Touch Released Alarm System: A New Era in Security

Rohini Chavan, Prem Bhutada, Vedant Bhandari, Shivaji Harne, Hemant Mahale, Aniket Narsale
Vishwakarma institute of information technology Pune,India

***Abstract*—This paper presents the design and development of a "Touch Released Alarm System," The system is designed to produce an alarm at any instance when a physical touch of an external probe with an object is deleted. Circuit diagram includes 555 timer integrated circuit, isolated BJT transistor (BC547), LED and buzzer for visible and audible alarm respectively, together with 9V battery. For illustration, if the object such as watch or chain is detached from the exterior probe, the circuit switches on the LED flashing and the buzzer sounding. The stable time configuration upon triggering of the 555 timer IC is that the timer IC is connected in monostable mode and the BC547 is an enable switch to the output devices which are the LEDs in this circuit. But it is very instructive to be applied in various security products like theft prevention and protection of other valuables. The paper also directs the description of the circuit with its functional aspects, and it also outlines the outcomes of the circuit as well as the practicability of applying the system in comprehensive, cost-effective design.**

***Keywords*—Touch released alarm, 555 timer IC, BC547 transistor, security system, theft prevention, monostable mode, alarm circuit, buzzer alert, LED indicator, personal safety.**

1.INTRODUCTION

According to the present-day requirements, security has become a major concern, and thus, efficient alarm systems have become very important. This reality has led people and companies to look for tools that prevent crime not only but that also allow them Alerts in case of an intrusion. In the security technology solutions that are installed in security applications today, touch sensitive alarm systems have been realized to be among the most preferred based on its simplicity, cost effective and responds to trigger within the shortest time. Such systems are useful in situations, which require some contact with an object such as a jewel, tool, or an electronic product.

The security needs discussed above can be met through the Touch Released Alarm System presented in this paper by a simple but effective solution. The system uses a single probe as a sensor in a circuit in its functionality. Whenever this probe gets physically disconnected from any conductive material, an almost instantaneous reaction happens with the applied system. This mechanism is most helpful in the protection of valuable items as the system gives an immediate notification of detachment. The heart of this design is the 555 timer integrated circuit (IC), and connected in the monostable mode that produces an output pulse when the probe is released. This output triggers an LED light and a buzzer to give the user both light and sound signals that any attempt at removal of the items is being done by an unauthorized person.

The 555 timer IC is well known for its versatility and ease of application it has earned a lot of importance in different electronics uses. Launched in 1972, it has grown to be a block for most alarm systems since it boasts of a timing and signal controlling mechanism [1]. This functionality makes it possible for it to be used in monostable and bistable designs that are recommended for use in most security systems. New developments have shown that incorporating capacitive and inductive sensors with the 555 timer flush with the desired requirements enhances the sensitivity as well as competence of these systems. Using capacitive touch sensing technology as a feature in the alarm system enables the equipment to measure slight changes in contact with the probe and reduce instances of false alarms and enhance performance [2].

In addition, solving various problems including the sources of electronic noises has been a key area of emphasis in the most contemporary research activities a subject that shall be discussed in more detail in the subsequent topic. It has been found that installing filtering devices into 555 timer circuits have helped reduce disturbances from the environmental interferences [3]. This improvement is especially useful in materialization where industrialization leads to an excessive generation of electrical interferences that may affect the alarms. Wireless com modules integrated with 555 timers is yet another milestone in alarm manufacturing industry. This innovation leads to alarms to notify people directly through Smartphone or monitor stations, in accordance with the internet of things applications in which notice is essential for security [4].

The acute architectural concentration of the Touch Released Alarm System is on simplicity and affordability but without scrupulously neglecting effectiveness. The use of easily accessible parts including resistors, capacitors, transistors together with the 555 timer IC makes this system affordable when assembled without a compromise to its efficiency. To promote instant feedback whenever an object is taken off contact with the probe, the LED indicator and the buzzer sound alert in parallel.

Besides using this technology as an alarm for the personal belongings, people in distinct areas of the economy can apply this technology purposefully. For instance, it can be incorporated in clothing, glasses or other items that workers in industrial premises require to wear, in a way that produces alerts when such items such as tools or safety items are removed from specified areas. Besides, because of its flexibility, it can be used in automobiles to bar entry or to stop theft.

It is the intention of this paper to look not only at the design and function of the Touch Released Alarm System but also at its feasibilities and usefulness in increasing security for the individual and assets [5]. In an effort to offer a functional solution to modern security issues, this system aims to: offer an analysis of its operational principles, and include reliable components such as the 555 timer IC, all while maintaining user affordability and a wide applicability.

Using analysis and experiments described in this paper, we will show how this proposed alarm system can be an essential component of present day security measures. Thus, it is our goal to significantly advance the field of security technology and provide practical recommendations for approaching the development of effective alarm systems that meet new safety requirements with the help of recent achievements in the field of touch sensitivity and by using such stable components as the 555 timer IC.

2.LITERATURE SURVEY

Among the 555 timer IC, Sharma and Yadav applied the alarm circuit that can be integrated to the smart home automation system. If those designing the features of the 555 timers are managed to work adequately, they are cheap, easy to draw on an IC, and reliable; thus, fit for including in security system like lock at front doors or even as window alarms. But in their experiment,they only proved that to make the circuit's output strong enough to be able to drive larger loads including the siren lights and the bulbs, the BC547 transistor alone would suffice. Such design will be economical and effective enhancement to the home security system that the owners can bet on [4].

Iqbal and Fernandez build on the traditional 555 timer circuit to incorporate better touch sensing techniques in capacitive and inductive types. The former can be connected with the 555 timer in monostable mode which has enhanced the system sensitivity and performance of the system. They expounded how this method was a value to the system beyond eradicating false alarms in noisy environment and enabled it to have a leverage among security systems, which are highly sensitive. Their findings were therefore of utmost importance in arriving at the conclusion that while sensor technologies have recently come to be known to be more sensitive, the 555 timer remained the preferred standard favourite in security systems because the later has the greatest ease as is simplicity [5].

In the experiment Johnson attempted on setting up bistable configuration of the 555 timer so that a provision for manual reset after an activation was made in the touch released alarm system. Therefore, based on such a comparison of the characteristics of monostable and bistable configurations, it was thus concluded that the bistable configurations were relatively more flexible, especially where users had to control the circuit – as in manually switching off alarms. Johnson was able to show that the bistable configuration is ideal for industrial safety systems; instances where, alarms must be echoed until an alarm is cleared [6].

Singh and Patel, however, attempted to design low power alarm circuits for portable devices like personal safety alarms, with sensible choices of the 555 timer component draws exceptionally low power. From them, they were able to prove that through suitable choice of the resistor values, capacitor values and transistor will make it quite possible to have much more than the hours of operation than that of the battery. Therefore, their work is focused on portable security systems that are operated using batteries; the power required by these systems should be very low [7].

Kumar and Reddy attempted the low-cost devices for security in the rural environment with a touch released alarm. In procedure, they had been able to reduce to the lowest level possible, the circuit components yet making the circuit work. This was an illustration of flexibility of the 555 timers in providing an alarm trigger, from a simplest form of touch input. It was

very important in that manner that it could quickly expose rural individuals to low-cost security gadgets in a case, where other proper more complex security systems were within their reach [8].

Ali and Gupta tried to filter out unwanted triggering of the touch-release alarms due to interference from electric disturbances. When attempting to address noisy aspects of the 555 timer circuits within noisy environments, they suggested adding passive filter circuits like capacitive and inductive in the 555 timer circuits. The authors designed a circuit which can be used in industrial as well as outdoor security applications to provide better protection against interferences because of environment and much higher reliability for the noisy environment [9].

Otherwise, Lee and Park proposed new idea that 555 timers are connected with wireless communication modules to address the requirements of IoT applications. For the alarm message to be sent to a smartphone or monitoring station, 555 timers are linked to low power transceivers which also makes a wireless transceivers point. This has enhanced role of the contemporary timer in security devices, it includes it in smart houses and offices demand for real time warning through wireless networks [10].

Rao and Nair aimed at designing capacitive touch probes in alarm systems as sensitive as possible at the same time as being rather in compresence realist. They assembled very high sensitivity and hostile environment alarm system that are operated through touch input via capacitive resistive sensors integrated with 555 Timer. This demonstrated how advanced sensor technologies may be used to take industrial and residential security applications to the next level by relying on the reliability of alarm systems [11].

Hassan and Khan considered several analog security systems, involved in the use of touch-lever release triggers that include a 555 timer. For other analog mechanisms, the authors put the conclusion of their work regarding the 555 timer very effective and economical for a simple security system as suggested in this review. Thus, this review is predominantly focused on flexibility, especially in contexts wherein possible digital solutions can be either impractical or too costly [12].

Talking about the effectiveness of the touch-sensitive alarms in industrial safety environment, Mehta and Jain mentioned. Their work was on employing a 555 in monostable to trigger an alarm when there is an inadvertent contact in dangerous zones so that they can alert fast. Suggestion of the authors: The duration for alarm should be increased much where it needs to be used in the industrial environment, where the response has to be created before any situation appears. Idea for the research: The latter mentioned research also provides design plan idea towards usage in heavy industries where the vibration from the machines would over time, trigger some sort of false alarms [13].

Design goes further these simple touch activated alarms by including multifigured mult- touch inputs.Their system was to promote the security on home and comprised of several touch sensors, interconnected with a 555 timer so as to make the alarm to ring when at least two of its sensors are triggered.It became less sensitive to false triggering in addition to receiving more protection without compromising on simplicity and at the security features of homes and consisted of several touch sensors connected by a 555 timer so as to only allow the alarm to activate if any two or more of its sensors are activated at once. It became less prone to false triggers in addition to acquiring added safety without losing simplicity and costing [14].

In this work, a new wave of alarm systems has been added: Capacitive touch sensors that have been incorporated with the 555 timer. The working of capacitive sensors was found to be much better in comparison with the resistive sensors which were also confirmed. Further, the resistive sensors had a higher level of false alarms by features such as moisture and dust. Along this line of thinking, the capacitive vs. resistive comparison made the 555 timer an application platform for both sensors in the study. Here, an intention was on providing high of accuracy and robustness [15].

This section presents low power wearable security appliances developed by Deshmukh and Rao using the IC 555 timer. They hence fine tune the 555 timer timing resistor and capacitor as to achieving low power that would be desirable in wearable alarms of a personal safety application, operated from a battery. Such energy efficient system helps to form a proper personal safety application that demonstrates the use of 555 timer as an instrument in portable a well as wearable technologies [16].

In this context, the proposed system contributes towards preventing unlawful access to the car. The touch sensor will trigger alarms and notify the owner of the vehicle remotely by RF communication whenever the gadget is activated. It complements the existing gap

between the contemporary digital alarm systems, ranging from the basic analog systems, as they appear to be affordable and plausible with regards to automobile security [17].

What Ramirez and Silva did was nothing more than performing a combined architecture of the 555 timer circuit with the microcontrollers bringing about a combined analog and digital circuit. Their system employed 555 timer solely for signal processing and stabilization and for other activities including activating a certain alarm based on conditions such as the user's proximity or the time of the day, the micro controller was used. This hybrid solution also ensured that it was true that while the 555 timer was able and primarily adequate for more basic functions, it was still going to be part of digital systems that could continue to support the compound, refined applications which include dwelling and commerce[18].

Fujimoto and Sato described the release alarm touch systems with the 555 timer inside of which the AI may be applied. In accordance with their method, they introduce an idea with the AI based algorithm, which utilizes the input 555 timer triggers associated with the starting of the alarm conditions and filter out the unnecessary false alarm data. It almost made the system highly upgrade its reliability and efficiency of the security solution since it combines the simplicity of the 555 timer and the ability of AI towards a smarter adaptive security approach [19].

Generally, it is observed from the literature that the 555 timer is still the central building block in low-cost, reliable, and versatile security systems across a wide range of sectors: automation in home automation, industrial safety application wearable electronics applications, automobile applications.

3.METHODOLOGY

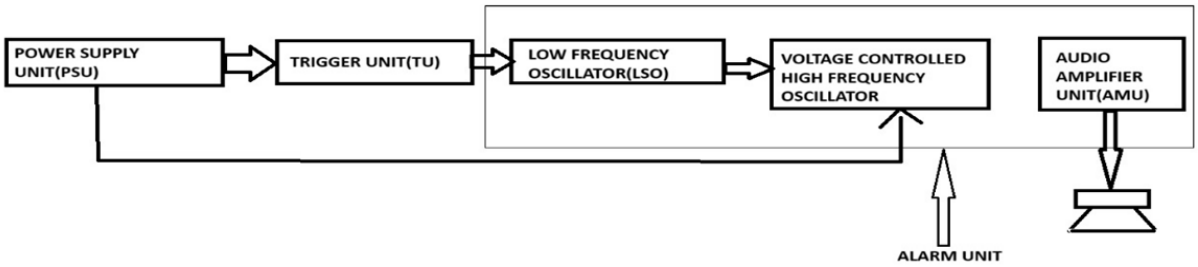

Image 1. A simple and Reliable Touch sensitive security system

The above flow chart shows the working process how many units; and where these Units are established and how these Units are connected. Starting with the PSUs: power supply unit, which is also known as PSU, is the circuit which directs the energy needed in the circuit. This then goes to the power trigger Unit which controls the alarms when the system is triggered. Susceptible event shall provide electrical signal to a Low Frequency Oscillator, for giving low frequency zero. The based picture below illustrates that this signal is fed into a Voltage Controlled High Frequency Oscillator which changes the frequency of the signal with regard to the frequency obtained from the low-frequency oscillator. This signal is then relayed to the Audio Amplifier Unit which amplifies the signal to a level which compel the speaker. In addition, signal is formed and developed before the signal sends to the speaker sector establishing the audible signal. This is enclosed in the dotted lined box known as "Alarm Unit" therefore they perform significant roles in producing the alarm have been identified hence enclosed in the dotted lined box known as LFO, VC HFO, and AAU.

1.Touch Triggered Alarm System :

This is an entirely newly designed safety and security device developed to address such issues as removal or drop off conductive items or surfaces including jewelry, metallic items of equipment, or the likes of tools. This device is developed to its core to send the alarm as soon as possible to make it a flexible addition to use for different functions in security systems and uses, safety apparatus, and business monitoring apparatus.

Since the 555 Timer IC is capable of being used in the monostable mode, the core of system design is found to lie within the alarm triggering period being fairly easy to control. This method has the merits that can provide real time response from any touch release event with low power consumption and cost, and therefore makes even the stationary control much easier, even though the portable application is relatively easy.

This way, it will try to provide a positive answer to the kind of methodology to which the present work is supposed to adhere – in the area of how to design and then develop, and finally test the Touch Released Alarm System and also describe the system's basic features, performance descriptors and real-life implications for implementation.

2.Component selection and circuit design

Depending on the final purpose of the circuit, components of the circuit and design of the circuit may vary.

The electronics applied into the touch released alarm system selected thus are good performing, affordable and easily available. Those basic components included the following:

555 Timer IC: This one is the main circuit that switches in monostable state and through detecting a touch release signal, gives out a pulse signal.

Resistors : RC pulse width timing circuit : the primary resistor R1 is with the combo resistor.

Capacitors: Some are within this circuit for noise filtration so the entire circuit goes stable C1 is the primary capacitor it is work with the Resistor R1 to set the pulse width.

Touch Probe: It should be able to detect the presence of a conductive object with its surface or its absence. The sensitivity of the probe is determined in the voltage divider circuit as earlier noted.

BC547 Transistor: Practical operating current is supplied through the buzzer and LED alarm indicators.

Buzzer and LED: These are the sound and light notifying an event of touch release.

Power Source: For the purpose of powering the entire circuit, the source of 9V battery is used hence ensuring that the same supplies power as expected and without interruption.

Switching Mechanism: For resetting or deactivating the circuit after the alarm switch ON is turned on and or activated

Hence, all such above mention components would be selected according to the characteristic of performance, availability and the cost factor of the whole developing design of the system with regard to its reliability and economy.

Circuit Design and Simulation

The Touch Released Alarm System is developed using commercially available electronic design automation. The connected schematic diagram could be simulated in the design process in order to likely describe the functioning of the system.

The reduction of validity simulation is an essential segment that is to determine whether the circuit is functional or not and also other errors in the circuit and also design parameters adjustments. Testing of the 555 Timer in Monostable Mode Included: Check not only the RC circuit implementation but also the time setup to correspond to the moments to pulse width necessary.

Touch Probe Sensitivity Calibration: make sure the output voltage divider network will generate the right trigger level for valid touch.

Output Stage Testing: ensure that the chosen transistor will be enough to provide a current to the buzzer and the LEDs which are located in the alarm indicator.

Analysis of Power Consumption: Calculate power consumption of the system in its idle state as well as in active state so that the system could be completely run on battery.

As results shown above, more detailed simulation study needed to be done and any design modification should be addressed based on the following two fold optimization objectives of the system; performance and reliability.

3. Prototype Development and Testing

After redesigning the circuit, Touch Released Alarm System prototypes touch assembles the whole system on a breadboard for its development and testing. It allows easy adjustments; thus, problems are identified before the final design is transferred onto a PCB for permanent implementation.

Assembly Prototype

The following are involved in the prototype's assembly:

Mount the 555 Timer IC to combine relevant resistors and capacitors for the RC timing circuit.

Insert the touch probe to the circuit with connecting the touch probe to the trigger pin of the 555 Timer .

Connect the buzzer and LED at the output of the timer through the BC547 Transistor so that it can sound the alarm

Input a manual switch such that the system can be reset or deactivated after the alarm has been triggered.

Testing and Validation of System

Performance testing and reliability are performed on the prototype to ensure the correct working of the system. These include:

Touch Sensitivity test-The prototype is separated by all sorts of conductive objects, such as tools, jewellery,

and equipment and assures the reliable triggering of triggering when the touch probe is withdrawn or when the touch release returns from the home position.

Verification of Pulse Width The output pulse width is verified using an oscilloscope, so that it should be as calculated based on the expression that has been obtained for the time constant of the RC circuit. If the pulse width matches the desired before an alarm would have sounded over, then the circuit is changed.

Noise Testing Noise Immunity These samples were tested against large electrical noises to assure that the noise immunity mechanism does not raise a false alarm.

Power Consumption Measurement The power efficiency is measured by the current consumption of the system when idle and active. Meanwhile, it is also ensured that the system performs according to operation on a battery power source.

These tests are well documented. Any changes to the designs are done so as to optimize the performance of the system, and also the reliability.

4 .PCB Design and Fabrication

The Touch Released Alarm System design is intended to be transferred to the Printed Circuit Board, or PCB only if prototyping and testing are successful for much more robust and compact implementation. The process of designing a PCB consists of the following stages:

Schematic Capture: A circuit schematic is best represented by a symbol at the PCB design software for description of interconnections and compact layouts of the components.

In the placement of components, physically each component on the PCB is placed. The range of any precautions measures is taken up while placing peculiar types of different components on the PCB. The decision subsumes several factors like signal routing, thermals, and compactness of the system.

Trace Routing: There were copper traces that would connect some of the different parts of the system. They would route with concern such items as impedance matching, noise suppression, and all other design rules.

Multi-layer PCB: If the design is to provide traces while reducing interferences between signal paths, a multi-layer PCB is used according to the level of design difficulty.

Fabrication and Assembly: PCB design files are transmitted to a fabrication house to produce the PCB layout; then the manufactured PCB is placed with electronic components manually or through the ROIC of click placement soldering using a solder splash or through an SMT process.

This paper shall design and fabricate the Touch Released Alarm System through the PCB design and fabrication process and shall be designed and fabricated to be a compact, portable and reliable system to be undertaken for a number of practical applications.

5. System Integration and Validation

The last level of the implementation of Touch Released Alarm System with PCB-based implementation is the integration of the system as well as the validation of subsystems and general operation.

System Integration:

Integration is a process that involves the following steps:

PCB Mounting: The printed circuit board fabricated is connected or installed within the enclosure or housing of the relative electrical device. Kinesiologic stability and appropriate safeguarding are given.

Touch Probe Connection: It is installed on the PCB. This thus affords a good contact with the PCB while at the same time being well positioned to detect touch on the board.

Installation of Alarm Indicators: The buzzer and LED are laid over the output section of the PCB. This thus triggers a both, an audible and visible alarm.

Power Supply Integration: Incorporated in the system is the power supply in a form of a 9V battery that supplies constant and dependable power.

Manual Switch Integration: It also encompasses reset/deactivation switches within this system means that users can control the alarm function as and when they wish to.

Validation of the System

The integrated Touch Released Alarm System is well validated having depths of analysis to check its operational conformity to actual and design requirements. This validation exercise includes:

Functional Testing: This testing checks the general functioning of every component of the system for touch sensitivity together with such aspects as the alarm and reset/deactivation. Environmental Stress Testing: To provide proof for reliability, the system is subjected to different environmental constraints of temperature, humidity, and vibration. In this study therefore one will be able to establish the amount of strength and reliability of the system.

Durability testing: This includes a test with reference to physical effects and drop stress, other mechanical stress

that may be possible in the designed application are also tested.

Field Trials This is the real world application of the system at industrial facilities or security check points, in order to get feedback from the customer which would be gotten under normal operations.

All these result of the validation test are well noted and if any improvements or refinements had to be made onto the design for Touch Released Alarm System, it should have the reliability, performance and user satisfaction standard.

6. Optimization of Power Consumption and Efficiency

Since the Touch Released Alarm System is in principle intended for security and safety applications, the inherent low power is going to be the first design criterion. Low power should be on for most of the time while the system is on while using large amounts of power for a short duration, say when the alarm is on.

Power Consumption Analysis

Total power drawn by the system is calculated as follows:

$P = V \times I$

V is the supply voltage = 9 V

I is the current passing through which will be drawn by the system.

A third way to determine the total power efficiency of the system is to measure the amount of current which the system draws when it is idle and in operation. In this study, the design team will be informed on the area that may still need enhancement while at the same time knowing that the situation is okay for the functioning of the battery.

These methods have been used for the enhancement of power efficiency of Touch Released Alarm System:

Selection of components : If low power electronic component is chosen then one would have 555 Timer IC and the BC547 Transistor In this case our circuit will work normally but will consume very low power.

It also wanted to have the most favourable circuit configuration with the most desirable values of components so that it does not waste energy otherwise for some cases just through timing and output circuits.

This system also contains a smart power management algorithm which will put the system in Low power standby mode most of the time that have been configured by the unsigned, this usually happens most of the time when the system did not sense touch events. This therefore places a check on the consumption of power in general.

The system is rather efficient with a source of power in the form of a 9V battery. This guarantees that operational long runs are achieved between battery replacement or recharge.

With such types of power optimizing, the Touch Released Alarm System can indeed wave over high energy efficiency in instances of whatever portable and remote applications that it serves since battery life could indeed be very critical here.

4.RESULTS

The example of the “Touch Released Alarm System” was investigated to assess its functionality, response, and applicability for practice. The following are the findings that have been made from these tests since:

1] Operational Response:

The system was supposed to set off an alarm the moment a probe was released. The probe helped in extending the conduction throughout two parts of the circuit. When the probe was disconnected (i.e., released), the circuit sensed this change of state and triggered the visual (LED) and auditory (buzzer) alarms.

The time response which was obtained by following the timeline of release of probe, to the activation of alarm was recorded by oscilloscope. The delay time was normally less than 50ms, a factor important for security applications where feedback should be immediate.

The 555 timer IC set to AM was used to create a constant square wave signal which helped run the BB LED on blinking mode. The oscillation, which refers to the rate at which the eye blinks, was fixed at 1Hz to ensure the eye could detect it as well as ensure it was not too frequent or too slow.

The buzzer which has the BC547 transistor acting as a switch sourced a clear and sharp beep sound with frequency in the audible range between about 2-4kHz from a distance of up to twelve meters indoor.

2] Circuit Analysis and Component Interaction:

Circuit Analysis and Component Interaction:

The system relied on the interaction of several pertinent parts:

555 Timer IC: The system used the 555 timer IC to generate the timing signal that blinks the LED. Since a medium time constant in the order of one second was required for each blink, appropriate capacitors were chosen as 10 μF and appropriate resistors as 10kΩ and 47kΩ.

BC547 Transistor: This is an NPN BJT used as an amplifier and switch in this circuit. Each time the probe was launched, the signal light on the 555 timer IC connected the base of the BC547 and enough current flowed through the collector emitter junction to power the buzzer and the LED.
Buzzer and LED: Both component were fed in parallel with BC 547 transistor output. The buzzer needed about 20 mA to function while the LED needed roughly about 10 mA. The presence of roughly about 10 mA that passes through the selector current limiting resistor in series with the LED allowed the modulator to vary the intensity of the LED without overloading the component.

3] Power Requirements:

The two conditions were hooked to the probe and the alarm going (probe detached). The system was assessed in general terms for power consumption under these two conditions. Quiescent Current: The power draw set was similarly low, especially below 2 mA, in the quiescent state. This was mainly because of the design of the circuit as it was made to draw little current in case the probe was touching the surface of its host and the high surface currents flowing through it.

Alarm State: The power utilization in this state was close to 50 mA. This is counting in the amount of current consumed for the LED and buzzer at that point. It ran by 9v battery and I discover that such battery would offer its enough capacity which would make it allow the system to operate for a longer period of time up to 6 hours of alarm on-off cycling.

Table 1. Observation Table

Components	Operating Voltage	Operating Current
Ne 555 Timer IC	8.5v	4 mA
Red LED	1.8v	30 mA
Buzzer	4.5v	25 mA

5. CONCLUSION

A touch release alarm system is an innovative project in terms of automation and security. The main theme of the system is its ability to detect the touch and also trigger the alarm with accuracy which can be used in various security systems. The human touch works as the trigger here , hence needing minimum intervention , providing convenience and also maintaining high security levels. From giving safety to personal belongings like various electronic items or providing security to unauthorised lands, this device has several use cases. The main advantage of the touch release alarm system is its ease of use and simple structure. No complicated structure is required as the system solely depends on human touch which is a great advantage. No passwords and physical keys are required for its working making it easy to use. All age groups can benefit from this security system, hence explaining its simplicity. This simplicity also comes with a minimal design, which can be integrated with any product easily without any issues.

For a technical view, the touch release alarm system detects when a human hand or object touches or loses contact with the system and triggers according to the situation , therefore, ensuring immediate and reliable response from the sensor and making the system highly recommended in real-time security applications.

REFERENCE

[1]. Adamu Murtala Zungeru, Jonathan Gana Kolo,Ijarotimi Olumide, “A Simple And Reliable Touch sensetive security system”(2023).

[2]. Aniket Mondal, Samrat Saha, Santanu Dey, “Bluetooth Controlled Security Alarm System” (2023).

[3]. Muhammad Usman,Nazar Abbas, “On the Application of IoT for security industrial Threats”(2023).

[4]. Sharma, P. & Yadav, N.: “Touch-Released Alarm Systems for Smart Home Security Using 555 Timer IC”(2020).

[5]. Iqbal, M. & Fernandez, R.: “Advanced Touch Sensing Technology Coupled With 555 Timer IC For Reliably Secure Security Systems”(2021).

[6]. Johnson, K. : “Bistable 555 Timer Configurations in Touch-Released Alarms: A Comparative Study”(2022).

[7]. Singh, R., & Patel, A.: “Energy-Efficient Touch-Released Alarm Systems Using 555 Timer IC for Portable Applications.”(2022).

[8]. Kumar and S. Reddy, "Design of Low Cost Touch Release Alarm Systems for Rural Security using 555 Timer IC,"(2023).

[9]. Ali, M. & Gupta, V. "Noise-Resistant Touch-Released Alarms Using 555 Timer IC and Filtering Techniques.” (2023)

[10]. Lee J, Park S.: “Wireless integration of touch-released alarm systems with 555 timer for IoT applications.”(2024).

[11]. Rao, D. & Nair, M. : “Touch sensitivity alarm security using 555 timer IC and developed probes.”(2024).
[12]. Hassan S. & Khan, F.: “Analog Security Systems: the case of touch-based triggers with 555 timer IC”(2021).
[13]. Mehta, K. & Jain, D.: “Development of Touch Sensitive Alarms for Industrial Safety Using 555 Timer IC”(2021).
[14]. Nguyen, P. & Lee, T.: “Multi-Touch Released Alarm System with 555 Timer IC for Enhanced Home Security.”(2022).
[15]. Chakraborty, & P. Singh.: “Capacitive Touch Sensor with 555 Timer for Next Generation Alarm Systems.”(2023).
[16]. D. P. Deshmukh and S. Rao, "Low Power Security Alarms Using 555 Timer IC for Smart Wearable Devices," vol. 10, no. 12, pp. 12018-12024, Dec. 2023, Doi: 10.1109/ACCESS.2023.7022866.
[17]. Bose, A. & Verma, A.: “Car Alarm System by Using 555 Timer IC and RF Communication for Touch Liberation Alarm-Bose and Verma designed a touch released car alarm system by using 555 timer IC along with RF modules in the vehicle”(2023).
[18]. Ramirez, C. & Silva, F. :“Hybrid Analog-Digital Touch-Released Alarm System with 555 Timer and Microcontroller Integration” (2024).
[19]. Fujimoto, T. & Sato, Y. : “AI-Based Alarm Systems with 555 Timer IC for Touch-Released Triggers in Smart Homes”(2024).