CHAPTER 1

INTRODUCTION

The high voltage power supply is housed in a triple width NIM module that is compatible with any standard NIM Bin. It uses a driven type dc-ac inverter operating at about 6 kHz which yields an efficiency higher than 80 % in power conversion to charge a multiplier circuit to produce power supply of 2 mA at 2500 V. The frequency of the inverter is determined by an astable multivibrator oscillating at the frequency for optimum operation [1].

The significant performance of the high voltage power supply to be developed are as follows :-

1. Output polarity : positive or negative
2. Output voltage range 50 to 2500V, continuously variable
3. Output load capacity 0 to 2 mA.
4. Regulation $\leq$ 0.01 % variation in output voltage for line variation from 200 to 240 V.
5. Temperature stability < 0.02 %/ ^{o}C through 0 to 50^{o}C operating range.
6. Long-Term Drift < 0.05 %/hr. variation in output voltage at constant input line voltage after 30 min warmup.
7. Output ripple < 10 mV peak to peak at full load
8. Overload protection: Built-in overload and short circuit protection with maximum output current of $\approx$ 2 mA.

The development of high voltage power supply can be summed up as follows:-

1. Develop a driven type dc-ac inverter using Ferrite E-P core.

2. Develop voltage multiplier and filter section for required HV output.

3. Develop regulated low voltage power supply for inverter and associated circuitry. The power is to be derived from 220V 50 Hz line.

4. Design master printed circuit boards to accommodate the components for the HV supply.

5. Design essential mounting hardwares for printed circuit boards in 4 and panel layout for controls and indicators

6. Carry out the performance test of the HV supply.