8051 MODULAR DVELOPMENT BOARD

Gregorious Jose C, Sreraj Chidambaran, Vishnuraj K M

Abstract— It is a general purpose 40 Pin 8051 modular development board with onboard 16*2 LCD support, 4*4 general purpose switches, power supply circuit, RS232 port for serial interface with computer and other serial devices, reset switch, poewer status LED. Use this board to kick start development based on compatible 8051 microcontrollers. The board lets you to concentrate on programming, testing and optimizing your code, and therby your overall project, rather than spending time in getting to know the electronics requinboardred to use these microcontrollers. These boards are perfect for learning, testing and development. The intermediate Board offers support for 16*12 LCDs with onboard contrast control and it offers a lot more general purpose LEDs and switches are connected to IO pins on the microcontroller the jumpers and their connected to pins can be disabled if you wish to use the io pins on the microcontroller for other purpose. The board is compatible with the AT89S51/52 microcontrollers. The board is perfect if you are just starting out with 8051 programming and also if you want areliable tried and tested board far building advanced project based on it.

Index Terms— RS232 Port, LCD,4*4 Matrix keyboard, Steper Motor, 7Segment display, LED,Switch, DC Motor

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1 INTRODUCTION

Micro-controllers are useful to the extent that they communicate with other devices, such as sensors, motors, switches, keypads, displays, memory and even other micro-controllers. Many interface methods have been developed over the years to solve the complex problem of balancing circuit design criteria such as features, cost, size, weight, power consumption, reliability, availability, manufacturability .Many microcontroller designs typically mix multiple interfacing methods. In a very simplistic form, a micro-controller system can be viewed as a system that reads from (monitors) inputs,

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So a system development of 8051 micro controller board that simulate and executes various operations and functions with motor, lcd, led, serial interface. So Our 8051 development board find helpful in laboratory purposes

Embded Systems Design in an interdisciplinary coarse from hardware, software, tool, algorithm and domain. The objective of the course Embeded Systems Design is to understand Computing Methadology and technology from system design perspectives.

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- *GregoriousJose C is currently pursuing masters degree program in electronics and communication engineering in University of calicut , India, PH-9995481128. gregoriousjose@mail.com*
- *Sreeraj Chidabaran is currently pursuing masters degree program in electronics and communication engineering in University of calicut, India, PH-9895479424. sreerajcn@mail.com*

2 SYSTEM MODEL

A simple trainer kit that helps to execute and simulation of 8051 Microcontroller The above circuit shows the basic circuit for 8051 Microcontroller development board. The intention of the design is to endorse engineers to exercise and explore the capabilities of 8051 microcontroller with many communication protocol ease. The board is compatible with 40-DIP/44-PLCC pin microcontrollers It provides a complete development platform with different modules interface that accerlates the task of designers to run application software on target 8051 hardware, thereby paving a platform to bench mark their systems, save time and expenses of building their own application test board and enabling them to get their design to market quality The circuit consist of external peripheral modules such as LCD interface, seven segment display , matrix key board, stepper motor driver output, keyboard The Board also consist of communication protocols The Board is compatible with Flash program utility thus providing a fast programming The kit is designed so as to facilate separate on board ISP programmer for Atmel micro controllers through ISP on serial port Programing can also done without detaching the micro controller from the ZIF socket

To make learning fun and develop interest in students, labs are based on real life applications. This paper covers a project based learning methodologies with step-by-step lab practice sessions for the design and development of a simple DC motor closed loop speed control application.The paper is organized as follows. 8051 Microcontroller as a subject is introduced. Top level system and closed loop control description is covered in section   III.

3 RELATED WORKS

Different approaches in Embededd systems have led to the development of on board microcontroller programming and the control and execution of peripheral components in the modular board which helps to develop a particular devices mainly baised on microcontroller programming.

4 PERFORMANCE EVALUATION

A hardware design project usually goes through the following steps: project specification, design, simulation, prototyping, and production. Accurate simulations of large systems can be extremely slow and the reduced reliability of faster, more abstract simulation models cannot always be tolerated. Software simulators are inexpensive and very flexible. On the other hand, prototypes are very expensive and typically inflexible. As the complexity of a system design increases, the efficiency of its software simulator decreases and the cost of its prototype increases. The gap between these two steps in the design of a complex system presents a major challenge to designers. Moving too early to prototyping may prove costly as prototypes are hard to modify. Extending the simulation phase too long delays the schedule while correct designs are not guaranteed. An attractive option is to build a prototyping test bed which is flexible enough to emulate different systems so that its cost is amortized as it is re-used. In the lower end of a digital system experimentation and design, various types of logic gates and structured devices are usually needed. These gates and devices are however usually not available at the time of design, thereby slowing down the industry-to-market time of the end product. Another challenge is in the laboratory when students are to carry out digital design experiments. Different logic gates integrated circuits (ICs) and structured logic ICs will be required at different times for which their availability and the required number are not always guaranteed.

The solution is to model a single system whose function is to mimic the functionality of each of these devices to serve as the device itself in a system under design. Such a ubiquitous system which emulates the functions of other devices is the structured logic emulator.

Emulation is a powerful tool especially for the later stages of the development phase. It can provide the necessary environment for the system development before the device construction. It also provides verification capabilities that allow one to build a testing environment before reaching the stage of chip device prototyping. Emulators have the necessary flexibility needed for validation purposes, which chip device prototypes lack, by using reprogrammable devices as underlying hardware. Hardware emulation is a technique with which we imitate the behavior of a system under design or parts of it with another piece of hardware. The main objective of emulation technology is to provide a fast, efficient and feature rich debugging environment for the system. It can be thought of as a competitive technique to simulation, although there are fundamental differences on the approach that each technique takes and the level of abstraction and the stage of the development phase that they target. We can deduce that the main difference between simulation and emulation is that while simulation mimics the outward appearance of a system, emulation mimics the cause processes used by the real system. This is more evident by the fact that hardware emulation requires that the description of the parts under test are synthesizable whereas this is not the case with simulation. The simulator needs only a behavioral model of the system.

Logic emulation offers a compromise between the flexibility of software simulation and the speed of a hardware model. Logic emulation is distinguished from logic simulation in that the circuits being simulated are compiled directly into hardware. However, unlike the hardware model, a logic emulator can be quickly re-programmed, via software only, to emulate a new circuit. Besides the cost saving of re-use, the ability to quickly reconfigure minimizes time between design iterations. Like the hardware model, a logic emulator can be integrated directly into a target system

5 PROBLEM ATATEMENT

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So a system development of 8051 micro controller board that simulate and executes various operations and functions with motor, lcd, led, serial interface. So Our 8051 development board find helpful in laboratory purposes A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their loads. The 5V output is taken from battery. Liquid Crystal Display also called as LCD is very helpful in providing user interface as well as for debugging purpose. A liquid crystal display (LCD) is a flat panel display that uses the light modulating properties of liquid crystals (LCs). LCD Modules can present textual information to user.

UART (Universal Asynchronous Receiver Transmitter) are one of the basic interfaces which provide a cost effective simple and reliable communication between one controller to another controller or between a controller and PC. Usually all the digital ICs work on TTL or CMOS voltage levels which cannot be used to communicate over RS-232 protocol. So a voltage or level converter is needed which can convert TTL to RS232 and RS232 to TTL voltage levels. The most commonly used RS-232 level converter is MAX23

The 4 X 4 matrix keypad to two ports in microcontroller. The rows are connected to an output port and the columns are connected to an input port. To detect a pressed key, the microcontroller grounds all rows by providing 0 to the output latch, and then it reads the columns. If the data read from the columns is D3-D0=1111, no key has been pressed and the process continues until a key press is detected. However, if one of the column bits has a zero, this means that a key press has occurred. For example, if D3-D0=1101, this means that a key in the D1 column has been pressed. After a key press is detected, the microcontroller will go through the process of identifying the key. Starting with the top row, the microcontroller grounds it by providing a low to row D0 only; then it reads the columns. If the data read is all 1s, no key in that row is activated and the process is moved to the next row. It grounds the next row, reads the columns, and checks for any zero. This process continues until the row is identified. After identification of the row in which the key has been pressed, the next task is to find out which column the pressed key belongs to. NXP semiconductors produce a range of micro controllers that feature both on chip flash memory and the ability to reprogrammed using in- system programming technology RS 232 communication enables point to point data transfer. It is commonly used in data acquisition applications, for the transfer of data between the micro controller and a PC .The voltage levels of microcontroller and PC are not directly compatible with those of RS 232, a level transition buffer such as MAX232 is used ULN2803 is used as driver port I/O lines are connected driver output are terminated to connector CN12 there can be interface relay/stepper motor or any driving source could need more than 50mA, Motor can connect JP3 or J3 connector In Embedded module 4 no's of common anode seven segment displays are used, the segment lines of seven segment LED is being terminated at connector .The digital select lines are connected to the port pins of 8051. All the common anode displays consume very small amount of current. User can use segment lines at any port P0, P1 and P2 by default digital select lines are connected to port P3 of pin 3

4   CONCLUSION

The 8051 development board that was developed resulted in providing a user friendly device. This system helps in college lab purpose for executing and implementing 8051 microcontroller programming with interfaced devices with in it The next version of the glove will be included more interfacing devices It makes this easily portable and easier to use. The board is compatible with the AT89S51/52 microcontrollers. This board is perfect if you are just starting out with 8051 programming and also if you want a reliable tried and tested board far building advanced project based on it.

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