

Embedded Baby Monitor

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Abstract

This paper presents an innovative infant care system called embedded baby monitor, which doesn't need continuous adult supervision. This system can be used not only at home but also in hospitals and nurseries. It has a cry detecting mechanism such that the cradle swings when the baby cries for a stipulated time period. In addition, it also has a wetness and temperature detector. If the baby wets the bed or has a fever, then the information will be intimated to the guardian through Angel care handy receiver which is light-weight, battery operated and portable. Thus this system ensures that the baby is kept in proper hygienic conditions and is given proper attention and quality care thereby providing parents/guardian the ease of watching over their baby without sacrificing comfort and security.

I. INTRODUCTION

During the early stages, infants need proper rest and sleep for growth and development. Hence, it is the responsibility of the parents/guardian to provide the necessary care and attention to the infant. But with the modern lifestyle, parents are busy and have a lot of work with little time to provide for their little ones. This finally results in giving their child to nanny who is assumed to take care of the baby but at times things don't turn out as expected. Some of the families cannot even afford a nanny because of their high demands. Women especially have to take care of their professional as well as the household work. There are existing baby care systems in the market which are either very costly or manually operated. Hence, we have

developed a system which would help the parents in child care.

II. BLOCK DIAGRAM DESCRIPTION

This system is divided into mainly two sections – Cradle module and Angel Care Handy Receiver. The communication between these two sections is carried through RF transmitter-receiver. We have used a low power microcontroller (PIC16F877A) as the embedded processor which is the heart of the system. The wetness and temperature of the baby is detected using LM35 sensor. The baby's cry sound is detected by Sunrom microphone amplifier module. The music is played by a low cost BT66 IC and finally the cradle is swung using a 12V DC motor. The different conditions are checked and the information is sent via RF transmitter to the Angel care handy receiver. In the Angel care handy receiver, we have used another microcontroller (PIC12F675) which on reception of the signal through the RF receiver drives the corresponding LEDs for the particular condition along with a buzzer sound.

A. Embedded Baby Monitor Cradle Module

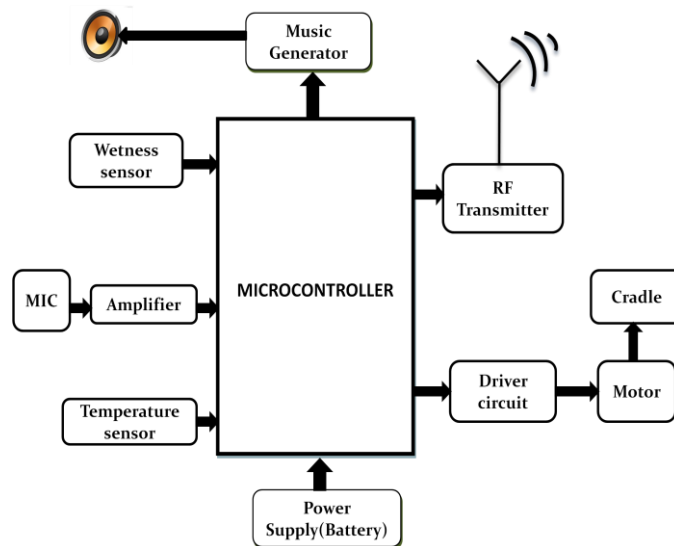


Fig. 1 Block Diagram of Embedded Baby Monitor Cradle Module

As shown in the above fig., PIC16F877A is the heart of the embedded baby monitor cradle module. The PIC receives the three inputs- from the wireless sensor, microphone amplifier module and the temperature sensor. The input received through the microphone module is amplified whereas the inputs received from wetness and temperature sensor is given directly to the microcontroller. When the baby cries, the PIC gives output to the music generator circuit which produces a soothing music and to the motor driver circuit which would gently swing the cradle. Simultaneously, a signal is sent through the RF transmitter to the Angel care handy receiver for intimating the parent or guardian

B. Angel Care Handy Receiver

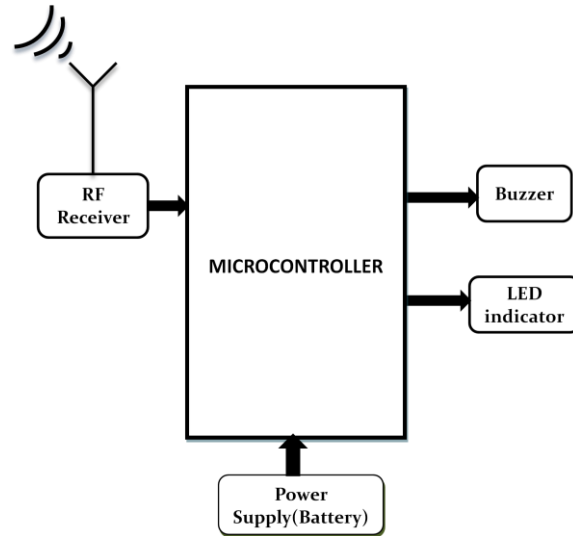


Fig. 2 Block Diagram of Angel Care Handy Receiver

As shown in the above fig. PIC12F675 receives the signal through the RF receiver. There are 3 LED on the receiver. The red LED indicates fever, green LED indicates wetness and blue LED indicates that the baby is crying. On receiving the signal, the PIC drives the LED for the corresponding condition along with a buzzer sound. This receiver is light in weight, battery operated and portable.

III. PROPOSED IMPLEMENTATION



Fig. 3 Prototype of Cradle Module

As shown in the fig. 3, a cradle prototype was built with length, breadth and height as 36 cm, 20 cm and 44 cm respectively. The programming of the PICs was done using MPLAB. The sensors used for detecting wetness and fever were the same as different threshold voltage levels were set according to the specified application. The output from microphone was set as 2.5V such that whenever the baby cried, the cradle would swing for 1 min through the driver circuit which drove the motor at 2.4V supply using the crankshaft mechanism. Simultaneously, the music generator would play the music for 1 min. The cradle module PCB was mounted on the lower side of cradle such that wetness sensor would be placed on the bed and the temperature sensor would touch the baby's skin.



Fig. 4 Angel Care Handy Receiver

Fig. 4 shows the Angel care handy receiver which is light weight, battery operated and portable. This device can be easily carried by the parent/guardian and has the dimensions similar to that of a cell phone. There are three LEDs for the indication of the three corresponding conditions. The signal is received through RF receiver which operates at 433 MHz using ASK modulation technique. The cradle module as well as the Angel care handy receiver operates at 5V supply which is given through a battery thereby providing maximum security to the baby.

IV. CONCLUSION

We have successfully completed our project Embedded baby monitor. This is an efficient, low cost and less energy consuming system. It can be used at home as well as in hospitals and day care centers. Thus an infant will get proper attention and quality care through this project without the need of continuous supervision by an adult. The successful completion of the prototype of our project implies that there are a plethora of readily available options that can be implemented in infant care.

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