PROJECT-BASED MICROCONTROLLER SYSTEM LABORATORY USING BK300 DEVELOPMENT BOARD WITH PIC16F887 CHIP

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Abstract

Microcontroller system is one of the vital subjects offered by students during the sequence of study in universities and other colleges of science, engineering and technology in the world. In this paper, we solve the problem of student comprehension and skill development in embedded system design using microcontroller chip PIC16F887 by demonstration of hands-on laboratory experiments. Also, developments of software code, circuit diagram simulation were carried out. This is to help students connect their theoretical knowledge with the practical experience. Each of the experiments was carried out using BK300 development board, PICKit3 programmer, Proteus 8.0 software. Our years of experience in the teaching of microcontroller course and the active involvement of students as manifested in complete in-depth hands-on laboratory projects on real life problem solving. Laboratory session with the development board and software demonstrated in this article is unambiguous. Future embedded system laboratory session could be designed around ATMel lines of Microcontrollers.

Keywords

Microcontroller, Embedded system, Hands-on lab experiments, simulation, and PICKit3 programmer

1. INTRODUCTION

The impression of studying microcontroller system is globally increasing in various branches of science, engineering and technology department of Universities and Polytechnics [1-2]. The use of microcontroller chips for controlling the embedded system functions are increasing exponentially in everyday technology design activities in colleges and technological research institutes [3].

A microcontroller is an entire computer integrated on a single chip that incorporates all the features that are found in microprocessor. For instance, microcontrollers are used as controllers in automobiles and as system exposure and focus controllers in camera. For the purpose of these applications, they have high concentration of on-chip facilities such as built in ROM, RAM, I/O ports, Serial Port, Parallel I/O ports, Timers, Counters, Interrupts controllers, Analog-to-Digital Converters, and Clock circuit. Since microcontrollers are powerful digital processors, the degree of control and programmability they provide significantly enhances the effectiveness of the applications.