

CABLE THEFT MONITORING SYSTEM USING GSM MODEM (CTMS)

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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : CABLE THEFT MONITORING SYSTEM USING GSM MODEM (CTMS)

Sesi Pengajian :

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Special dedicated to my beloved family, lecturer, friend and those people who have guided and inspired me throughout my journey of education.

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ABSTRACT

This project is about cable theft monitoring system using GSM modem (CTMS) using programmable interface controller (PIC) microcontroller system, voltage divider, temperature sensor and several other devices. The main problem is cable theft activity is always happen although lot of methods have been developed by Telekom Malaysia to solve and reduce cable case theft such as cable theft prevention campaigns at the national level among the community, organizing security patrols, wiping grease on telecom poles, replacing existing cable with fiber cables and I-Watch System installation. The objective of this project is to design and develop a cable theft monitoring system using GSM Modem (CTMS). It is a low cost system. The output of this system can be divided into two parts which are display mode and message mode. For display mode, liquid crystal display (LCD) is used to display the percentages of voltage and circuit temperature. For message mode, the microcontroller activate the GSM module and GSM send alarm messages when the cable is cut and send back messages when the cable is in normal condition. For the temperature changes, temperature sensor is function when the circuit box temperature is more than 40°C and GSM also send alarm messages. The microcontroller is operating when sensor detects the voltage drop on cable from two roads either Jln Bendahara-Jln Teluk Piah Kanan or Jln Tgh Masjid- Jln Tebuk Sri Makmur. The two roads are referring to the either one road that the occurrence of cable theft or both of the road. The percentages of voltage drop and temperature changes is displayed on the LCD display. Advantages of this project are low cost, easy to manage and can reduce cable theft cases.

ABSTRAK

Projek ini bertujuan menghasilkan satu sistem pemantauan kabel curi menggunakan GSM modem (CTMS) dengan menggunakan sistem pengawal mikro (PIC), pembahagi voltan, sensor suhu dan beberapa peranti lain. Masalah utama adalah aktiviti kecurian kabel sentiasa berlaku walaupun banyak kaedah telah dibangunkan oleh Telekom Malaysia untuk menyelesaikan dan mengurangkan kecurian kes kabel seperti kempen pencegahan kecurian kabel di peringkat kebangsaan di kalangan masyarakat, membuat rondaan keselamatan, menyapu minyak gris pada tiang telekom, menggantikan kabel sedia ada dengan kabel gentian optik dan pemasangan system I-Watch. Objektif projek ini adalah untuk mereka bentuk dan membangunkan sistem pemantauan kabel curi menggunakan GSM modem (CTMS). Ia adalah sistem kos yang rendah dan berkesan. Keluaran sistem ini boleh dibahagikan kepada dua bahagian iaitu mod paparan dan mod mesej. Bagi mod paparan, paparan kristal cecair (LCD) digunakan untuk memaparkan peratusan voltan dan suhu litar. Bagi mod mesej, pengawal mikro mengaktifkan modul GSM dan GSM menghantar mesej penggera apabila kabel dipotong dan menghantar kembali mesej apabila kabel adalah dalam keadaan biasa. Bagi perubahan suhu, sensor suhu berfungsi apabila suhu litar sistem adalah lebih daripada 40°C dan GSM juga menghantar mesej penggera. Mikropengawal sedang beroperasi apabila sensor mengesan kejatuhan voltan pada kabel dari dua jalan sama ada Jln Bendahara-Jln Teluk Piah Kanan atau Jln tgh Masjid-Jln Tebuk Sri Makmur. Dua jalan adalah merujuk kepada salah satu jalan yang berlakunya kecurian kabel atau kedua-dua jalan. Peratusan penurunan voltan dan suhu perubahan dipaparkan pada paparan LCD. Kelebihan projek ini adalah kos rendah, mudah untuk mengurus dan boleh mengurangkan kes-kes kecurian kabel.

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LIST OF ABBREVIATIONS

RM	- Ringgit Malaysia
TM	- Telekom Malaysia
PDRM	- Polis DiRaja Malaysia
GSM	- Global System for Mobile Communications
LCD	- Liquid-Crystal Display
PIC	- Peripheral Interface Controller
CPU	- Central Processing Unit
IMEI	- International Mobile Equipment Identity
CCS	- Code Compose Studio
	- Bulletin Board Systems
BBS	- Volt
V	- Input/output
IO	- Read/Write
R/W	

CHAPTER 1

INTRODUCTION

This chapter consists of six parts which are introduction, problem statement, objective, scope of work, significant of study and chapter organizations.

1.1 Introduction

Nowadays, telecom cable thefts have been increased in Malaysia. Losses year by year incurred by Telekom Malaysia Company were so great and it was spend about millions of dollars each year up to RM42 million in 2012 [1]. Various methods have been applied by Telekom Malaysia to overcome this problem such as cable theft prevention campaigns at the national level among the community [2], organizing security patrols [1], wiping grease on telecom poles [1], I-Watch (An Anti- Theft Cable Detection and Escalation System) installation [3], and replacement of existing cable to fiber cables [4]. As part of the campaign, TM has begun communicating the community service messages through print media, electronic media (TV and radio), outdoor and online media [2]. For the security, TM is collaborating with PDRM, the local authorities, the other telecommunication company and utilities providers as these are the key stakeholders in mitigating the

cable theft issue [2]. TM seeks the cooperation from all parties especially from local community and members of the public in ensuring the communication facilities provided are preserved and protected from any undesired incident such as cable theft, vandalism and any incident which results in interruption of telecommunication services [2]. In order to reduce the number of cable theft cases, an alarm system developed by Telekom Malaysia (TM) is introduced which is Anti- Theft Cable Detection and Escalation System (I-Watch). I-Watch is a system which alerts telecom's operatives when the thieves attempt to cut a cable, and it also informs the security guard exactly where the incident is happening [1]. All efforts have been undertaken to reduce the rate of cables loss but cable theft activity is always happen. In this project, a cable theft monitoring system using GSM modem (CTMS) will be proposed.

1.2 Problems Statement

There are a lot of methods have been developed by Telekom Malaysia to solve and reduce cable case theft such as cable theft prevention campaigns at the national level among the community, organizing security patrols, wiping grease on telecom poles, replacing existing cable with fiber cables and I-Watch System installation. Recently, I-Watch System has been used to prevent cable theft, however the cost for the installation of I-Watch System is expensive but still less effective because it uses human energy to catch the thief. Location of the incident and the distance to reach the location also cause the system is less effective due to criminals targeting rural areas and far from human to do cable theft activity.

Table 1.1: The statistics of cable loss in Kuala Selangor from year 2007 until year 2013 [5]

Year Area	2007	2008	2009	2010	2011	2012	2013	Total
Kuala Selangor	123	113	68	64	104	52	45	569
Sasaran	90	72	35	33	52	35	33	350
Tanjong Karang	-	-	65	79	92	116	59	411
Sekinchan	-	-	147	100	62	222	45	576
Batang Berjuntai	53	44	30	51	34	29	28	269
Ijok	111	67	9	28	27	23	33	298
Total	377	296	354	355	371	477	243	2473

Referring to the TM statistical schedule the number of cable theft in the area of Selangor, 2012 is highest cable theft in Selangor from year 2007 until 2013. The most numerous cases for 2007 and 2008 are the area of Kuala Selangor. This is caused by copper cable is installed in the first area of Kuala Selangor in Selangor. In 2008, the number of cable loss theft is decreasing compared in 2007. This is due to cable theft prevention campaign implementation and monitoring of the TM patrol in the area most of the loss cable [2]. Sekinchan and Tanjong Karang areas are new area in Kuala Selangor from year 2009 and were the highest number of cases contributor compared to other areas. Cable thefts rise in 2012 even though TM has been using the I-watch system [1]. I-watch is a system which alerts the TM team the moment when thieves attempt to cut a cable, and informs them exactly where the incident is happening. It triggers the alarm and TM teams will be dispatched to the scene. However, their safety comes first and if the situation is dangerous, TM teams will wait for the police [1]. In 2013, the number of cable loss theft is decreasing compared in 2012. This is due to I-watch system is installed at the place that always happen cable theft which is Sekinchan and Tanjong Karang thus reduce cable theft for 2013.

Therefore, a new low cost system will be proposed in this project to help in reducing the activities of cable theft.

1.3 Objective of Study

There are two objectives to be achieved in this project. The objectives are:

1. To design and develop a cable theft monitoring system using GSM Modem (CTMS).
2. To analyze overall performance of CTMS in terms of percentage of detection.

1.4 Scope of Works

The scope of works for this project as follows:

1. The buzzer and alarm light is function when the cable is cut.
2. GSM send alarm messages when the cable is cut and send back messages when the cable is in normal condition.
3. Temperature sensor is function when the circuit box temperature is more than 40°C and GSM also send alarm messages.
4. LCD display is used to show the changes of voltage and circuit temperature.
5. PIC 16F877A Microcontroller will be used in this project to develop the program and C programming is used in the program.

1.5 Significant of Study

From the perspective of society, this project can help the society to reduce and prevent activities of cable theft. Also that, this project also can reduce the cost of