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Electronic Watch Dog Project

Pratibha. B. Hosalli[1]; Mahadevi S. N.[2]

[1]UG Scholar Students, Department of Electrical and Electronics Engineering
PDA College of Engineering Kalaburagi, Karnataka, India

[2]Project Guide, Professor PDA College of Engineering Kalaburagi, Karnataka, India

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Abstract: Now a days thefts are increasing as more security is necessary; However, a physical guard dog is not always feasible. Instead, we can implement this Electronic Watch dog model. It mimics a real dog but its cost effective and easily affordable. Furthermore, in today's busy schedules, people often lack the time for dog care, such as walks and exercise. This electronic model solves this issue by working without human supervision. The model's key components typically include an IR receiver, an IR transmitter, a battery, a diode, a regulator, a speaker, and various Integrated Circuits (ICs).

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I. INTRODUCTION

Now a days thefts are taking place even in the middle of the day. If we have expensive items in our homes this system provides a necessary safeguard. Recently this threat has been prevalent with many thefts occurring during midday especially in regions like North Karnataka. We can install it near gates but its more probable and highly recommended to install it near lockers where expensive items are kept. Its highly cost effective compared to CCTV, manned guard. When placed near lockers, people present inside the home can easily identify source of alarm, unlike an outdoor gate. When siren sounds, we are immediately alerted.

False triggering when installed at gate due to wind or small animals/pets. We can mitigate it this by installing it indoors or by adjusting the sensor height. This is why my model design, which uses modulated IR (38KHz), is superior to simple IR detection. The TSOP1738 receiver specifically filters out unmodulated light from the sun or indoor lamps, drastically reducing false alarm from environmental changes. We can use two parallel IR beams spaced a short distance apart, requiring both beams to be broken within a short time window to trigger the alarm.

Compared to expensive solutions like CCTV or security guard, this system is a much better, budget-friendly alternative. We can specifically apply it at lockers in homes or even in schools for securing sensitive materials like question papers. CCTV systems require cameras, recording devices, continues power, and large data storage capacity, leading to high initial and maintenance costs. In contrast, our system uses ICs and basic IR components which are extremely inexpensive. The project offers a highly functional, immediate audible alert-a feature CCTV lacks without added integration-for a tiny fraction of price. It's a perfect solution for spot protection (like single locker or doorway) rather than broad area monitoring.

➢ *Automated Intruder Detection and Alert:*

- Goal: To automatically detect the unauthorized entry or movement of a person across a secured threshold (like a gate or doorway). Mechanism (IR Sensor): The system uses an IR transmitter/receiver pair to establish an invisible beam. When the beam is interrupted by a person, a trigger signal is generated.

➢ *Voice/Sound Notification (using ISD1820):*

- Goal: To provide a loud, distinct, and informative audio alert immediately upon detection. Mechanism (ISD1820): The ISD1820 is a voice recording and playback IC. Its specific role is to: Store a prerecorded message (e.g., a dog barking sound, a warning message, or an alarm siren. Playback this recorded sound immediately when triggered by the IR detection circuit.

II. METHODOLOGY AND WORKING

The Methodology and Working involve the following components:

- IR receiver
- IR transmitter
- IC 555 (Two ICs are required for the circuit)
- UM66 (Likely a music/melody IC)
- ISD1820 (Likely a voice/sound recording IC)
- Speaker
- Battery

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➢ *Component Details:*

- IR Transmitter: The IR transmitter consists of an IR LED that continuously emits a straight beam of light with a 38 kHz frequency.
- IR Receiver (TSOP1738): The IR receiver, specifically the TSOP1738, is a receiving component known as a Thin Small Outline Package with a serial number of 17. It continuously receives an infrared signal at a 38 kHz frequency. The TSOP1738 has three pins: V(cc), ground, and output.
- IC 555 Timer: The stable running of the IC 555 timer (Model One IC) consists of eight pins:
- Pin 1: Ground (GND)
- Pin 2: Trigger
- Pin 3: Output (O/P)
- Pin 4: Reset
- Pin 5: Control
- Pin 6: Threshold
- Pin 7: Discharge
- Pin 8: V(cc)

➢ *Circuit Operation:*

- The IR LED is connected to pin 3 of the IC1 (likely the first 555 timer). Which is Astable free running no stable states (self triggering it autometically switches without any external back and forth trigger).
- The output of the TSOP1738 is connected to pin 2 (Trigger) of IC2 (likely the second 555 timer). Which is monostable one shot multivibrator or pulse generator it has one stable state and one unstable state (requires external trigger pulse).
- Whenever there is an interruption (the infrared beam is broken), the output of the TSOP1738 becomes low. Since the TSOP1738 output is connected to pin 2 (the trigger pin) of IC2, this low signal triggers the output of IC2 to become high. This high output then triggers the sound when it is connected to the ISD1820 (or similar sound IC) or pin 3.
- The overall result is that the system generates a barking sound, and the speaker makes a loud sound.

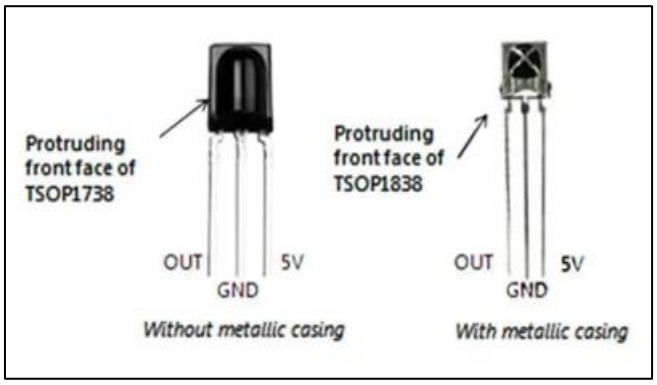

Fig 1 TSOP1738

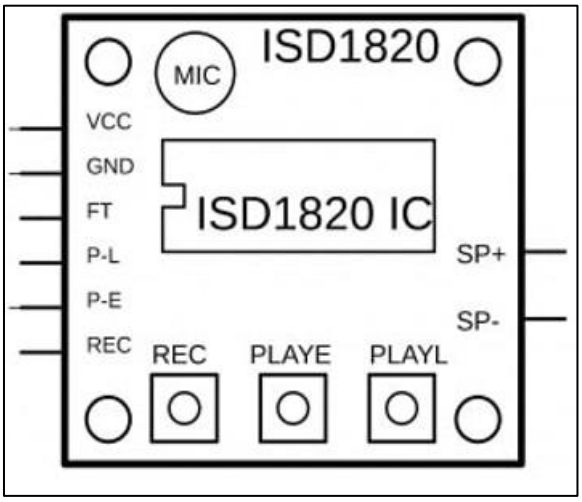

Fig 2 ISD1820

III. RESULTS

The Electronic Watchdog Project was a success, delivering an automated, low-cost intrusion alert system where the ISD1820 provided the unique, customizable output central to the "watchdog" concept. The system achieved reliable detection and signal processing thanks to the critical role of the 555 Timer IC, which operated in Monostable mode. The {IR} sensor provided an instantaneous, non-contact detection when the beam was broken. The {555} Timer then correctly converted the momentary electrical pulse from the {IR} receiver into a clean, fixed-duration pulse of approximately {3.63{seconds}}, effectively eliminating the risk of the alert

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cutting out due to a noisy or brief sensor input and confirming the timer's role as a reliable signal processor. The component values (R_T = 33 kilo omega and C_T = 100 microfarad) were calculated to ensure the output pulse was long enough to fully activate the subsequent alert stage. Furthermore, the system featured a custom and reliable audio alert because the ISD1820 chip was used, surpassing traditional melody generators. This component allowed the system to play a prerecorded, custom audio message, such as a dog barking sound or a warning voice, fulfilling the core aim of creating an informative, high-impact alert suitable for deterrence. Crucially, by connecting the {555} output to the {ISD}1820's{PLAYE} (Play-Edge) pin, the entire recorded message was guaranteed to play from start to finish upon the rising edge of the {555} pulse, even if the intruder only passed the sensor very quickly. Finally, the system demonstrated high practicality due to the {ISD}1820's on-chip amplifier, which provided sufficient volume, and the chip's automatic power-down feature, which kept power consumption low during the system's long idle periods.

IV. CONCLUSIONS

Reliable Signal Conditioning: The 555 Timer IC, operating in Monostable mode, proved essential by reliably converting the instantaneous pulse from the {IR} sensor into a clean, fixed-duration output (3.63 {seconds}). This critical step eliminated signal noise and ensured the alert system would not prematurely cut out, guaranteeing a robust trigger.

Effective, Custom Deterrence: The use of the ISD1820 chip allowed for a prerecorded, custom audio message to be played. By connecting the timed pulse to the {ISD}1820's {PLAYE} pin, the system guaranteed that the entire warning message was played upon detection, achieving the project's core goal of providing an informative, high-impact "watchdog" alert suitable for effective deterrence.

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