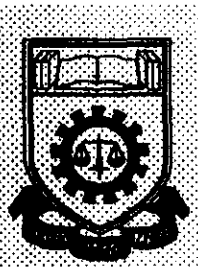
PRODUCTION OF REPETITIVE PULSES FROM A SINGLE SHOT PULSE USING SOLID STATE DEVICES

Thesis is presented in partial fulfilment for the award of the Advanced Diploma in Electrical Engineering of INSTITUT TEKNOLOGI MARA



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ABSTRACT

This report presents the method of obtaining repetitive pulses from a single shot pulse using solid-state devices with the chopping technique. This development is a modular configuration that comprises dc power supply, pulse generator, scaledown equipment, monostable and chopper circuits. The repetitive pulses output will be used to activate the Cockroft-Walton stack as multiplier circuit for the generation of a high d.c voltage. Simulation through PSpice is carried out to predict the overall performance theoretically.

This technique is a modelling to predict the feasibility for the implementation of higher voltage. This project has succesfully produced a repetitive signal with 14.5 kHz, maximun frequency from a single shot pulse.

1.0 INTRODUCTION

High voltages are used in many branches of natural sciences or other technical applications.

In high voltage technology direct voltages are mainly used for pure scientific research work and for testing equipment related to HVDC transmission systems. There is still a main application in tests on HVAC power cables of long length, as the large capacitance of those cables would take too large a current if tested with a.c voltages. Though such d.c tests on a.c cables are more economical and convenient, the validity of this test suffers from the experimentally obtained stress distribution within the insulating material, which differs considerably from the normal working conditions where the cable is transmitting power at low-frequency alternating voltages.

High d.c voltages are even more entensively used in physics(accelerators, electron miscocopy,etc.), electromedical equipment (x-rays), industrial applications (precipitation and filtering of exhaust gases in thermal power stations and cements industry; electrostatic painting and powder coating etc.) or communications electronics (TV; broadcasting stations). Therefore, the requirements on voltage shape, voltage level, current rating, short-or-long differ strongly from each other. With the knowledge of the fundamental generating principles it will be possible, however, to select proper circuits for special application.