After about 2 minutes have elapsed during which the cathode warmed up, the cathode is seen to glow dull red and the luminous spot appears on the fluorescent screen. The brightness and focus of the luminous spot can now be adjusted by varying the negative bias voltage. A diametrically magnetised ring magnet is mounted on the aluminium rod of the tube fixture. With the help of this magnet, the luminous spot can be brought to the center of the screen, or moved to its periphery when using the sawtooth generator. For this purpose, turn the magnet as required and if necessary adjust its height.

The right edge of the tube panel carries five connecting jacks for the sawtooth generator module. All required connections are correctly established as soon as the plug pins on the edge of the sawtooth generator module have been inserted into the jacks on the edge of the tube panel.

Fig. 3: Circuit Diagram of the Cathode Ray Tube and the Sawtooth Generator Module

Experiments with Cathode Rays

IMPORTANT NOTE: For all experiments, switch on the thermionic cathode only just prior to operating the tube, and switch off again immediately after concluding the experiment. Do not operate the tube idle for long periods.

Experiment No. 1  Magnetic Deflection of the Cathode Ray

Operate the tube without attached sawtooth generator and approach a bar magnet from above, about 10 cm behind the fluorescent screen.

Result: The vertically orientated magnetic field deflects the electron beam in the horizontal direction.

Explanation: Rapidly moving charged particles such as electrons represent an electric current. A force is exerted on a current-carrying conductor in a magnetic field. This force is proportional to the current magnitude I, to the length of the conductor L and to the magnetic