Chapter 2

Technology, Computer

CHAPTER 2 LITERATURE As the name implies, Zilog is a set of library files that provides an interface between the user application and this project uses Zilog XP F0822, a part of microcontroller product. The kit used allows the users to be familiarized with the function of this device. The kit consists of 8Kb version of Z8 encore. This hardware is intended for blind person. It is expected to be reasonably used by the blind people with no support. For their safety, this device it completed with the ultrasonic sensor that work perfectly for distance measurement between the blind person and any moving or stationary object. The ultrasonic sensor provides: * Precise, non-contact distance measurements within a 2 cm to 3 m range * Simple pulse in/pulse out communication * Burst indicator LED shows measurement in progress * 20 mA power consumption * Narrow acceptance angle * 3-pin header makes it easy to connect using a servo extension cable The main features of Z8 Encore! XP F0822 Series include: * eZ8TM core CPU * 8 KB Flash memory with in-circuit system programming (ISCP) capability * 1 KB register RAM * 5-channel, 10-bit Analog-to-Digital Converter (ADC) * Full-duplex UART * I2C interface (Master Mode only) * Serial Peripheral Interface (SPI) * Infrared Data Association (IrDA)-compliant infrared encoder/decoder (Endec) * Two 16-bit timers with capture, compare, and PWM capability * Watchdog Timer (WDT) with internal RC oscillator * Eleven or nineteen I/O pins * Programmable priority interrupts * On-Chip Debugger * Voltage Brownout Protection (VBO) * Power-On Reset (POR) * 2. 7 V to 3. 6 V operating voltage with 5 V-tolerant inputs * Operating temperatures: 20 °C ±10 °C This device was programmed with certain instructions so it properly works as determined. As mentioned, this project is aimed to serve as a

sensory substitution specially for a blind person. While using this cap, a blind person can perceive information by simply listening to the sound whenever he or she is about to hit a wall or any barrier while walking or moving around. Fortunately, this Zilog prototype is connected with the ultrasonic sensor that necessarily helps the blind person to solve their problem without human aid. Since this disability keeps a person to not retrieve data or information from the retina, this ultrasonic device transfers information from touch receptors to the hearing cortex for perception and interpretation (moving away). So, it is possible that the blind person can navigate and easily identify the obstacles. All they have to do is to follow only the ultrasonic instruction. This is very helpful, since it is controlled by the barrier next to the user. The advantage of this ultrasonic sensor is to detect any object that serves as barrier to the blind person. Aside from this, the researchers also found the idea that this device can be useful for the miners. Since the miners always deal with the underground barrier. The limit is it can't get wet. So definitely by using this device, one of many problems for humanity is solved. Definition of Terms Analog-to-Digital Converter (ADC) is a sample of the large number of analog-to-digital conversion methods. Barrier is a physical structure which blocks or impedes something. Burst indicator LED is an LED ideal for call for assistance, process control and other applications that call for immediate attention. Central Processing Unit (CPU) is the brain of a computer. It is the hardware within a computer system or smartphone which carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system. Debugger is a computer program that is used to test and debug

other programs (the " target" program) Decoder is a device which does the reverse operation of an encoder, undoing the encoding so that the original information can be retrieved. Encoder is a device, circuit, transducer, software program, algorithm or person that converts information from one format or code to another, for the purposes of standardization, speed, secrecy, security, or saving space by shrinking size. Flash memory is an electronic non-volatile computer storage device that can be electrically erased and reprogrammed. Infrared is an energy radiation with a frequency below our eyes sensitivity, so we cannot see it. Infrared Data Association (IrDA) is an industry driven interest group that was founded in 1993 by around 50 companies and provides specifications for a complete set of protocols for wireless infrared communications. Interface is a tool and concept that refers to a point of interaction between components, and is applicable at the level of both hardware and software. This allows a component, whether a piece of hardware such as a graphics card or a piece of software such as an Internet browser, to function independently while using interfaces to communicate with other components via an input/output system and an associated protocol. Inter Integrated Circuit (I2C) is a system for serial data exchange between the microcontrollers and specialized integrated circuits of a new generation. I2C interface (Master Mode only) is an interface used to communicate data to and from a PICmicro microcontroller and a serial EEPROM. Microcontroller is (sometimes abbreviated μC, uC or MCU) is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals. Kit is a package of electrical components used to build an

electronic device. Power-On Reset is an electronic device incorporated into the integrated circuit that detects the power applied to the chip and generates a reset impulse that goes to the entire circuit placing it into a known state. Prototype is an early sample or model built to test a concept or process or to act as a thing to be replicated or learned from Pulse is a burst of current, voltage, or electromagnetic-field energy. In practical electronic and computer systems, a pulse may last from a fraction of a nanosecond up to several seconds or even minutes. Pulse Width Modulation (PWM) is powerful and commonly used technique for controlling the analog circuits or power to inertial electrical devices and made practical by a processor's digital output such as the modern electronic power switches. Register RAM is very small but are extremely fast - access time is usually 1 cycle. RAM is a much larger and slower memory that applications use as a scratch space. RAM usually has an access time of about 100 processor cycles. Retrieve is to get back again. Sensor is a converter that measures a physical quantity and converts it into a signal which can be read by an observer or by an (today mostly electronic) instrument. Servo is a device used to provide control of a desired operation through the use of feedback. Stationary is a thing that is not capable of being moved; fixed. Universal Asynchronous Receiver/Transmitter (UART) is a special line for transferring clock signal is not used. This is a very simple way of transferring data since it basically represents the conversion of 8-bit data from parallel to serial format. Ultrasonic sensor is transceiver that work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high

frequency sound waves and evaluate the echo which is received back by the sensor. Watchdog Timer (WDT) is a computer operating properly timer. Zilog is an American manufacturer of 8-bit and 16-bit microcontrollers, and is most famous for its Intel 8080-compatible Z80 series. Zilog XP F0822 is the first in a line of Zilog microcontroller products based on the 8-bit eZ8 CPU and offering Flash in-circuit programming capability that allows for faster development time and program changes in the field.