

# PROGRAMMED CRADLE AND NURSING FOR INFANTS

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**ABSTRACT-**The Programmed Cradle and Nursing for Infants is the automatic cradle mainly designed to overcome the difficulty of working parents to spend enough time for their infants due in spite of their busy schedule. This proposed system is to develop an Automated Control System using PIC16F877A. Different sensors are being used to monitor room temperature, light intensity. Hence, this system helps in providing better performance and reduces manual efforts. Generally, the baby's cradle is used for „to make sleep and soothe to baby. However, conventional cradle does not electronically equip such like battery or adapter to automate the cradle. This system reduces the burden of working mother in almost each and every aspect.

## INTRODUCTION

In earlier days, man was the only responsible for the source of income to the family while women took care of home and infant efficiently. Women utilized all their time in monitoring and nursing their infants. As the time moved on, slowly women too got educated and stood as par with men. Now-a-days women as a passion, to prove them and to meet their family requirements they also started to earn. But they find it difficult, only when they have to take care of child. Sometimes Women in need of taking care of their job, their home, as well as their babies after few month of her delivery. Generally, the baby's cradle is used to make sleep the baby. In conventional cradle, it need man power to operate it. But in this E-World everything is automated. To fill this gap and to support the mothers in handling and take care of their infants, research has been done to develop Programmed Cradle and Nursing for Infants. The main objective of the paper is to automate the swing of cradle, functioning of ventilation and luminescence, singing lullaby and alarming when the mattress gets wet or when the baby continuously weeps. Besides, there are extra features or functions that are provided by the newly automatic cradle are very beneficial for parents. Since it is automatic this application is very useful for the nurses in maternity units of hospital.

## EXPERIMENTAL SET-UP

The system implements two SPDT Toggle Switch is used to select Manual and Auto mode system and in an auto mode to select between Night and Day time.



### MANUAL MODE:

Wireless communication can be easily made using HT640 Encoder, HT648L Decoder, and 434MHz ASK (Amplitude Shift Keying) RF Transmitter and Receiver Module. Here a group of 4 keys namely S- Speaker, F - Fan, L - Light and M – DC Motor forms a Keypad. When any key is pressed, the respective analog output is sent to an encoder unit. The Encoder used in the system converts the received analog signal into a digital output. At the RF Transmitter section, the received digital data got transmitted with a frequency of 434MHz. The RF Receiver section receive the same digital signal as that of the transmitter. The received digital signal then passes into the Decoder, where it got converted back into same analog signal. Thus, the original data retrieved at the end of decoder entered into the host processor.

Here, the whole system is monitored by PIC16F877A Microcontroller which acts as an interfacing unit between all its connected input and output devices. It is programmed in such a way that once it receives the valid input, it sends the respective code based output data to its connected output devices to switch them ON or OFF.

The cradle output devices namely i)DC Motor for Swing of Cradle ii)Speaker iii) Fan for Ventilation iv) Light for Luminescence and all can be controlled over switching ON and OFF by microcontroller through individual driver circuit along with the relay units. In Voice IC section, „the sound record and play back WTV-SR Voice Module IC is used to store lullaby songs. Once the digital parallel coded input from microcontroller sensed at voice IC section, the respective song gets selected and the analog output of voice IC reaches the Speaker which is an electro-acoustic transducer that converts an electrical signal into sound then it starts singing lullaby.

### AUTOMODE

The room Temperature Sensor (Thermistor) continuously monitors the surrounding temperature around the infant. Microcontroller is programmed in such a way that if it recognizes the temperature of 19°C and above, will switch ON the fan to provide a pleasant air circulation around the baby in the cradle. If it recognizes the temperature below 19°C, either it will not switch ON the Fan at all or will switch OFF the fan which is in running condition. The Microphone used here to be aware of baby weeping and converts the sound into an electrical signal. The Microcontroller is programmed in such a manner that if it recognizes infant's weeping or screaming, it will do following actions:

- i) Starts rocking motion of a cradle to recreate the environment in which baby fell asleep back irrespective of Day or Night mode.
- ii) Starts singing lullabies to establish a soothing atmosphere between an infant's physiology and the outside world so as to get back to sleep well ignoring of Day or Night mode.
- iii) Turn - ON light since toddler will not feel safe in a pitch dark room. A dim night light is used to reassure and to make your baby feel safer in a Night mode.

After a period of 2 minutes if it recognizes still the baby is weeping or screaming it gives an emergency alarm. In that case, controller allows the cradle rocking, singing, dim-night light, and alarm all can be switched OFF manually but only after providing attention to the infant. Here, the time period is based on user specific and it can be re-programmed.

An Alarm unit is a signaling device which gives an audible warning about the condition, based on infant state to pay immediate attention. This alarm unit is connected with a switch to make it OFF manually whenever necessary. It gives buzzing sound under two states based on pre-programmed. The two states are,

- i)When the baby cries or screams continuously still after a stipulated period of 2 minutes.
- ii)When the baby wets the mattress.

In Wet Sensor, two copper leads kept at a fixed distance apart from each other by an insulating material used to measure the wetness condition of the infant's mattress. So, when the baby makes the mattress wet, the two leads will short and sends a signal to the controller via an Amplifier unit.

The 16 x 2 Character Line LCD(Liquid Crystal Display) screen is an electronic

display used to show the below current status of the system:

- System in which mode – Auto or Manual,
- Loads like dc motor, fan, light, speaker, and alarm – ON or OFF state,
- Reading of room temperature around the toddler,
- In case of speaker ON – playlist of which song playing, and
- Reading of count rate on baby voice recognition.

### CONCLUSION

Each parent is responsible to provide the basic needs for the infants like love, sleep, food, and safe and clean environment. The designed system uses real time cradle which consist of five major parts. Mechanically equipped with DC motor, the sound record and play back Voice IC Module in which 4 lullaby songs sung by a mother in real time got recorded., soft – night light, to light up a room automatically, AC axial fan controlled automatically based on baby surrounding temperature or manually by mother whenever required, wet sensor model by having two copper leads. Here, four samples of sound level of an infant crying tone are taken as 24dB, 27dB, 20dB and 30dB at different time period and found to be 20dB as minimum sound level. This least value is set as preset value. Normally, the environmental noise ranging from 0dB to 5dB which is less than the preset value and baby cry wont be detected. The cardioids pattern mike is placed closer to baby mouth about 1 to 5 inches. With this pattern, a microphone naturally filters background noise, isolating the voice of an infant for recording.

The proposed system, Programmed „Cradle and Nursing“ for Infants is designed

to provide an un-interrupt service to an infant until the baby needs which is decided by the mother in-case of Manual mode and to provide an interrupt service to an infant whenever the baby needs which is based on the pre-programmed PIC16F877A microcontroller in-case of Auto mode.

### APPLICATION

The benefits of this Programmed „Cradle and Nursing” for Infants are:

- It is very easy to operate and it reduces the manpower work.
- The system can be used by working parents who can't be with their babies all the time and don't want a caretaker. The parents can finish their household work in that period.
- The one of the most benefits of this cradle is we can use this cradle as a bio- medical product in the hospital which have neonatal and maternity units. It will be helpful for the nurses to take care of infant and sooth whenever they need. They do not have to seat nearby.

The above designed system is very economical, affordable and user friendly for working parents, elders, nurses and whoever takes care of the infants.

On the whole, the proposed system removes the difficulties in baby care by ensure security, comfort, and entertainment from a distance while the mother is busy with other works. With the development of technology, day to day work has been eased for parents along with baby care.

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