and capacitors incorporated into the flyback to make high voltage, this is almost standard in modern TVs and computer monitors. The output of an IHVT includes the second anode voltage, and usually the focus and screen voltages. These diodes



Slow Decay of the Ringer Sinewave

Fig. 1: Represents a typical oscilloscope waveform when a good IHVT is being ringer tested.



Rapid Decay of the Ringer Sinewave

Fig. 2: Represents a typical oscilloscope waveform when a bad IHVT is being ringer tested.

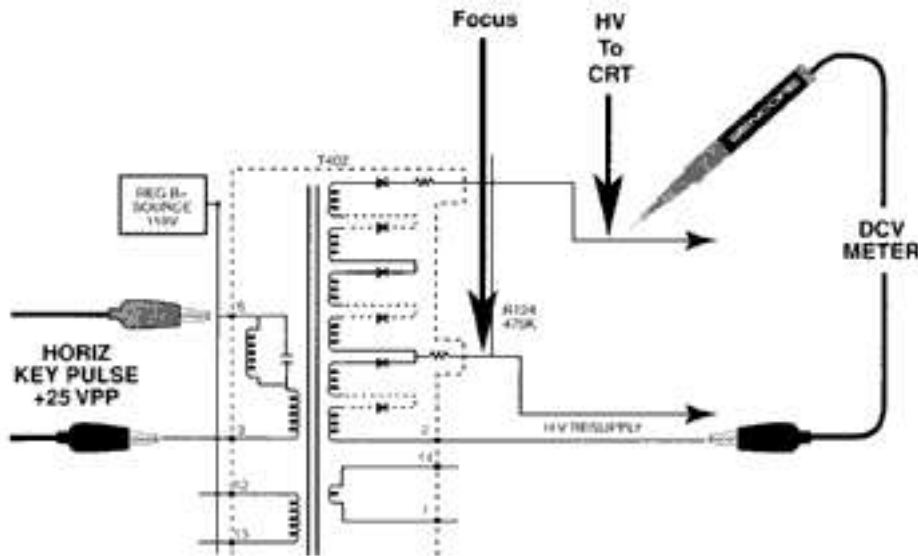


Fig. 4: Shows the proper lead hookups for doing an IHVT Drive Test.

and capacitors can fail causing decreased or no high voltage. The IHVT Drive Test checks these multiplier diodes and capacitors. To perform the test, a generator with a horizontal sync signal is needed. The CM2125 can be used when testing a monitor IHVT, and the TVA92 or

VA62 can be used when testing an NTSC TV IHVT.

To perform the IHVT test, input a 25 VPP horizontal sync signal to the primary winding of the transformer. This simulates the actual horizontal signal at a reduced

level and the transformer will produce high voltage in proportion. Next, measure the DCV at the anode lead and compare your results with the chart below. See Fig. 4 for the proper lead hookups.

Internal shorts in the Focus/Screen divider network can also develop in an IHVT. To check for this, measure the focus and screen voltage while doing the IHVT drive test. The focus voltage should be slightly higher than the screen voltage and both voltages should be a stable DCV. Arcing of the Focus/Screen spark gaps on the video board can be another sign of focus/screen shorts. This board is located on the neck of the CRT.

In closing, lets recap all of the ways a flyback/IHVT can fail:

1. Shorted Turns - Check with the Ringer Test.
2. Arcing from core to winding or winding to winding - Check with the Leakage Test.
3. Multiplier Failures - Check with the IHVT Drive Test

Normal H.O.T. Collector PPV	Normal CRT High Voltage					
	10kV	15kV	20kV	25kV	30kV	35kV
100	2500	3750	5000	6250	7500	8750
200	1250	1875	2500	3125	3750	4375
300	833	1250	1667	2083	2500	2917
400	625	938	1250	1563	1875	2188
500	500	750	1000	1250	1500	1750
600	417	625	833	1042	1250	1458
700	357	536	714	893	1071	1250
800	313	469	625	781	938	1094
900	278	417	556	694	833	972
1000	250	375	500	625	750	875
1100	227	341	455	568	682	795

Chart 1: Expected DCV output with 25 VPP input.

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