LAND PHONE LOCKER USING DTMF TECHNOLOGY

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ABSTRACT

Land Phone Locker Using DTMF Technology is designed for the necessity of limiting the unauthorized outgoing calls from a land phone. Even though the physical lockers can lock the dial pad, the people who use the phone frequently can find any alternative for unlocking the pad lock. This circuit contains a software programmed microcontroller to identify the password to unlock the telephone. This circuit is designed for making calls only for the people who know the password. This is not affected for the incoming calls.

Keywords: *Dual Tone Multi Frequency, MT8870, 16F628 microcontroller, password verification, unlocking the telephone*

1.0 INTRODUCTION

Telephones are misused by unauthorized people for unessential calls and criminal purposes. Locking the land phone for outgoing calls is essential for these circumstances. A telephone which is not locked can be used by everyone. In a house it can be used by children, each family member, visitors, servants, unauthorized people and everyone. In an office staff can make calls without any limitations. In these cases parents and employers want to control these unwanted outgoing calls. Then they can use a physical lock which covers the dial pad as well as a programmable lock which cannot be directly seen as a locker. If we use a physical locker, the caller may know that and try to remove that hardware. If we use a programmable lock we can trickily trap the unauthorized people make calls from that telephone. In this project, a programmable locker for the land phone was introduced. The technology used for the circuit designing is DTMF (Dual Tone Multi Frequency) technology.From the studies, the locker was designed by programming the 16F628 microcontroller to block the dial tone unless dial the correct password. If the password is correctly dialed, permit to have the current call only.

2.0 EXPERIMENTAL

Pins 7 and 8 of MT8870 are connected to a 3.579545 MHz oscillator/crystal. Pins 1 through 3 are for the op-amp inside of the MT8870 chip. The configuration has a gain of

about 150k/56k = 2.6786 V/V. The amplified signal gets passed through a "Dial Tone Filter" to separate the two frequencies into a high frequency and a low frequency. To calculate the specific frequencies the number of zero crossings are counted for a specific span of time, which is one of the reasons that the oscillator is needed. The two diodes, D5 and D6, are a limiter circuit which protects the chip from large voltage swings. C1 and C2 are decoupling capacitors. Pin 4 outputs the reference voltage which is nominally $V_{DD}/2$. EST (pin 16) is a logic one when a valid tone pair (number) is detected and returns low when the signal stops. This is connected to the steering input (pin 17) so that the new tone pair is registered and the output latch (Q1-4) is updated. When the voltage at pin 17 falls below V_{TSt}, the device is ready to accept a new tone pair. This amount of time is simply an RC time constant determined by R17 and C4. Pin 17 also acts as an output (GT) which resets the time constant whenever necessary. When the latch is updated and a new number is stored, STD (delayed steering, pin 15) goes high and returns to logic low when the voltage on St/GT falls below V_{TSt}. TOE (pin 10) enables the output pins 11-14 and is pulled up internally. Pin 5 inhibits the recognition of the tones for A, B, C and D[1].

When the subscriber off hooks the receiver of the telephone, it has only the power. Dial tone does not appear. The program has a password of four digits. If only the first digit of the password is correct allows the user to dial the second digit. Otherwise should start from the beginning. If all the digits of the password is correct, gets the dial tone and can make the call.

3.0 RESULTS AND DISCUSSION

The telephone could be unlocked only after dialing the password. Once the password is dialed correctly, it is only valid for the current call. When the password is correct, dial tone appeared and gave a signal to the user to dial the telephone number to be called. Incoming calls didn't have any effect from this. Authorized subscribers can only make the calls and can minimize the telephone bill and prevents the misusing of the telephone. Since the circuit design is cost effective, light in weight and small in volume purchasing, installation and usage is easy.

To test the password verification circuit we connected switches to the input of the PIC to simulate the outputs from the DTMF decoder. Then we attached LEDs to output pins so that we could see what was stored in memory and make sure that the numbers we entered

were being stored correctly. Then we had an LED light up when the numbers entered matched the password stored in memory. The drawbacks of the designed circuit are not very much user friendly, cannot make calls even for emergency numbers and danger of bypassing the circuit between the rosette and the telephone.

When the subscriber off hooks the receiver of the telephone, it has only the power. Dial tone does not appear. The program has a password of four digits. If only the first digit of the password is correct allows the user to dial the second digit. Otherwise should start from the beginning. If only the second digit of the password is correct allows the user to dial the third digit. Otherwise should start from the beginning. If only the third digit of the password is correct allows the user to dial the forth digit. Otherwise should start from the beginning. If only the fourth digit of the password is correct the subscriber can get the dial tone. Otherwise should start from the beginning.

When the password is correct and gets the dial tone, subscriber gets a signal after some seconds to inform that to dial the phone number which should be called in10 digits. For the demonstration purposes this is designed only for a call of few seconds and then it will be automatically cut and then the above process should be repeated.

4.0 CONCLUSION

The land phone locker using DTMF technology was designed based on unlocking the telephone by using a password. It has given an automatic locking time by the program by a delay to demonstrate the circuit.This circuit design doesn't have any connection with the service provider when this is available at the market, anyone can purchase and install the circuit equipments following the given guidelines.

ACKNOWLEDGEMENT

REFERENCES

[1]. DTMF based door locking system