

UNIVERSITY COLLEGE SEDAYA INTERNATIONAL
SCHOOL OF ENGINEERING
FINAL YEAR PROJECT
FINAL REPORT

DESIGN AND IMPLEMENTATION OF A BRUSHLESS
DC MOTOR CONTROLLER

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ABSTRACT

A controller module is used to operate a three phase, 15V trapezoidal brushless dc motor for this project. The commutation, speed and torque control of this brushless dc motor is controlled by a PIC16F877 microcontroller. The microcontroller sends signals at intervals by using Pulse Width Modulation to drive motor drivers TC4669 and IRF5305 and IRLI3705N power H-Bridge MOSFET circuit, which will in turn drives the brushless dc motor. The Back EMF of the motor is detected by a zero crossing detection circuit with LM339 quad comparator which sends signals to the microcontroller. The microcontroller then sends signals to switch on or off the H-bridge MOSFETs which will dictate the commutation process. This completes the whole operating system of the motor. All subsystems are constructed on separate circuit boards and connected to the controller module so to allow opportunity for future developments. The design and implementation of a brushless dc motor is being studied and researched. This research and journals done by other researchers are discussed and written in a detailed manner in this report. This project stresses mainly about the Back EMF detection scheme to be understood by readers about the controller module used to drive the motor.