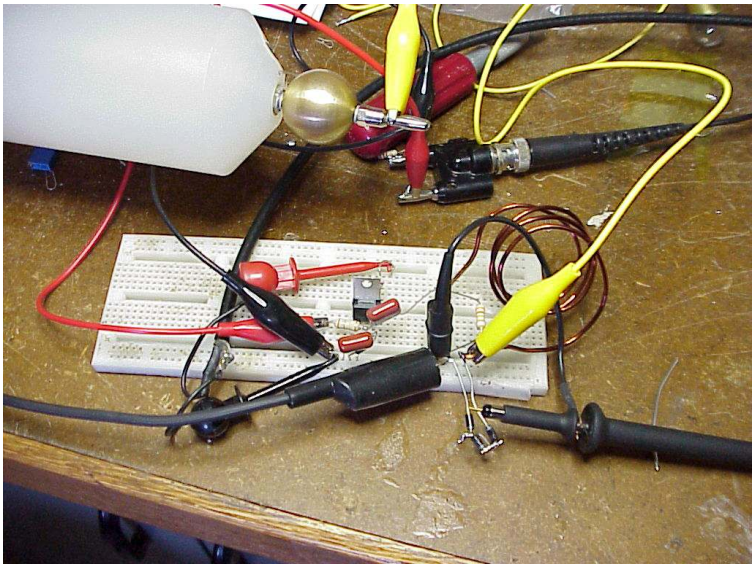
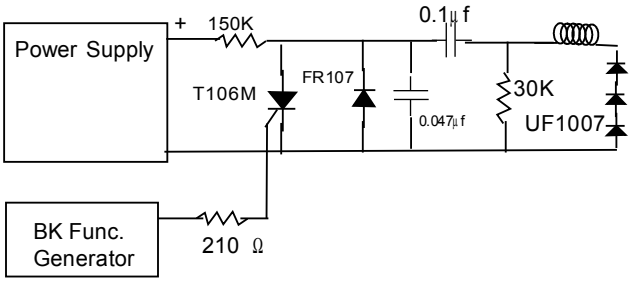
Objective:

Since the Russian SOS like effect has been previously demonstrated this investigator wish to conduct further experimentation but with a less noisy and more controllable switch. To meet these needs an SCR was used for switching (connecting) the charged capacitor to the inductor (see FN 27FEB00A). A photo of and the schematic for the experimental setup is shown below:



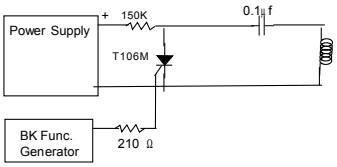


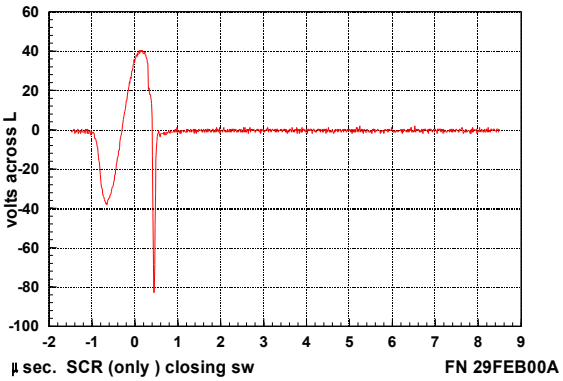
Operation:

The above circuit is similar to the previous in that the switch connects the charged capacitor to the inductor. The LC values are the same however the positive side of the capacitor is connected to ground when the SCR switches on. The reverse SCR shunt diode is used not only to protect the SCR from large voltage reversals but also to provide a reverse conduction path for the reactive inductive swings. The 0.047 shunt capacitor is used to suppress the semiconductor noises so that clean switching occurs. The SCR switch on timing is provided by the BK function generator. Operation occurs as follows: 1st the 0.1μf capacitor is charge through the 150k and the 30K resistors; note that the latter is necessary since the diodes are in the reverse configuration, 2nd the SCR turns on connecting the plus side of the capacitor to system return, 3rd charge on the negative side of the capacitor flows through the inductor and the diode array constituting the diode pumping cycle, and 4th the inductive reactance reverses the current causing the inductor to store energy until the diode opens.

Waveform \ SCR only (no shunt components) \ 90V charge:

The schematic and waveform of the circuit without the diodes for Vcharge = 90 volts is:

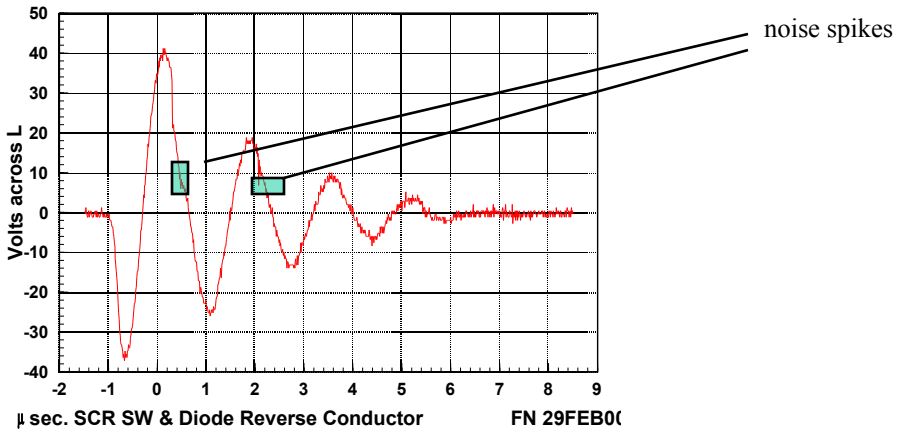




The purpose of showing the above is to demonstrate what happens if only the SCR is used; as can be seen an unwanted spike occurs

Waveform \ SCR and shunt diode only \ 90V charge:

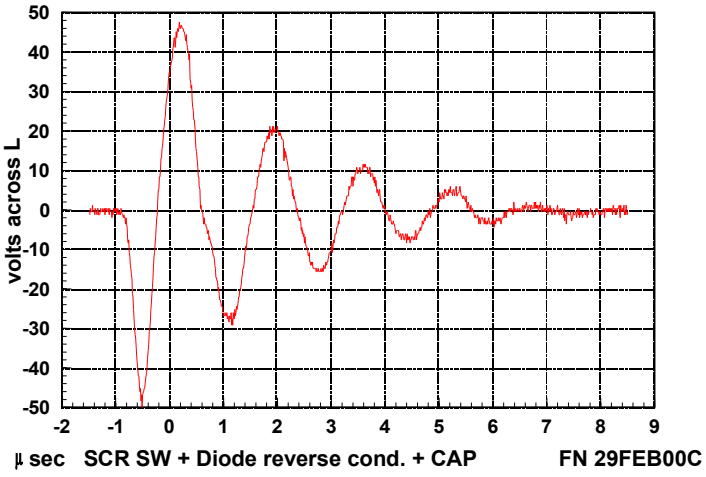
The waveform of the circuit circuit but with the FR107 shunt diode for Vcharge = 90 volts is:



The above waveform shows what happens when only the SCR and shunt diode is used. Although a much cleaner damped waveform occurs noise spikes are visible.

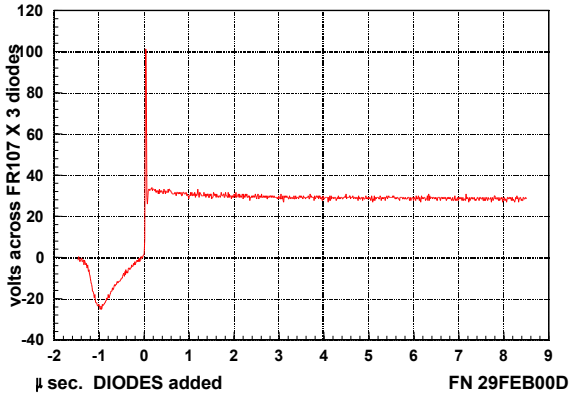
Waveform with the Shunt Capacitor:

When the shunt capacitor is added the noise spike is removed:



Waveform with the Diodes::

The next waveform shows the voltage across the diodes that were added to the above circuit; Vch. = 90V:



and the expanded view below: