

IMPLEMENTATION OF CMOS NAND GATE CIRCUIT FOR ANTI THEFT APPLICATIONS

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Abstract:

As people are mostly worried of loosing their belongings, so we have come up with a project named implementation of cmos nand gate circuit. To guard our belongings we usually lock our belongings through the old methods with the help of lock and chain. To overcome the fear of theft, here is an easy circuit which is based on the NAND gate. Another application of this security alarm system is, you can use in your home for the security from the theft. In this circuit, when someone tries to lift your belongings, it will generate a warning alarm which is very much helpful during your travel in the bus or train even at the night time as it can also produces buzzer indication attached to the relay. Here we are using IC-CD4011, resistors, capacitors. As the basic work of NAND gate when the two inputs are low the output gets high. In this way as if someone lifts the belongings away the alarm raises to intimate us.

Keywords: Nandgate, cmos nand, relay, warning alarm.

1. Introduction:

This paper is made for the purpose of the security while travelling by train or bus, generally our luggage is locked using a typical chain-and-lock arrangement. Number of incidence of theft and robbery has increased to a greater extent and it's a serious offense. The only way to stop this is by alert people with proper certificate arrangements. We have seen people footstep ahead for protection, the use of chains, locks as security arrangements to secure their luggage. This might be a nice try, but still it is not sufficient to reassure ourselves that we are in safe hands, our holding is in safe zone. Locks and chains can be easily recess and our effort for safety goes in vain. And, therefore to reassure ourselves here we have presented a simple alarm circuit to alert us from such situation when somebody tries to cut the chain.

During our journey through train and bus, we carry many important things and all the time we have fear that someone might lift our luggage. So to protect our baggage, we normally lock our baggage through old ways by the help of chain and lock. After all locks, we still remain in fear that someone may slash the chain and take away our valuable material. To overcome with these fear, here is an easy circuit which is based on the NAND gate. In this circuit, when someone tries to lift your luggage, it will generate a warning alarm which is very much helpful during your travel in the bus or train even at the night time as it can also produces audio visual indication. Another application of this circuit is that you can employ these into your house so to avoid the attempt of robbery in your house with the help of this alarm circuit.

2. Problem Statement:

As everyone has a fear of guarding their belongings. They are helpless in travelling or at home. Sometimes we are not able to look after our belongings. To overcome that fear here is a simple circuit. During our journey through train or bus, we carry many important things and all the time we have fear that someone might lift our things.

3. Block Diagram:

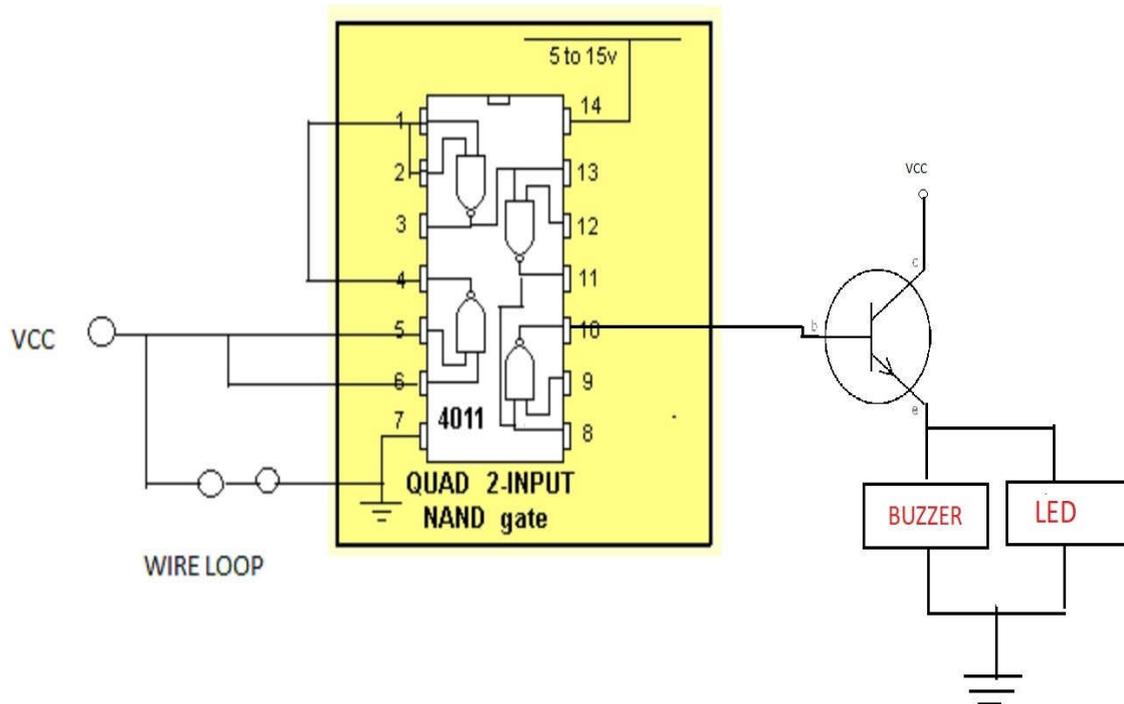


Figure 1: Block Diagram

4 Truth Table:

Input		Output
A	B	$Y = \overline{A \cdot B}$
0	0	1
0	1	1
1	0	1
1	1	0

Figure 2 : Truth table

5 Working:

The basic building block of this circuit is CD4011 along with some other components viz. resistors, capacitor along with transistor which is used to save your important things from robbery with the help of this easy circuit. It produces a warning beep, when someone tries to unlock the lock as an effect of its wire loop will split and alarm is produced. To get familiar with the working, you should get aware with the NAND gate truth table. When any of the input states or both the input states go to the low state in the NAND gate, then the output will be high and if both the inputs are at high state, then the output will be low in that case.

CD4011 is the mainly used CMOS (Complementary Metal Oxide Semiconductor) chip. It arrives in a Dual Inline Package (DIP) of 14 pin. There is a small notch present on the chip at one of the corner which is recognized as pin 1. In a single chip, it is a group of 4 NAND Gate which are independent of each other. Each gate is a three terminal device with 2 terminals for the input purpose and one is for the output purpose. 5V to 16V is the working voltage range of the IC. Approximately 10Ma of current at 12 V is been deliver by the IC which can be trim down with the reduction of the power supply voltage.

Functioning of these circuits is very easy when we will receive; output is based on the voltage on pin 5. At the time when power supply is attached to the circuit pin 5, voltage is at zero as loop is unbroken. Hence at pin 4, voltage is high which is coupled with pin1 and pin 2 which is also at high state. As you can also find from the truth table of the NAND gate that if both the inputs are at high state, then the output is low hence at the pin 3 of gate 1, we get low which is once more attached to pin 12 as well as 13 moving them also to the low which in turn makes the pin 11 to switch at high switching pin 8 as well as pin 9 also at high and low voltage at pin 10 due to this transistor linked to it via a resistor will not boost the base of it and the alarm will not receive by us. This implies that our property is secure.

Similarly, when the loop is broken, the voltage at pins 5 and 6 are connected to the VDD. From the truth table of NAND gate, when the inputs are high the output is low. Thus makes the output at pin 4 low. This low output is given as input to pin 1 and 2 which makes the output high which is further given as input to the 12 and 13 pins which gives again produces a low output. This low output is finally given to pin 8 and 9 which gives a high output. This high output will bring the transistor into ON state and simultaneously rings a buzzer which implies that the property is being accessed.

6 Results:

When the wire loop is connected the final output of the NAND gate is low which is given to the input of transistor and the transistor will be in off state and therefore the buzzer does not ring which implies that the property is safe. Now, when the wire loop is broken the final output of the NAND gate is high which is given to the input of transistor and the transistor will be in on state and therefore the buzzer will ring which implies that the property is being access.

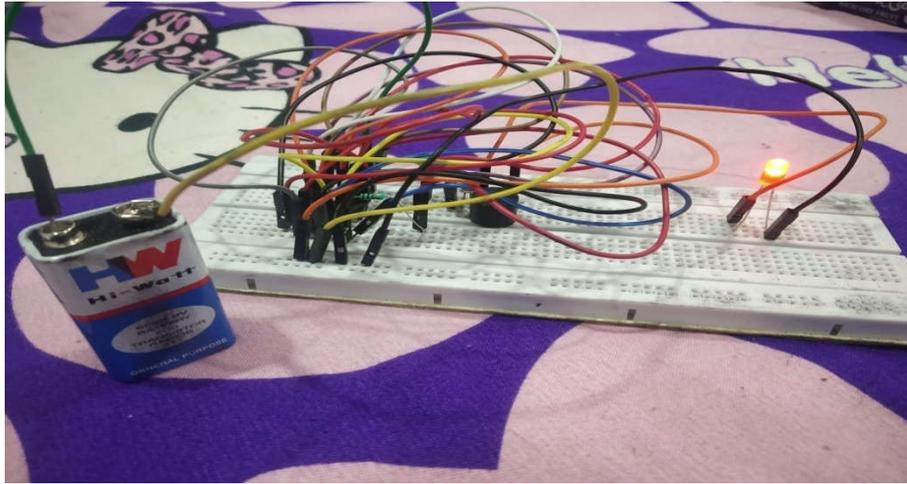


Figure 3: output result

7 Conclusions & Future scope:

Finally, when the wire loop got removed buzzer rises a sound which is identified by the person. When someone attempt to take your baggage then the loop attached to it broken down. At the time loop break down, pin 5 as well as pin 6 shift to high and just opposite work will take place which we will explained above due to which pin 10 reaches to high state and transistor begin its conduction and alarm is receive by us. And the alarm will not stop till the time we once again interact with the loop. So when this happens we will in alert to secure our baggage or any items. This is a method or a way to secure our belongings.

We can add a camera to the circuit which we are using. So that when the wire loop is broken then camera reacts to it and clicks a picture and send it to the user by GPS. As here we can also connect a GPS tracker to our belongings. So that he can identify/recognize the person as fast as he can. If it is implemented, then there is a benefit that person cannot lose his belongings. So that he can leave his luggage freely.

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