

**Higher Technical Institute  
ELECTRICAL ENGINEERING DEPARTMENT**

**DIPLOMA PROJECT**

**HOME SECURITY SYSTEM**

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**JUNE 1999**

HIGHER TECHNICAL INSTITUTE  
NICOSIA – CYPRUS

# HOME SECURITY SYSTEM

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E 1198

Academic Year 1998/1999

HIGHER  
TECHNICAL  
INSTITUTE

PROJECT NO.  
2994

# Contents

## Introduction

1. The intruder or Burglar alarm.....	1
2. Main parts of an intruder alarm system.....	2
a. Main Control Unit	
b. Sensors	
c. Warning devices	
3. Wireless Systems.....	8

## Description and initialization details of the chips used

1. Proposed System	
a. Block Diagram.....	9a
b. Description .....	9b
2. The 8259 Programmable Interrupt Controller.....	10
3. HD47804 Dot Matrix LCD controller/driver.....	12
4. The 8279 keyboard/Display Controller.....	15
5. The 8255 Programmable Peripheral Interface.....	20

## **Programming and operation of the system**

1. Operation of the Hardware.....	23
2. Initialization of the hardware (Assembly Coding).....	26
i. HD44780U Dot Matrix Liquid Crystal Display Controller/Driver	
ii. The 8279 Keyboard/Display Controller	
iii. The 8259A Programmable Interrupt Controller	
iv. The 8255 Programmable Peripheral Interface	
3. Main Program.....	29
4. Test Done.....	37
5. Conclusions.....	38

## Introduction

The increasing crime in every country is mostly due to the intrusion of burglars in either domestic commercial or industrial buildings. The intruder may be an individual who seeks valuable things and who follows more or less common procedures to enter a building. In other cases, the intrusion may be done on an organised manner with professional participation which may be able to break and by-pass many sophisticated burglar alarms.

### 1. The intruder or burglar Alarm

There are various types of security systems that their aims are to:

- i. Discourage the intruder to break in
- ii. Give an early warning alarm before the intruder gets in the building
- iii. Give warning alarm when the intruder has entered the building after overcoming other alarm circuits
- iv. Give warning if precious items are removed from their position

The design and contraction of the intruder alarm system is often so complicated and sophisticated as to ensure reliance in case of the system being overcome. As intruders have managed to de-activate a system, the manufacturers seek for new approaches which are always more and more complex.

These solutions are usually kept as top secrets of the company and so no specific information are released concerning the construction and internal operation of the systems. Neither the technical operation of the detectors nor any other characteristics are released to everybody for obvious reasons.

## 2. Main parts of a security system

- a) Main Control Unit
- b) Sensors
- c) Warning Devices

### a. Main Control Unit

The primary part, "brain" of an Intruder Alarm System is the Main Control Unit. The MCU that is a CPU based electronic device that accepts signal from various detectors and gives signal for a siren to go off or informs a predefined person (i.e. the police) through a modem. Usually the control unit is a multifunction adapter that allows except from the supervision, arming, disarming and programming of the system. The control panel is in a metal box to protect the electronics and is often out of sight.

### b. Sensors

The sensors are the most sensitive elements used for the detection. The detectors usually have Normally Open (NO) and Normally Close (NC) contacts, which enables them to be connected in series or in parallel and in every case the circuits are continuously monitored for a malfunction or external unauthorized influence.

The sensors detect signals due to the presence or action of the intruder and they are of the following types:

- Microwave Doppler detectors
- Ultrasonic Doppler detectors
- Standing wave Ultrasonic detectors
- Acoustic Detectors
- Passive Infrared detector
- Pressure Deferential detectors
- Capacity Volume detectors
- Vibration detectors
- Beam Interrupt detectors
- Capacity Proximity detectors
- Glass Breaking detectors
- Seismic detectors

Most of those incorporate additionally an anti-tamper device, which gives alarm if someone tries to destroy a detector. The next section is a brief explanation on how some of the most common types of detectors and sensors operate.