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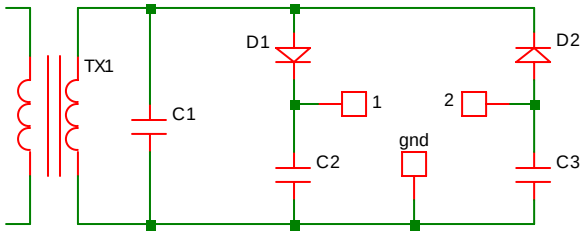
HV Resonance Collection – HV-RC

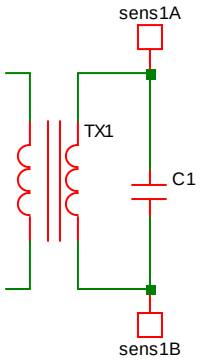
Those are ideas how to collect the resonance power from high voltage resonance (range above 60 to 500V) using simple circuits and SCRs (thyristors).

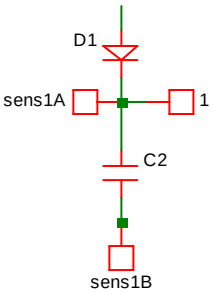
A classical diode-plug circuit



This is the circuit used to extract the power from the resonance. C1 in this circuit is optional. If C1 is used then C2 = C3, C1>C2, then we extract only a portion of the power. When C2 is charging a load is put between 2 and gnd to discharge C3. When C3 is charging a load is put between 1 and gnd. This is done with a SCR (thyristor) and it requires a sensory circuit to be triggered at the right moment.

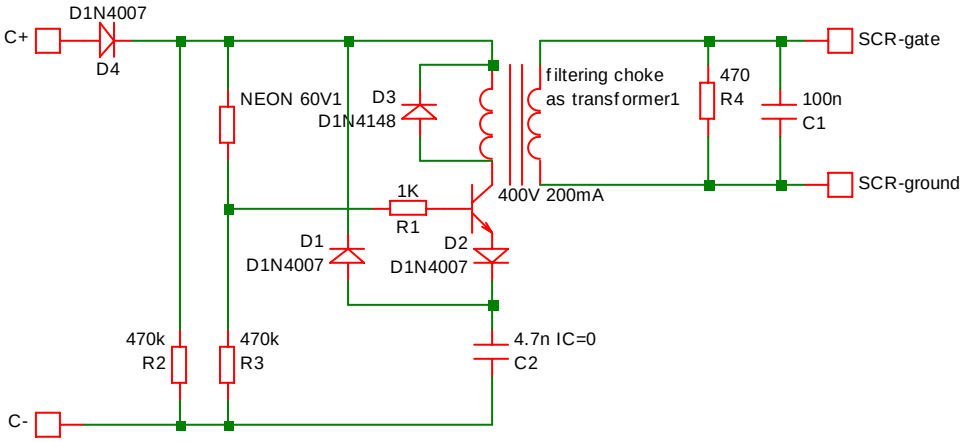
It is adviced to use the sensory circuit on AC side, however, you can use it on a capacitor directly as well, but then the sensory circuit must not fail or capacitors remain filled and the circuit operation stops.





The sensory circuit

This is a neon trigger circuit. It senses the voltage level from the input (capacitor) and triggers the SCR over the inductive coupling in an output. When input (capacitor) is lets say over 65V, neon conducts, 4.7n capacitor gets filled and the trigger signal is generated to SCR. Neon will remain on until the voltage has dropped below 60V, so there will be no repeating false signals. The discharge cycle where the 4.7n capacitor discharges into R2 is chosen where RC time T (halftime) is quite short. A high voltage transistor is required and the capacitor 4n7 must be 500V rated or higher. 10n may used as well instead of 4.7n. A small transformer was used that is used in most power supplies as an input filter. Circuit is designed for 50-100hz. The real values and parameters must be worked out in a ‚lab'.

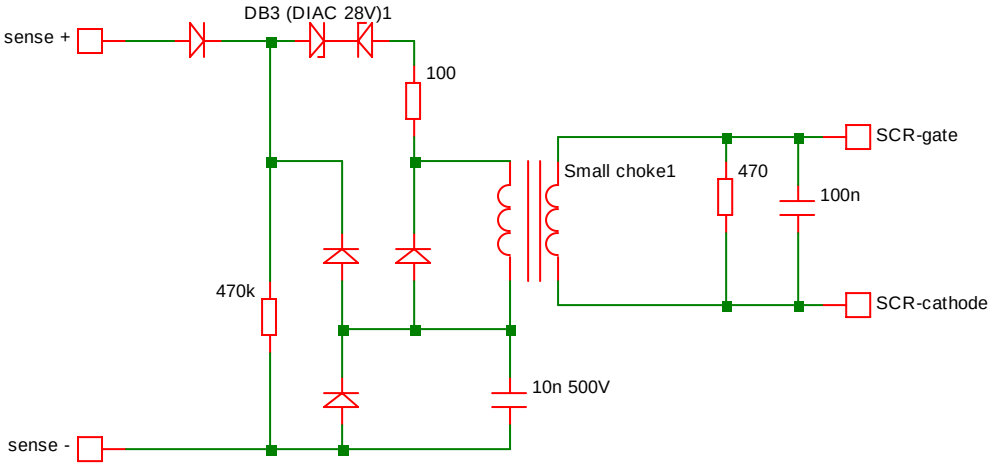


Note! This design is tested and works!

Inductive trigger's advantages over the opto-trigger are: no false triggers due to lower sensitivity, lower power consumption and simplicity.

Even better sensory circuit (much easier to do)

Instead of neon bulb you can use DIAC (DB3) 28V. You do not need the transistor and the whole circuit will become easier. Tested with SCR TYN412, all diodes can be 1N4007. Use 100ohm or less resistance in series to coil to make it more sensitive. You must have all those diodes in the circuit, as it will not be stable with less components (i.e. the input diode has its own parasitic capacitance that must be neutralized with the diode in parallel to the capacitor).



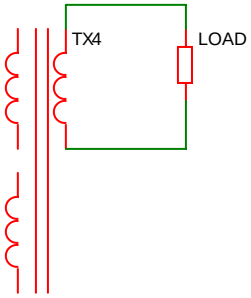
Note! This design is tested and works!

Collecting/extracing the power from the resonance

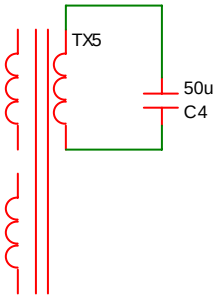
While one capacitor is sensed and triggered the other is discharged. Normal LC resonance is preserved and other capacitor behind diodes are smaller that the main capacitor, this way we will tap only certain proportion of the resonance. A partial power extraction is required where we need some charge to be left in a main capacitor that will preserve the magnetization of the alternator (RV alternator).

You can discharge the capacitor through the SCR switch into the transformer. Following diagrams will illustrate how it is done. Just imagine the left side (primary) has two SCR switches coming from the diode plug.

The output has many options. You can use directly the load behind the tapped resonant power.



Or you can continue resonating another LC. This may continue to the next stage of an array.



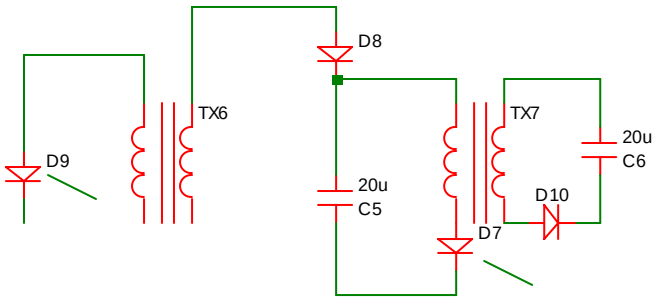
Applications

Using RC in a **RV (rotoverter) alternator**. Lets assume there is a resonance amplification in the LC, you split the 1/3 capacitance into the diode plug and 2/3 capacitance remains to the main LC to preserve the voltage for self induction. Next step is to extract the power from diode plug by using 2x RC's that switch the output power to the load (light bulb). Note that if the light bulb is too low watts, it will leave the SCR open as the capacitor has not discharged and the circuit will not behave as required. Instead of that – you may switch the power out through the transformer in short pulses.

Other similar application is using a **ferroresonant transformer** with a diode plug and RC. Similarly, pulsing the power out through the transformer into the load. (Instead of load you may use a battery.)

EASER array

Alternatively you can create an impulse where the collapsing EMF or CEMF or BEMF is caught into the capacitor (and then switched to load). The idea of the EASER is the amplification and the voltage level, pulse length and the collecting capacitor parameters determine the amplification. That all requires tuning.



The circuit ends with the capacitor. It can have the next stage in the array where similar SCR trigger mechanism is used to discharge other polarity capacitor to the next stage and so on

until the load stage. You may call it a Resonance Collection Array using Diode Plug (RCA Plug).

Notes

As per ‚book' we know the array uses EASER principle for power amplification where each stage has its own required parameters. To create the required condition, Hector has recommended the optimum transformer ratio to be 1:5 and the capacitor ratio 2:1. Another note is that the voltage must be quite high to have better efficiency and the primary to have minimum number of turns and big wire in the primary that creates the short impulse.

A simple SCR diode plug extractor implementing HV-RC to test the SCR switching efficiency from the normal grid should be implemented first! The next step is to use this circuit to tap the resonant power of the ferroresonant transformer.

Alternatively, when switching power throught the transformer, the Xenon trigger can be used for R&D purposis instead of SCR's to create very sharp dischargings that cause many interesting effects.

The advantages of this array are:

- it will amplify AC and output AC
- simplicity, ‚a spartan' design
- it keeps the freq in sync to the output
- array as the name tells – it is cascadable
- high voltage design and practical use for RotoVerter alternator or transverter resonant power extraction
- you can run a RV primemover with those impulses or resonate a 3PH transformer (ideas for the future)