Digital Compass Prototype

CS470 Applied Software Development

This folder and associated CD have the complete documentation for my digital compass project. This project involved the development of a solid-state digital compass using a microcontroller, magnetic sensor, AD converters, and LCD to display a real-time compass bearing and virtual compass needle on the display. The project still needs work on calibration and scale factors to improve sensor reading reading accuracy. The base hardware design and monitor have been thoroughly tested and are in good working order.

Hardcopy Documentation:

I. **Project Proposal**

I. **Project Presentation**

I. **Flowcharts and Auxillary Documentation**

I. **Source Code (Approx. 120 pages)**

CD Documentation:

I. Overview

.A Original Project Proposal

.B Overview and Schematic Layout

.C Calculating a Bearing

.D Development Tools

.E Project Summary

I. Hardware

.A Magnetic Sensor

.B AD Conversion

.C Power supplies

.D Memory-Mapped I/O

.E Micro-controller

.F LCD Display

.G RS232 Serial Port

.H 2-axis Accelerometer

.I Keypad

.J Parts List

I. Code

.A Circular Buffers

.B Central Dispatcher

.C I2C Code

.D Interrupt Handlers

.1 Serial Interrupt Handler

.2 Timer0 Handler

.3 External Interrupt Handler

.E I/O Routines

.F Math Functions

.1 8-bit SIN and COS

.2 CORDIC routines for 16-bit SIN, COS, ATAN

.3 Trig. Function using Taylor Series

.4 16.16 Fixed Point Math Routines

.G Miscellaneous Functions

.H Raymon Monitor

.1 Revision history of Raymon 8052 monitor

.2 Revision history of ray.psf logic file for PEEL ICT22CV10

.I Timer Routines

I. Resources

.A Interesting stuff - list of links, suppliers, and manufacturers

.B Single Gate TTL

.C SMD Components

.D Miscellaneous - TTL families, supply decoupling, units

.E Need to purchase - list of parts to acquire

.F 8052 memory map

.G 8052 Special Function Registers

.H 8052 Interrupt Vectors