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SCHOOL OF ENGINEERING

FINAL YEAR ENGINEERING PROJECT

FINAL REPORT

DESIGN & DEVELOPMENT OF MULTIPHASE STEPPER MOTOR CONTROLLER

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Abstract:

The hardware design of a multiphase stepper motor controller is introduced. Meanwhile the software is designed to meet the requirements of hardware. The controlling principle of components within the multiphase stepper motor controller as well as the relationship among them is elucidated.

The Permanent Magnet (PM) stepper motors are used and the PM stepper motors can be controlled by both Personal Computer (PC) and a control circuit which consisting of two essential parts; one is control part; another one is driver part.

Inside the control part, it comprised of a few push button switches; with the microcontroller PIC16F873 as the brain of the control circuit. The main reason of choosing this microcontroller over the others is because it is able to provide sufficient I/O port to meet the project needs. For the driver part, the Bipolar Junction Transistor (BJT) and the Metal Oxide Semiconductor Field Effect Transistor (MOSFET) is used to act as a switch in order to track the fast changed of signals, and also to turn the current 'ON' and 'OFF' at precise instant of time. In addition, the BJTs that are used in this project are the NPN type BJT; and the MOSFETs that are used in this project are the n-channel enhancement type MOSFET.

Finally, as the name suggests, the prototype of a multiphase stepper motor controller, which has a selection of multiple modes to control the stepper motor has been built.