

# Ion Ray Gun

## 1 The Circuit

I found the following schematic from online sources. It's about generating and launching ions. I did not built this circuit. But I'll present some ideas on how to focus ions so that they will travel a longer distance.

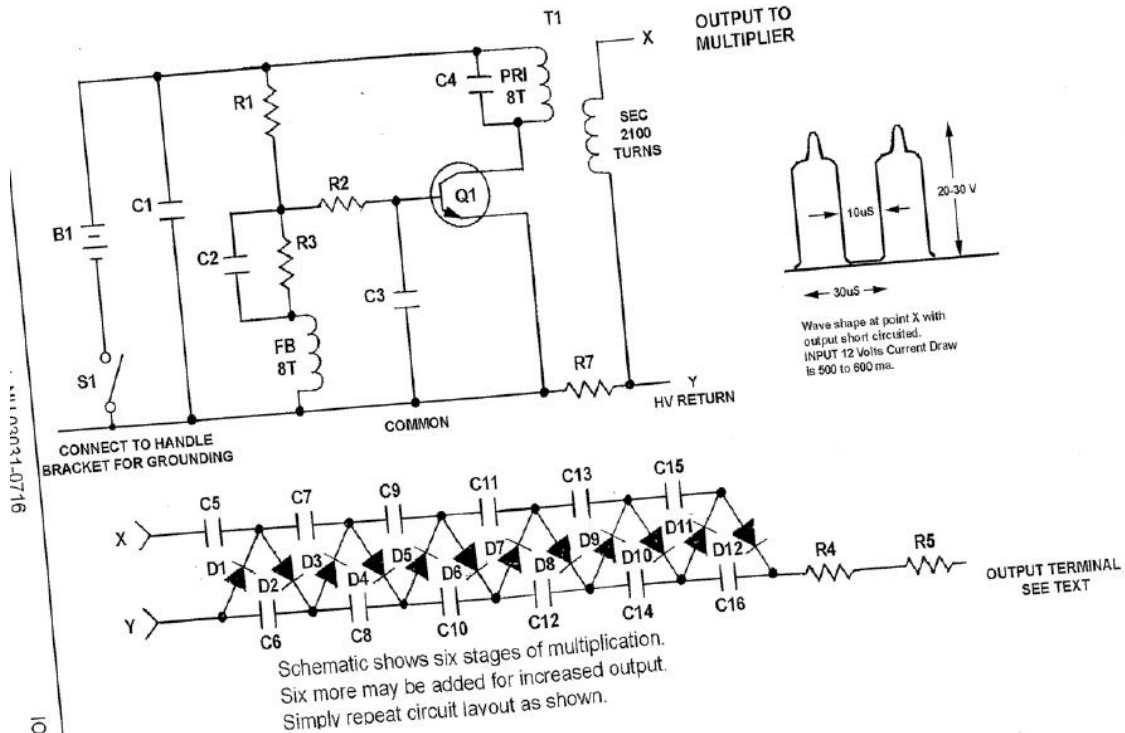


Fig. 1. Basic ion ray gun circuit.

### Parts List

R1	2.2K
R2	27Ω
R3	220Ω
R4-R5	100MΩ
C1	0.47µF/50V

C2-C3	0.047 $\mu$ F to 0.068 $\mu$ F
C4	1 $\mu$ F/100V
C5-C16	0.001 $\mu$ F/15KV
D1-D12	22KV 5mA Avalanche Diodes
Q1	MJE3055, TO-220 NPN
T1	2100:8:8
BH1	8 Cell AA Battery Holder
HS1	Heat Sink Bracket

Electrons gather at sharp points in metals. Electrons are emitted from a needle like sharp point as shown in Fig. 2. A negatively-charged plate may be used as an electron reflector to focus electrons along a line, thus producing a tight beam as shown in Fig. 1(b). Even a tighter beam is possible if the needle point is replaced with the structure shown in Fig. 1(c), though experimental verification is needed. To avoid loss due to corona, the entire wire and the reflector, except the sharp emitter, should be covered by an isolating material such as silicon etc. and surface variations should be very smooth.

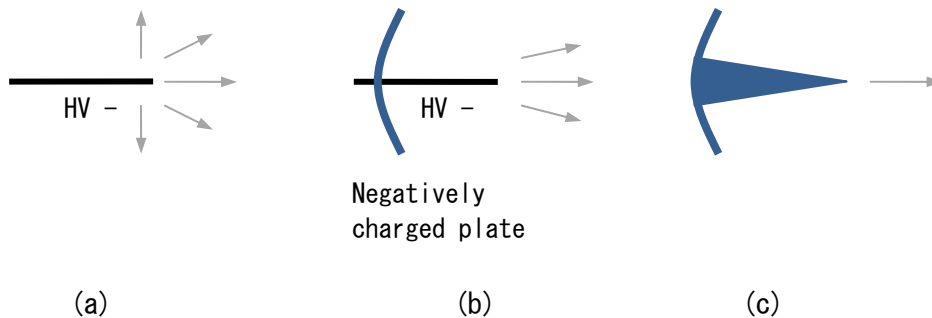


Fig. 2. Focusing electrons using a negatively charged plate having smooth surface and edges.

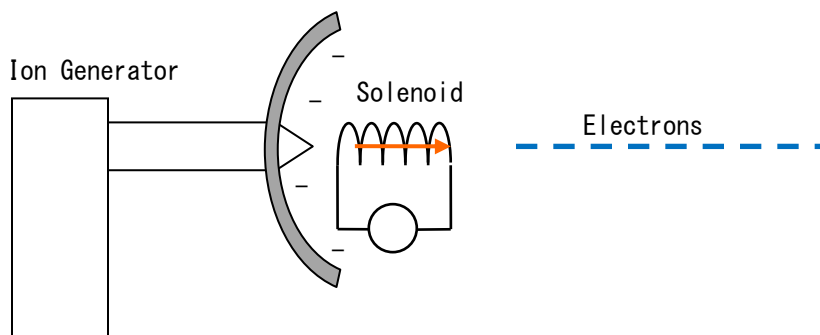


Fig. 3.

Configuration shown in Fig. 3 can be used to bunch electrons using a magnetic field. Later, if the magnetic field is cut rapidly, bunched electrons are released and due to the focusing effect of the negatively charged reflector (NCR), they can be launched on to a target. A pulsed magnetic field would do the job if it's generated by a pulsed capacitor discharge. So, if a HV capacitor is discharged on to a solenoid through an SCR, some amount of electrons and negative ions are captured and bunched by the magnetic field inside the solenoid. As the pulse dies out, they are released and focused by NCR.

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