HORIZONTAL LINEARITY (right side size verses left side size)

A method for choosing the correct linearity coil.

In the yoke current path there is a saturable coil. Just like a size coil, any inductance in series with the yoke will reduce the size of the picture. This saturable coil will change inductance depending on the amplitude and direction of current flow. At the start of a trace the linearity coil has an inductance of 20 percent of that of the yoke. By the center of the trace, the linearity inductance has decreased to about 4 percent of the yoke where it remains for the rest of the trace. Adjust this variable inductor so the right and left sides of the picture are the same size.

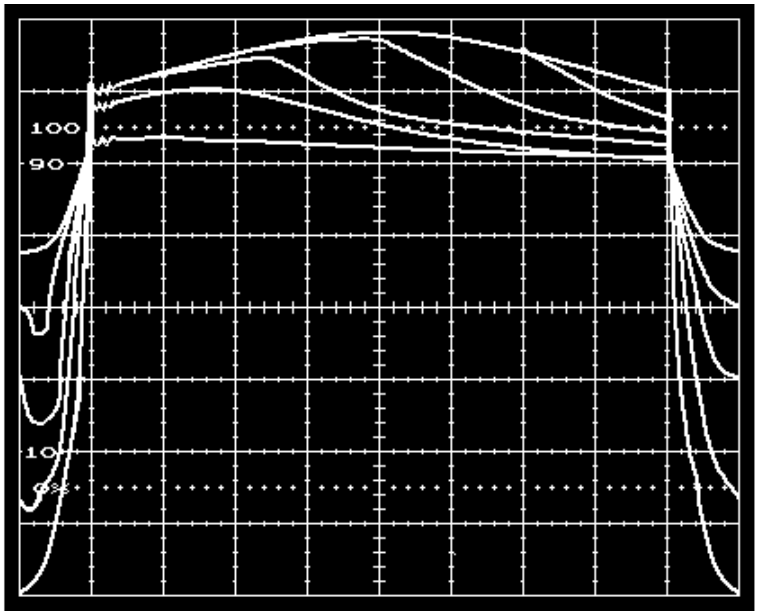


diagram 1. Voltage from two turns of wire added around the linearity coil.

The effect of a lin coil can be hard to measure. A fast way to test a lin coil is to add two turns of insulated wire around the coil. Connect an oscilloscope to measure the voltage from the two turns. When the coil saturates the voltage drops to near zero. These six traces show different amounts of bias magnet applied to a lin coil. The top trace shows no saturation. The bottom trace indicates a saturated core for all current levels. The third and fourth traces are typical. If the coil is <u>too small</u> for the job there will be saturation on both side of the trace. This last condition (not shown) is hard to detect by measuring the screen with a ruler.

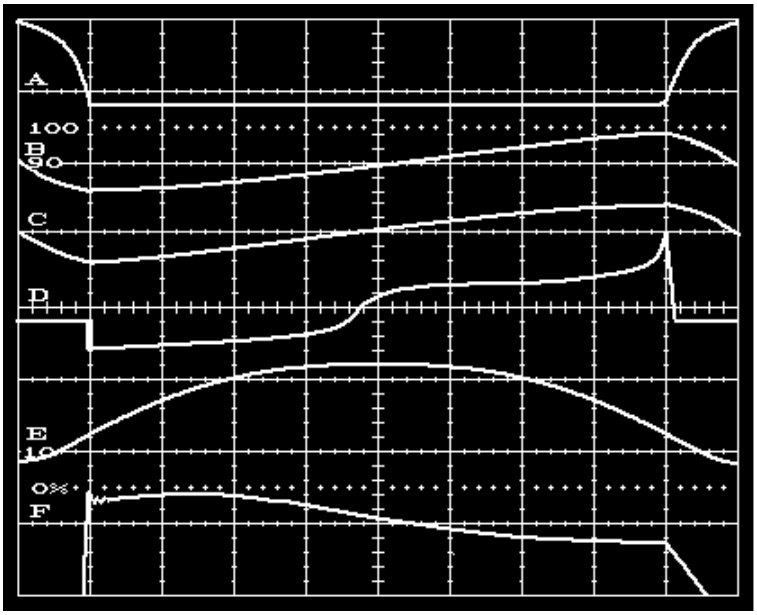
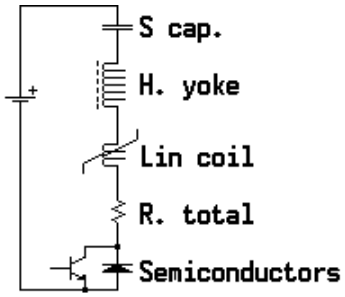
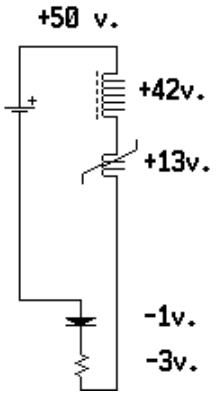


diagram 2.

Trace A is the yoke voltage at about 1000 volts peak to peak. Trace B is the yoke current. Trace C is the voltage across the total of all resistance in the horizontal loop. Trace D is the voltage loss due to the semiconductors in the loop. Trace E is the voltage across the S capacitor. Trace F is the voltage across the linearity coil.

The linearity coil should have a waveform like the inverse of trace C+D. Thus the loss seen in traces C+D+F should equal a straight line.





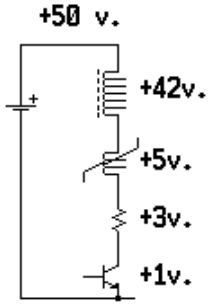


diagram 3. Left side effect Right side effect
Horizontal deflection schematic to show losses that cause linearity problems.

The losses in the resistance and semiconductors cause the left side of the picture to be larger than the right side. As can be seen in the diagram above the effective left side supply voltage is 50 volts + the diode drop + the voltage across the resistor. This equals 54 volts. The supply voltage in the right side is 50-3-1=46 volts. The linearity coil has high inductance on the left side of the picture causing the left side to shrink. The right side inductance is small thus causing the right side to appear to grow larger. The voltage across the lin coil should balance out the voltage across the semiconductors and resistance.