Child Tracking System Using GPS

R.Manikandan[1], A.Arun[2], J.Arunkumar[3], G.Mohanprasath[4]

[1, 2, 3, 4] Department of ECE

[1, 2, 3, 4] Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

Abstract- *Recently many cases of missing children between ages 05 and 10 years reported. Parents always worry about the possibility of kidnapping of their children. This paper proposes a solution based on GPS (Global Positioning System), GSM (Global System For Mobile Communication). GPS is one of the technologies that are used in a huge number of applications today. One of the application is tracking children and keeps regular monitoring of them. This tracking system can inform the location and route traveled by a child, and information can be observed from any other remote location. GPS takes Latitude and Longitude from satellite containing Latitude and Longitude which is used to locate the child. When a violation of child sage is detected, specific sensor in child module will produce a signal. This signal will be sensors to microcontroller and current position of child is located by (GPS) then displayed in LCD. The child tracking system requires certain hardware between child model and parent one. This includes a certain driving circuit that activates the sensors.*

Keywords- *GPS (Global Positioning System), GSM (Global System For Mobile Communication), Pic Microcontroller, Buzzer, LCD (Liquid Crystal Display).*

I. INTRODUCTION

The children, growing up bring with them a mixture of pleasure and pain, love of knowing everything and need to discover anything. It would be nice if children are happy and free of troubles or dangerous. Feeling safe about children is the first importance needs for parents in all worlds. Although there is no substitute for good childcare, Which would include constant monitoring, the reality is that constant monitoring of children is not always feasible; especially when a parent must monitor multiple children at the same time. Developing a tracking system for parents with multiple children could greatly decrease their stress and giving them more freedom during excursions with their children.

II. WORKING METHODS AND APPLICATIONS

A. PIC (16F877)

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc… are some of the memories of which FLASH is the most recently developed. Technology that is used in PIC16F877 is flash technology, so that data is retained even when the power is switched off. Easy programming and erasing are other features of PIC16F877. The pic start plus development system from microchip technology provides the product development engineer with a highly flexible low cost microcontroller design tool set for all microchip PIC plus development programmer. The PIC start plus programmer gives the product developer ability to program user software in to any of the supported microcontrollers. The PIC start plus software running under mplab provides for full interactive control over the programmer.
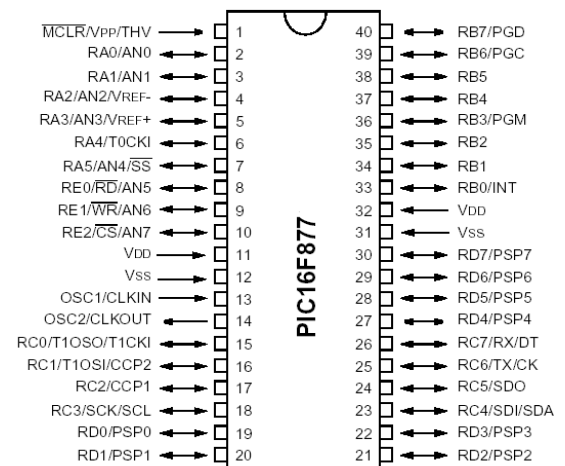

Figure 1.PIN DIAGRAM OF PIC 16F877

B. GSM module

The GSM module is a specialized type of modem which accepts a SIM card operates on subscriber mobile number over a network, just like a cellular phone. It's a cell phone without display. GSM-module used is SIM900 series. SIM900 is a GSM module that can work at frequencies of 850/900/1800/1900 MHZ with a capabilities of GPRS mobile station class B. Class B means that it can connected to GSM services (phone call and SMS) or GPRS services alternately at the same time. SIM900 using UART (Universal Asynchronous Receiver Transmitter) to communicate with controller and can be controlled using AT Command. The algorithm of sending an SMS in this work can be seen as follow [4]:

1) Give high signal at least three seconds to pin "P" of the SIM900 to turn on SIM900 digitally.
2) Send serial data "AT+CMGF=1" to SIM900 to select SMS message format in text mode. Give one second delay afterward.
3) Send serial data "AT+CMGS=" to SIM900 to send SMS in text mode. Give one second delay afterward.

Figure 2. GSM-Module SIM900

C. GPS Antenna

We're interested in designing, building, and testing a GPS (Global Positioning System) antenna that would be implemented on the body or inside of a vehicle. This antenna would be different than others on the market in that it would not only utilize the L1 frequency (1575.42 MHZ), but also the L5 frequency (1176.45 MHZ) to be introduced in the future. Our goal is to also make it interoperable with the European counterpart to GPS, Galileo which uses 1164-1214 MHZ and 1563-1591 MHZ bands. In addition, We intend to gather the specifications for the LNA that would be needed for our specific antenna based on its gain, impedance, and other characteristics.

If time allows, We intend to design and simulate the LNA using Agilent's advanced design system software package at the end as well.

D. LCD

Liquid Crystal Display screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are prefe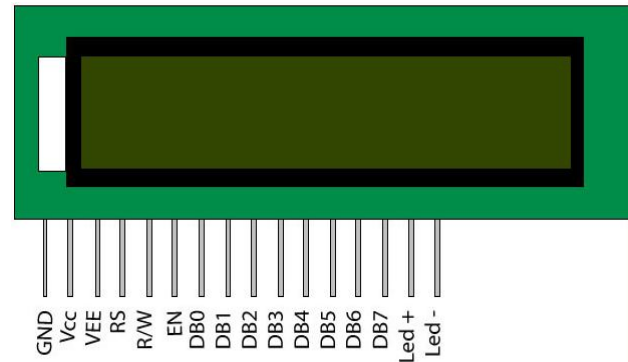rred over seven segments LED's. The reasons being LCD's are economical; easily programmable; have no limitation of displaying special & even custom characters, animations and so on.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and data.

Figure 3. LCD Pin Diagram

E. Buzzer

A Buzzer or Beeper is an audio signaling device, Which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.
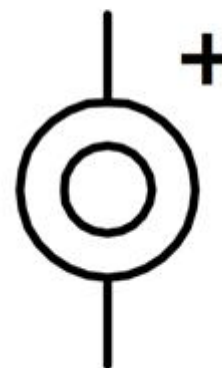

Figure 4. Electronic Symbol for Buzzer

III. SYSTEM DESIGN

A. Hardware Design

Our proposed project first uses RF sensors to detect whether the child crossed the certain distance or not. If child crossed it then signal to PIC controller which is the heart of this project the alert sound produced and current location of child (GPS) which is placed in child will monitor the location and it will be displayed in LCD unit continuous. GPS is a multiple satellite based radio positioning system in which each GPS satellite transmits data that allows user to precisely measure the distance from the selected satellite to his antenna and to compute position, velocity and time parameters to high degree of accuracy. GPS delivers with high sensitivity and accuracy with low power consumption. In this project main use of GPS module is to sense the current location of child. GPS module used for this project is GR-301, which provides latitude and longitude values. Whenever child moves outside of define area then position of child can find by parent through GPS modem. By clicking on this the location of the child will be shown on the map. This alert message will be send until child come back into define area or till system is shutdown. Because of this continuous monitoring of child will not be required. Even after this if parents want to see the current location of child they can send the message to child module and obtained the location of child.
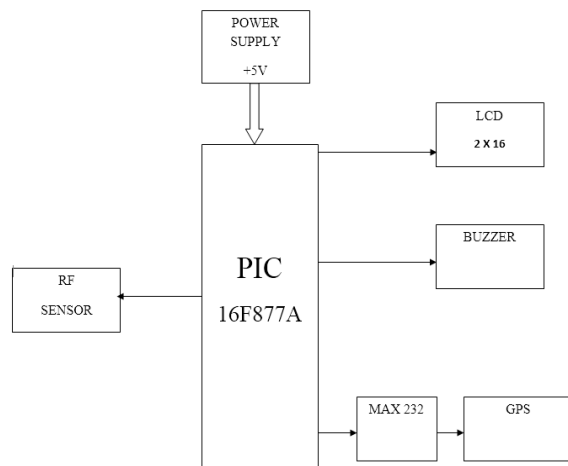

Figure 5. Block Diagram of the System

B. Software Design

The project process flow chart of child tracking system. The design project process was started by the research of the problem and make decision to design hardware part, electrical part and coding for software. Then electrical part and coding were test the whole system to ensure it works properly. The process flows chart for the tracking part of child tracking system. First GPS and GSM are tuned 'ON', GSM waits for the some password validated, GPS is turned 'ON', to set the coordinated location. GPS which then send the

information to control GPS Arduino send the information to GSM. Finally GSM send the data location to LCD display.
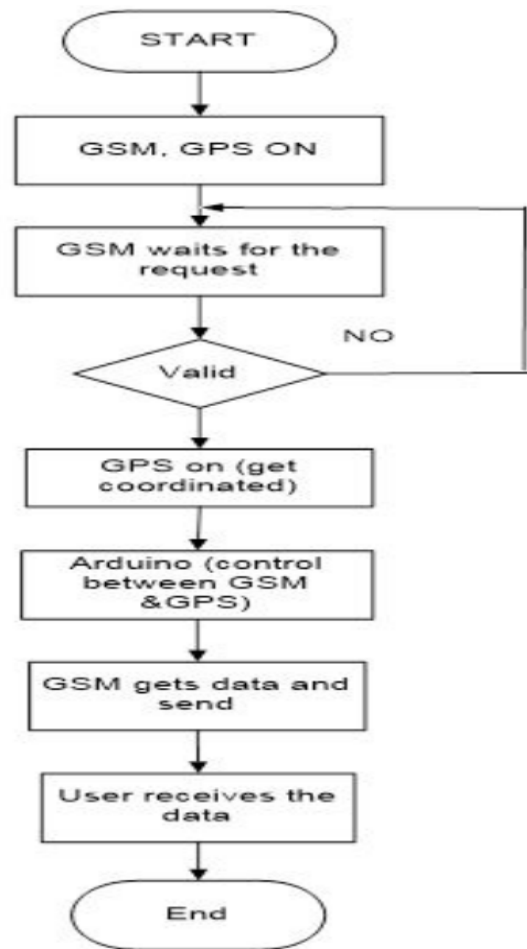

Figure 6. Flowchart of the System

V. CONCLUSION

This paper focuses on tracking a child's position and its location is sent to his/her parents. It mainly aids in locating missing children. In addition to this, whenever any authorized person sends to GSM modem placed in the transmitter which is with the missing child, the location is tracked by GPS module and these values are sent to the parent or authorized person through the GSM at the transmitter. The proposed solution takes advantages of the rich features offered in android phones. This project makes it easier for law enforcement, thus keeping general public safer, ensures child safety and monitors the whereabouts of physically challenged people.

REFERENCES

[1] Ghaith Bader Al-Suwaidi, Mohamed Jamal Zemerly, "Locating friends and family using mobile phones with

global positioning system (GPS)," IEEE/ACS International Conference on computer systems and Applications, 2009.

[2] Alomomani, I.M., Alkhalil, N.Y., Ahmad, E.m., Jodeh, R.M., "Ubiquitous GPS vehicle tracking and management system," 2011 IEEE Jorden conference on Applied Electrical Engineering and Computing Technologies (AEECT).

[3] Chandram, A., Jain, S., Qadeer, M.A., "GPS Locator: An Application for Location Tracking and Sharing Using GPS For Java Enabled Handhelds,"2011 International Conference On Computational Intelligence and Communication Networks(CICN).

[4] Anderson, Ruth E., et al., "Building a transpotation information system using only GPS and basic SMS infrastructure," 2009 International Conference on Information and Communication Technologies and Development(ICTD)..