

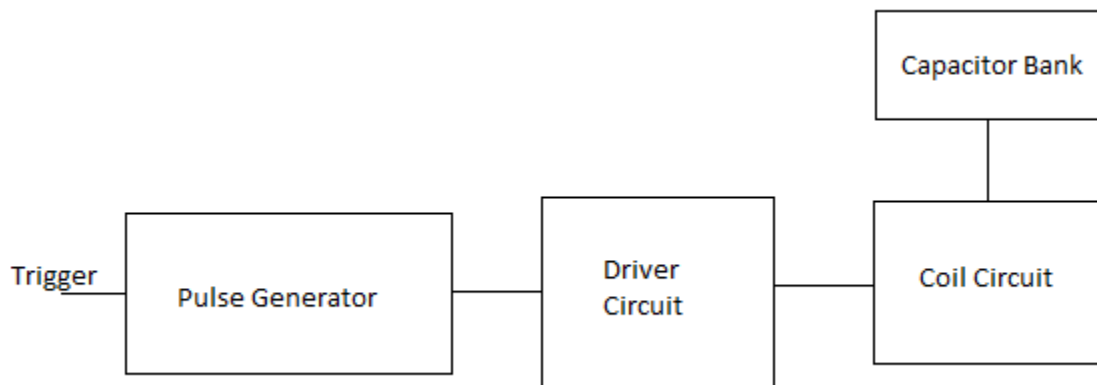
Mini project 1 – EMP Generator

Introduction:

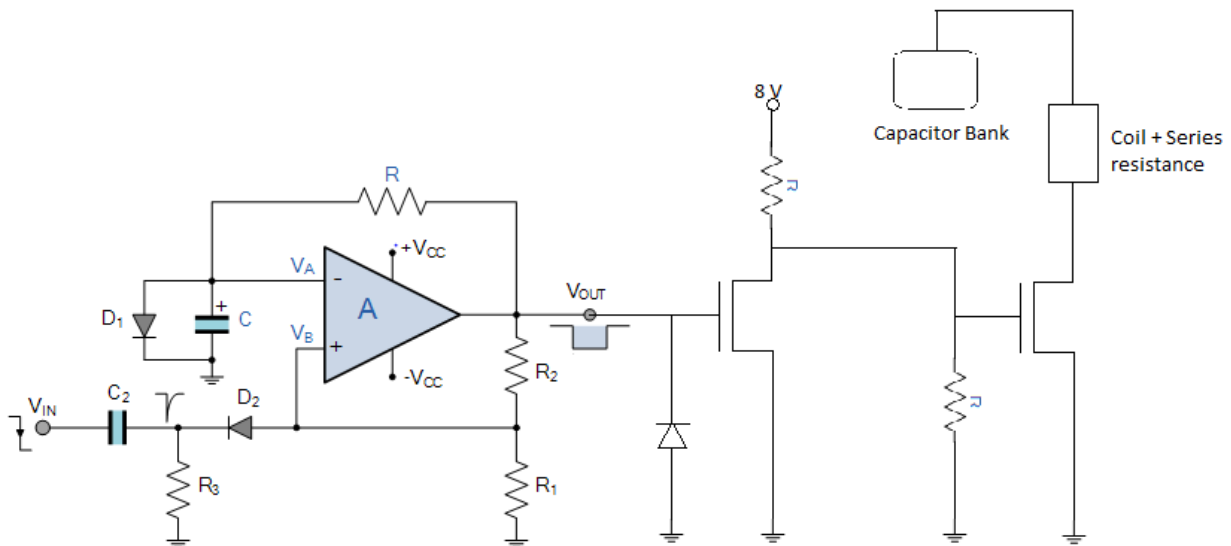
An EMP (Electro-Magnetic Pulse) Generator is a device used to disrupt or damage other electronics devices by virtue of a powerful magnetic field.

Though most devices today are protected against these fields by Faraday cages, the EMP generators are an area of interest in the Military mainly for testing.

Block diagram:



Schematic:





Working:

- A low pulse is generated by a monostable multi-vibrator to a driver circuit, the duration of which is decided by component values.
- The driver circuit is set up with a BJT. When the low pulse is received at the base, it turns off and hence pumps charges into the gate of the Power MOSFET in the next stage.
- Once the MOSFET is turned on, the capacitor bank has a discharge path available via the coil. Depending on the values of the capacitor bank and the inductor, a current pulse of a large amplitude is generated.
- The coil thus radiates a large pulse of magnetic field capable of damaging or resetting devices.
- A pull-down resistor at the gate of the MOSFET is provided to ground any stray charges on the gate when the MOSFET is turned off. This prevents accidental turning on of the device.

Results:

Circuit simulation tools like LTspice help me understand the circuit passive components characteristic. I successfully generated 150V surge as an output voltage using Capacitors as an energy storage bank.