Abstract: This proposed system uses an ultrasonic module interfaced to a microcontroller of 8051 family. An ultrasonic transducer comprising of a transmitter and receiver are used. The transmitted waves are reflected back from the object and received by the transducer again. The total time taken from sending the waves to receiving it is calculated by taking into consideration the velocity of sound. Then the distance is calculated by a program running on the microcontroller and displayed on an liquid crystal display screen interfaced to the microcontroller. The circuit is used to receive the reflected signals of 40 KHz from the missile object, to feed that to a program of the microcontroller and to switch on appropriate load while the program is executed at the microcontroller.

Keywords: Microcontroller, Ultrasonic Transducer, DC Gear Motor.

I. INTRODUCTION

The proposed system uses an ultrasonic module interfaced to 8051 family microcontroller to detect missile object. An ultrasonic transducer comprising of a transmitter and receiver are used on same module. The ultrasonic transducer produces sound waves. The transmitted sound waves are reflected back from the object and received by the transducer again. The total time taken from sending the waves to receiving it is calculated by taking into consideration the velocity of sound. Then the distance is measured and displayed on a liquid crystal display interfaced to the microcontroller. The Laser gun is rotated and controlled by Gear motor by one axis and also with another axis it rotates up and down directions towards missile object simultaneously[1]. The programs for 8051 family microcontroller are written by the embedded C programming using kiel software.

II. ARCHITECTURE OF PROPOSED SYSTEM

The architecture of proposed system is consists of 8-bit microcontrollers AT89S52 and Ultrasonic Transducer module, geared DC motor drive module, LCD interface module and other necessary accessories. These are explained in subsections.

A. Microcontrollers

The missile detection and automatic destroyer system using 8-bit microcontrollers are shown in Fig1. The AT89S52 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable. The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution. The AT89S52 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer / counters, serial port and interrupt system to continue functioning. The Power-down Mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset[3].

![Fig.1. Block Diagram of Microcontroller based Missile Object Detector.](image)

B. Ultrasonic Transducer

Ultrasonic sensors also known as transceivers work on a principle similar to radar or sonar which evaluates 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 is shown in Fig2. Use for motion or distance sensing with Frequency: 40kHz ±1.0kHz, Aluminium case, Capacitance: 2000Pf ±20% . The
transmitter bandwidth is 5.0kHz/100Db and sound pressure level 112Db/40±1.0kHz.

**Fig. 2. Ultrasonic Transducer Module.**

An ultrasonic proximity sensor uses a piezoelectric transducer to send and detect sound waves. Transducer generate high frequency sound waves and evaluate the echo by the detector which is received back after reflecting off the target.

**C. Gear Motor**

A Gear motor is a brushless AC synchronous electric motor that can divide a full rotation into a large number of steps. The motor’s position can be controlled precisely, without any feedback mechanism (see open loop control). Gear motors are similar to switched reluctance motors, which are very large stepping motors with a reduced pole count, and generally are closed-loop commutated. It is a “digital” version of the electric motor. The rotor moves in discrete steps as commanded, rather than rotating continuously like a conventional motor. When stopped but energized, a Gear holds its load steady with a holding torque. When we compare with the servo motor, simple drive electronics, good accuracy, good torque, moderate speed, and low cost are most advantages of Gear motor is shown in Fig.3.

**Fig 3. Gear Motor.**

The working of the kit based on the ultrasonic sensor input, based on this input microcontroller drive the motor to corresponding direction and the laser is activated to destroy the missile.

**III. KEIL SOFTWARE**

The keil software provides with software development tools for the 8051 family of microcontrollers. Keil provides following tools for 8051 development such as C51 Optimizing C Cross Compiler, A51 Macro Assembler, 8051 Utilities (linker, object file converter, library manager), Source-Level Debugger/Simulator, μVision for Windows Integrated Development Environment [5].

**A. Keil C Cross Compiler**

Keil is a German based Software development company. It provides several development tools like, Integrated Development environment (IDE), Project Manager, Simulator, Debugger, C Cross Compiler, Cross Assembler, Locator/Linker.

**IV. EXPERIMENTAL SETUP TESTING**

The experimental setup is tested in Fig. 4 and verified. The experimental setup mainly works on autonomous standalone system with sequence of operations as per algorithm and programs executes through microcontrollers.

**Fig. 4. Experimental Setup.**

**V. CONCLUSION**

The Ultrasonic transceiver (Transmitter & Receiver) detects missile object and displays the missile direction on LCD through Microcontroller. If there is any target within the detection range, the application will turn ON the Laser gun to the nearest detected target and fires. A buzzer alarms when any of the ultrasonic sensor identifies the missile to alert the nearest people.

**VI. REFERENCES**

Missile Detection and Automatic Destroy System


