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FINAL REPORT OF DIPLOMA PROJECT

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AC TO DC CONVERTER

ERWANAS ASMAR ISMAIL

SAIFUL BUHAIRIE MOHAMAD ADNAN

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ERWANAS ASMAR

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SAIFUL BUHAIRIE

UNIVERSITI TEKNOLOGI MARA

CAWANGAN PULAU PINANG

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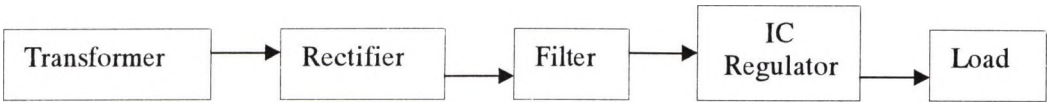
ABSTRACT

AC to DC converter using rectifier



An AC/DC converter is actually a rectifying circuit which converts an alternating current into a pulsating DC voltage which is a unidirectional current. A rectifier circuit allows currents to flow only in one direction.

In other words, a rectifier is capable of converting a sinusoidal waveform (whose average value is zero), into a unidirectional waveform, whose average value is non-zero. There are two types of rectifiers, half-wave rectifier and full-wave rectifier. But to gain a much more improved DC level obtained from a sinusoidal input, AC/DC converter is very useful where its application has been used world wide. This is because of its capability of converting AC to DC, where most of sources that are being transmitted to users are in the form of AC. This is where the converter becomes an important tool to convert the AC to
DC.

This report will describe how the AC/DC converter is implemented in daily use and works by using the Circuit Maker program.

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CHAPTER 1
INTRODUCTION

1.1 Background

What is the function of rectifier? The rectifiers used to convert the alternating current (AC) to direct current (DC). The connection of diodes can be done in many ways diodes to. The bridge rectifier is the most important and it produces full-wave varying DC. A full-wave rectifier can also be made from just two diodes if a centre-tap transformer. Rectifier that using 2 diodes and requires a center-tapped transformer to establish the input signal across each section of the secondary of the transformer. The output will perform a DC voltage according to the circuit. When input voltage produce positive cycle, D1 will short circuit while D2 will open circuit. This will produce the output wave a positive wave. And when negative cycle is produce from the source, D1 and D2 will vice-versa. The output will keep on producing positive wave and hence, DC voltage can be generated from this circuit.

Filtering is performed by a large value electrolytic capacitor connected across the DC supply to act as a reservoir, supplying current to the output when the varying DC voltage from the rectifier is falling. The diagram shows the unsmoothed varying DC (dotted line) and the smoothed DC (solid line). The capacitor charges quickly near the peak of the varying DC, and then discharges as it supplies current to the output.

A voltage regulator (or voltage regulator IC units, LM7809) is used to maintain a constant output voltage. A voltage regulator also can use DC input to provide a DC voltage that not only has much less ripple voltage but remain the same DC value even if the input DC voltage varies somewhat, or the load connected to the output DC voltage changes. Voltage regulators are very robust. They can withstand over-current draw due to short circuits and also over-heating. In both cases the regulator will shut down before damage occurs. The only way to destroy a regulator is to apply reverse voltage to its input. Reverse polarity destroys the regulator almost instantly.