

MJR 2000
(DEVICE LOCATOR)

Group 22
October 16, 2000

Advisor: Dr. Yu-Dong Yao

Jimmy Yeung
Marlo Delfin
Raul Lucaci

“I pledge my honor that I have abided by Stevens Honor System”

Table of Contents

Sections:

I.	Abstract.....	1
II.	Project Proposal Plan	
	II-I Introduction.....	3
	II-II. Design Requirements.....	5
	II-III. Design Approaches.....	7
	II-IV. Financial Budget.....	8
III.	Conclusion.....	9
IV.	References.....	10

I. Abstract

The MJR locator is meant for those people who tend to lose items such as a television remote control, car keys, house keys, wallets, etc. The MJR locator is designed to assist people in locating items that are constantly lost around the house, garage, or even in your car. Many problems arise when one questions the application of the MJR locator. First of all, the MJR locator consists of two items, a receiver and a transmitter. Secondly, one has to consider the size of the receiver and the transmitter. The transmitter can be of any size and weight, but the receiver has to have a specific size and weight.

Problems of whether the receiver can be hidden in small items such as a key, a wallet, etc. Another problem that has arisen within our planning was to whether how the device will operate, whether on a double A battery or a lithium battery. It was also addressed that the receiver's second function, which is the security function contains errors, errors in which now that the size of the receiver has to increase in order to fulfill its functions.

As a technical approach, we took a telephone that contained such a device and tested out its specs and its features. We realized that the chip was small and that we had to make it about the same size but slightly bigger. This is to accommodate the second function of the receiver acting as a security alarm. At the conclusion of the project we expect to have the MJR locator working, locating items, and acting as a security alarm. People would appreciate our design and take it into consideration that people need such as device locator because many people tend to lose items around the house and therefore this device can save people the trouble and time for looking for missing items as well as not messing up your house.

II. Project Proposal Plan

II-I. Introduction

The design of the MJR locator is based on the paging technology that is located in a cordless telephone. This device serves in two functions: first, it is used to locate items that can be lost, items such as a TV remote control, car keys, a notebook, documents, wallet etc, and second it serves as a security device. MJR locator consists of two components, the transmitter “console”, and receiver. The transmitter is the primary (input) unit and the receiver is the secondary (output) unit. The design of the transmitter will be the size of a pager (2” x 1 1/2” x 1/12”) and receiver (1/2” to 3/4” cube in depth), both consist of a clip to clip on garments and the receiver contains a magnet for metal purpose.

The device will be using the Federal Communication Commission frequency to emit a fixed frequency. The bandwidth of the frequency will approximately be an average home of 1,000 square feet and two to three floors. When the receiver picks up the fixed frequency, the circuit makes the speaker emit a beeping sound, which is repeated a fixed amount of times. The user follows the sound until they locate the receiver, otherwise they

must repeat the process.

The second function of the MJR locator acts as a security device. The purpose of the security is to protect personal valuable from leaving the area. The innovation of the design is to create a sensor that allows the transmitter and receiver to sound when it leaves out of range. The range will be approximately 2000 square feet in radian. The alarm will sound when the receiver is out of range, therefore whatever the receiver is placed on, the person will be able to locate their belonging, whether it's stolen or miss placed. The receiver will along with its' own device and functions will need to be designed with a transmitting device in it so that the security function will be enabled. With the transmitting device in the receiver base it will allow the receiver to send back the signal to the console based. The MJR locator having both functions will be a reliable and useful mini tool for everyday life.

II-II. Design Requirements

The design of the MJR device locator is based on the paging technology in a cordless telephone. The device will be using the Federal Communication Commission frequency to emit a fixed frequency. The bandwidth of the frequency will approximately cover the average home of 1,000 square feet and two to three floors. When the receiver picks up the fixed frequency, the circuit makes the speaker emit a beeping sound, which is repeated a fixed amount of times. The user follows the sound until they locate the receiver, otherwise they must repeat the process. The volume of the beeping sound will be approximately between 15 to 30 db.

The second function of the MJR locator acts as a security device. The purpose of the security function is to protect personal valuable from leaving the area. The innovation of the design is to create a sensor that allows the transmitter and receiver to sound when it leaves out of range. The range will cover approximately 2000 square feet in radian. The alarm will sound when the receiver is out of range, therefore whatever the receiver is placed on, the person will be able to locate their belonging, whether it's stolen or miss placed. The receiver will consist of a transmitting device in it so that the

security function will be enabled. With the transmitting device in the receiver base, it will allow the receiver to send back the signal to the console base. The design of both functions will allow it to be a more reliable tool.

II-III. Design Approaches

The Design approach of the MJR device locator will be implemented by studying the function of several difference devices, applications, and protocols. The initial approach is to examine the function of a cordless telephone. The observation of how the chip acts between the handset. We will obtain the understanding of the wireless technology between the handset and the base. Also we will study the fundamentals of frequency requirements for amateur designs and cost.

The applications and protocols will be tested through out the project. We will study the reliable and reasonable application and protocols that we can use to create a device by using amateur frequency requirements. The approach of the design will be based on understanding of wireless technology, radio frequency, transceivers and receivers, cordless communications etc.

II-IV. Financial Budget

Industrial project	Cost
Labor	\$90 per hour
Materials and Parts:	
2 Circuit Boards	\$100 each
5 receivers	\$50 each
1 transmitter case	\$100 each
10 transmitter buttons	\$10 each
Test equipment	\$1000
Documentation	\$100
Travel, hotel accommodations and meal	\$4000
Support staff	\$4000
Rent, utilities, overhead	\$150 per month
Profit	??

III. Conclusion

The MJR device locator has potential applications such as office or home use. This device is suitable for everyday life because in a busy world, people tend to lose or misplace valuables or important items such as car keys, remote controls, briefcase, documents, portfolios, senior design proposal, cellular phone, eye glasses and you get the point.

Therefore, for the new millennium MJR 2000 (device locator) is the tool to have. This tool will be a handy and portable device to own. It will be affordable and reliable. MJR 2000 is the essential tool to purchase.

IV. References

<http://www.ntia.doc.gov/osmhome/allochrt.htm>

<http://www.grove.com>

<http://www.fcc.gov>

The Design of CMOS Radio Frequency Integrated Circuits
Thomas H. Lee, January 1998

Build Your own intelligent amateur radio transceiver
Randy Lee Henderson, September 1996

CMOS Wireless Transceiver Design
Jans Crols, Michiel Steyaert, June 1997

Integrated circuit for wireless communications: Electrical Engineer

The ARRL Radio Buyer's Source Book
Bob Schetgen, June 1997

Transceiver System Design for Digital Communications
Scott R. Bullock, Gary A Breed, January 1995

Radio Amateur's Handbook
Collin, A Fredrick, Hertzberg

Radio Fundamental
Albert, Arthur Lemuel

Radar Handbook 2nd Edition
Merrill Skolnik

Home Radio: How to make and use it
Verrill, A Hyatt

Wireless Communication Paging Technology Handbook:
Principles & Practice
Theodore S. Rappaport, September 1995

Paging Technology Handbook
Neil J. Baucher, August 1992

Cordless Telecommunication in Europe
Wally H.W. Tuttlebee, January 1990

Global Paging: Technologies
Ecomar Lawrence, October 1998

The Cell Phone Handbook
Penelope Stetz, June 1999

Understanding WAP: Wireless App, Devices, Services
Marcel van der Heijden, July 2000

Programming Application with the Wireless App protocol:
The complete Developer Guide
Steve Mann, October 1999

