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AUTOMATED INTRUSION MONITORING SYSTEM

Mohamad Asrul bin Ahmad Siaman

BEKC

July 2009

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"I hereby declared that I have read through this report and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Control, Instrumentation, & Automation)"

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Date : 9/7/2009.

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AUTOMATED INTRUSION MONITORING SYSTEM

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This Report Is Submitted In Partial Fulfillment of Requirements For The Degree of

Bachelor in Electrical Engineering (Control, Instrumentation, & Automation)

Fakulti Kejuruteraan Elektrik

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JUNE 2009

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"I hereby declared that this report is a result of my own work except for the excerpts that have been cited clearly in the references."

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ABSTRAK

Projek ini direka bertujuan untuk memperbaiki sistem keselamatan yang sedia ada dan juga untuk membantu mengurangkan kadar kes-kes jenayah seperti pencerobohan, kecurian dan sebagainya. Projek ini melibatkan penggabungan antara perisian dan perkakasan. Perisian yang digunakan adalah M-File yang dihasilkan dengan menggunakan perisian MATLAB. Perkakasan yang terlibat adalah seperti pengesan, camera dan sistem penggera. Sistem ini akan dikawal oleh perisian. Bagaimanapun, sistem ini akan dimulakan melalui perkakasan dengan pengesan yang mengesan sebarang pencerobohan. Isyarat akan dihantar kepada perisian dan langkah yang berikutnya akan berlaku mengikut sistem yang telah ditetapkan. Jika penceroboh berjaya melepaskan diri daripada tangkapan pengawal keselamatan, sistem ini mempunyai bukti untuk menangkap penceroboh tersebut.

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ABSTRACT

The project is designed to improve the already security system and also to help our country to reduce the rate of crime such as invasion, theft and so on. The project is need to interface interact between software and hardware. M-File is used where it is produce by MATLAB software. The hardware that include in this project is sensor, camera and alarm system. The system will controlled by software. However, the system will begin from hardware when the sensor senses any invasion. A signal will send to software and the next step will happened base on the system setup. If the invader escaped from security guard, the system still has an evidence to catch him.

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CHAPTER I

PROJECT BACKGROUND

1.1 Introduction

Security system is the theme of this project because it has a link between human and personal or prohibition areas. This project was designed based on software and hardware. Software is the major part in this project and hardware is the minor part. MATLAB programming is software that used to control the operation system. By using the tools and components, any programming can be created to form a system. In addition, MATLAB can interface with others equipment or hardware. Thus, a system will operate base on the programming that human designed.

In general, this project is about a snapshot of image when an intrusion is happened and the intruder image displayed on a monitor. The system is completed by alarm system where it will give a signal to security guard or owner house when there was an intrusion. If the intruder or burglar was escaped from security guard, the intruder can be caught because his picture is in security system. That is the evident to catch the intruder.

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1.2 Problem Statement

Nowadays, there are many crimes happened. Sometimes it happened in building and sometimes outdoor. Intrusion is one of the crimes that need to be avoiding together. Normally, the crime is happened at night when peoples sleeping or they are not in their house. House especially bungalow and also prohibition areas (at night) such as museum, bank, office and etc need a security system. So, the owner use human to guard the prohibition areas or house. Furthermore, there are many security companies that organize to protect any places from invasion. It looks like an efficient effort.

However, there are many weaknesses when the security system is human only because sometime human make mistakes. For example, if a place was guarded by one security guard, a lot of problem will come because he will tire early. At the same time, he feel bored because do the job alone. Sometime he is not doing the job well. So, we need to design a security system by using some equipment to help human to do this job more efficient.

1.3 Project Objective

The project has two objectives that need to achieve. The first objective is to develop the security system in any areas. Security guards are needed to help to increase or develop the security system level. At lease, the project can help in reducing the criminal index because the crime was caught by police based on the image that the camera snapped.

The second objective is to study the interfacing interact between software and hardware. The project will be controlled by software program and the hardware part

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will be active based on the setting in software programming. MATLAB programming is the software that used to control the project.

1.4 Project Scope

The scope of this project is the detection of sensor towards human (invasion). It is important because the operation of the system will begin when the sensor sense an invasion. The sensor should be placed at the strategic point to ensure that burglars or intruders do not know about the sensor.

The other scope is capturing image. Camera will snap some picture to make it as reference and evident. The camera also placed at strategic point to get the best captured image. The entire image will be saved in the MATLAB data base.

All of the operation system must be setup in the software. Thus, interfacing between software and hardware is very important to make sure the system can be operated.

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CHAPTER II

LITERITURE REVIEW

2.1 Overview

This chapter will discuss about source or article that related to the project. There have many sources or researches done before and from there, details about this project are known and can understand briefly.

2.2 Normal Alarm System

Most of the alarm system that installs in house area or prohibition areas has a siren box. The system will begin when the sensor detect an invasion. Then the siren will activate. Normally, the external siren box will enhance the sound level until 120 decibel (dB) to alert others. So, peoples know that someone was entered their area without permission. Peoples or security guard will try to catch the intruder.

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However, sometimes the intruder escaped because of the siren sound. And the other times, the intruder will try to find the other way to bum the area to get the valuables.

The simplest type of burglar alarm control contains a single relay. For this kind of alarm system, the sensor circuits hold the relay energized. The relay contactor will change to close when the relay energized. Thus, the type of relay used is normally open. The system is also used normally close relay because the relay is restores when the contact closed and energized before the contact is open. This relay is used to operate the bell or siren.

The system is disarmed by a key operated shunt which forces the relay to energize, and armed by closing all traps and open the shunt. While the system is operate, the single relay control incorporates all dual relay design are still widely used in standalone applications which powered by lead acid batteries.

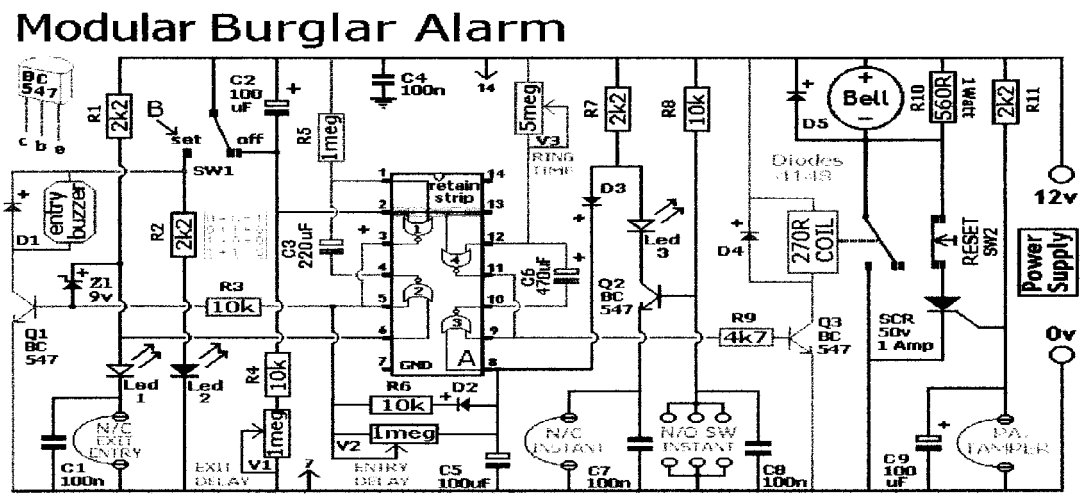

Figure 2.1: Example of alarm system circuit [4]

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2.3 MATLAB

MATLAB® is a high-level language and interactive environment that enables you to perform computationally intensive tasks faster than with traditional programming languages such as C, C++, and FORTRAN. [1]

MATLAB program can use to plot function, matrix manipulation, implementation of algorithms and interface with other programs. This program can be used to solve many problems by following the truth methods. Graph can be form also. Furthermore, the stabilization of system also can be checked by using MATLAB program. Oscillation, damping, ramp and many more can be determine from this program. Matrix problem also can be solving. Thus, MATLAB is a program that can be used to solve some problem, create a system and etc.

MATLAB application is built around the language. The easiest way how to run the MATLAB code is to type it in at the prompt (>>) in the command window. Command window is one of the elements of the MATLAB Desktop. Sequence of commands can be saved in a text file. Any changes of the command can be done in the test file.

2.3.1 Variables

For variables, it can be defined with the assignment operator (=). In MATLAB, variable can be assigned without defining their type except it is not a symbolic objects and the type that can change. Values can come from constants from computation involving values of other variables, or from the output of a function. [2] For example:

```
>> x = 17
x =
 17
```

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```
>> x = 'hat'
x =
hat
>> x = [3*4, pi/2]
x =
   12.0000    1.5708
>> y = 3*sin(x)
y =
   -1.6097    3.0000
```

2.3.2 Vectors or Matrices

MATLAB is a Matrix Laboratory and it can provide many suitable methods for creating vectors, matrices, and multi-dimensional arrays. In MATLAB vernacular, a vector refers to a dimensional (1*N or N*1) matrix. Normally, a matrix is refers to a 2 dimensional array. When array is more than two dimensions, it is referred as multidimensional arrays. Example:

```
>> array = 1:2:9
array =
 1 3 5 7 9
```

Matrices can be defined by separating the elements of a row with blank space or comma and using a semicolon to terminate each row. The list of elements should be surrounded by

- square brackets: [ ]
- parentheses: ( ) -used to access elements and sub arrays

example:

```
>> A = [16 3 2 13; 5 10 11 8; 9 6 7 12; 4 15 14 1]
A =
 16  3  2 13
  5 10 11  8
  9  6  7 12
  4 15 14  1

>> A(2,3)
ans =
 11
```

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2.3.3 Semicolon

In MATLAB program, semicolon is used to suppress the output of the line that it includes [2]. Result of a statement will be display if the statement is not terminating with semicolon. Sometimes, semicolon is not necessary because the statement is not for any value. Example: clc. Additionally, a semicolon may be used within a vector or matrix declaration in order to separate rows.

2.3.4 Graphic

MATLAB can be used to plot a graph either 2 dimensions or 3 dimensions.

2.3.5 Interaction with Other Languages

MATLAB can call functions and subroutines written in the C programming language or Fortran. A wrapper function is created allowing MATLAB data types to be passed and returned. The dynamically loadable object files created by compiling such functions are termed "MEX-files" (for Matlab EXecutable). [2]

Libraries written in Java, ActiveX or Net can be directly called from MATLAB and many MATLAB libraries are implemented as wrappers around Java or ActiveX libraries. Calling MATLAB from Java is more complicated, but can be done with MATLAB extension, which is sold separately by Math Works. Through the MATLAB Toolbox for Maple, MATLAB commands can be called from within the Maple Computer Algebra System, and vice versa.

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2.4 RS 232

Figure 2.2: RS 232

In telecommunications, RS-232 (Recommended Standard 232) is a standard for serial binary data signals connecting between a *DTE* (Data Terminal Equipment) and a *DCE* (Data Circuit-terminating Equipment). It is commonly used in computer serial ports. A similar ITU-T standard is V.24.

RS-232 devices may be classified as Data Terminal Equipment (DTE) or Data Communications Equipment (DCE); this defines at each device which wires will be sending and receiving each signal. The standard recommended but did not make mandatory the D-subminiature 25 pin connector. In general and according to the standard, terminals and computers have male connectors with DTE pin functions, and modems have female connectors with DCE pin functions.

Other devices may have any combination of connector gender and pin definitions. Many terminals were manufactured with female terminals but were sold with a cable with male connectors at each end; the terminal with its cable satisfied the recommendations in the standard. Presence of a 25 pin D-sub connector does not necessarily indicate an RS-232-C compliant interface.

For example, on the original IBM PC, a male D-sub was an RS-232-C DTE port (with a non-standard current loop interface on reserved pins), but the female D-sub connector was used for a parallel Centronics printer port. Some personal computers put non-standard voltages or signals on some pins of their serial ports.

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The standard specifies 20 different signal connections. Since most devices use only a few signals, smaller connectors can often be used. For example, the 9 pin DB-9 connector was used by most IBM-compatible PCs since the IBM PC AT, and has been standardized as TIA-574. More recently, modular connectors have been used. Most common are 8P8C connectors. Standard EIA/TIA 561 specifies a pin assignment, but the "Yost Serial Device Wiring Standard" invented by Dave Yost (and popularized by the Unix System Administration Handbook) is common on Unix computers and newer devices from Cisco Systems.

Many devices don't use either of these standards. 10P10C connectors can be found on some devices as well. Digital Equipment Corporation defined their own DECconnect connection system which was based on the Modified Modular Jack connector. This is a 6 pin modular jack where the key is offset from the center position. As with the Yost standard, DECconnect uses a symmetrical pin layout which enables the direct connection between two DTEs. Another common connector is the DH10 header connector common on motherboards and add-in cards which are usually converted via a cable to the more standard 9 pin DB-9 connector (and frequently mounted on a free slot plate or other part of the housing).

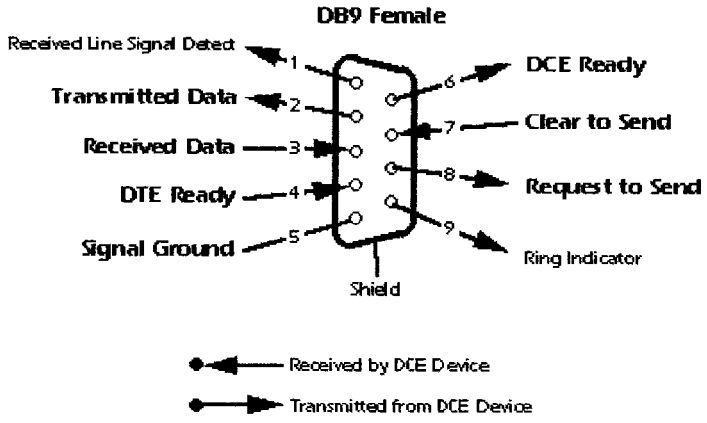

Figure 2.3: Signal definition for the DCE device

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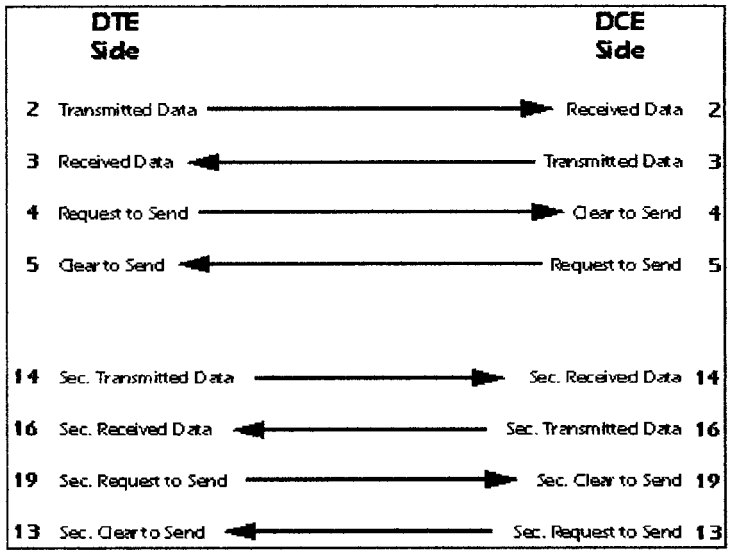

Figure 2.4: List of the conventional usage of signal names

2.5 Max 232

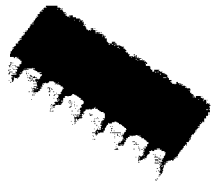

Figure 2.5: Max 232 chip

The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

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