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Dedicated Motor Control Circuit

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EET-491 SENIOR DESIGN PROJECT

DEDICATED MOTOR CONTROL CIRCUIT

Prepared for
Professor Paul I-Hai Lin

Prepared by
Michael Foreman

April 26, 1999

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ABSTRACT

A micro-controller is an excellent choice for servo control in embedded applications. The PIC17C42, used in this project, offers the computation speed needed for closed loop DC motor control. It is shown that a PID (Proportional, Integral, Differential) control calculation can be performed in less than 200 μ s (at 16 MHz) allowing control loop sample times in the 2 kHz range. Encoder rates up to 3 MHz are handled by the micro-controller's high speed peripherals. The DC motor control system discussed in this report uses a PIC17C42 micro-controller, a programmable logic device (PLD), and a single-chip H-bridge driver. Such a system might be used as a positioning controller in a printer, plotter, or scanner. The DC motor used here was mounted on an application stand to simulate a "real world" application. A LCD display and infrared remote control was added to the project to aid user input and reduce the need for a host computer.

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