

# **DEVELOPMENT OF HIGH DC VOLTAGE FOR GAS LASER POWER SUPPLY**

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**Mohd Daud bin Rajab**  
Department of Electrical Engineering  
School of Engineering  
Institut Teknologi MARA  
40450 Shah Alam, .  
Selangor D.E. Malaysia  
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With the name of Allah, and with the help of Allah. All good ascription's, devotions, good expressions, prayers are for Allah. I bear witness that there is no god save Allah alone, no partners unto Him, and I bear witness that Muhammad is as his servant and His Messenger, sent him along with the truth, as giver of glad tidings and as a Warner, and to tell that the hour is fast-approaching, no doubt in it. Peace be on you, O the Prophet, and Allah's mercy and His blessings. Peace be on us and on Allah's upright servants. Allah, forgive me and straighten me.

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MAY ALLAH BLESS YOU ALL.

## **Abstract**

The report presents the development of a high voltage power supply source for gas laser applications using solid state devices.

The complete system comprises a low scale rectifier circuit, oscillator circuit, flyback transformer and double Cockroft-Walton. The input of the system is a low dc voltage source of 13 V. The system uses power transistor switching that will cause the flux to fall and cut the entire secondary winding of the flyback transformer producing square wave pulses. Enough energy are required at the primary in order to produce constant output voltage. The Cockroft-Walton acts as the voltage multiplier.

This development had achieved 77.6 kV dc at the output of Double Cockroft-Walton, which is adequate for the generation of laser.

A comparative study had been carried out on PSpice to observe the performance of particular circuit theoretically.

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# CHAPTER ONE

## 1.0 INTRODUCTION

Many fascinating and amazing scientific electronic development have evolved during the past several decades. One of the most interesting and controversial is the laser. Whereas, the monochromatic and coherence of the laser allows many uses such as holography, optical ranging, detection analysis, radar, communication, special effects and etc. Basically, the laser development require high-voltage power supplies very similar to ham radio transmitters and consequently must be treated with total respect for all safety precautions. From the work itself , it can be used in the effect of charging a person experiment, remote charging experiment, spark discharge experiment, remote charging by gun configuration experiment, oppositely charged unit experiment, Ion motor, spark discharge, Ion charging experiment, Flashing gas lamp experiment, Corona display experiment, Charge density explanation and other new devices using high voltage power supplies.

Apparently, this project describes the semiconductor technology and inverter-transformer circuit that can develop a very high voltage output. In this manner ,the devices can be very small, light and portable for any kind usage involving high voltage power supplies. Further more, the dc power supply of the system is considered low such as in the range of 0V to 16V. So a small dc batteries can be used depending of its application and experiment purposes.

In this development a different technique is introduced to perform multiplication function. Ismail et. al [1,2,3,4,] makes use of single Cockroft-Walton stack to produce high dc voltage, whilst in this development double Cockroft-Walton is employed.