Baby Status Monitoring System - User Guide

Introduction

Welcome to the Baby Status Monitoring System user guide. This document will help you set up, operate, and troubleshoot your system to monitor a baby's status (sleeping, awake, or crying) using an ESP32 microcontroller, LEDs, and an LCD display.

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1. System Overview

The Baby Status Monitoring System detects and displays the baby’s condition in real-time:

- **Sleeping**: Indicated by a green LED and corresponding message on the LCD.
- **Awake**: Indicated by a yellow LED and corresponding message on the LCD.
- **Crying**: Indicated by a red LED and corresponding message on the LCD.

This system uses a potentiometer to simulate baby behavior and processes the input using an ESP32.

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2. Hardware Components

Component	Description
ESP32 Microcontroller	The core processing unit of the system.
Potentiometer	Simulates baby behavior based on input values.
LEDs	Visual indicators for sleeping (green), awake (yellow), and crying (red).
LCD Display (16x2, I2C)	Textual display of the baby’s status.
Power Supply	Textual display of the baby’s status.

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3. Setting Up the System

3.1 Wiring Instructions

Follow the table below to connect components to the ESP32:

Component	ESP32 Pin
Potentiometer OUT	GPIO 34
Green LED	GPIO 18
Yellow LED	GPIO 19
Red LED	GPIO 23
LCD SDA	GPIO 21
LCD SCL	GPIO 22

3.2 Power Supply

- Connect the ESP32 to your computer or a USB power adapter using a micro-USB cable.

3.3 Initial Setup

1. Upload the provided code to the ESP32 using the Arduino IDE.
2. Ensure the required libraries (e.g., LiquidCrystal_I2C) are installed in the Arduino IDE.

3. After uploading the code, the system will initialize, and the LCD will display a message indicating it is ready.

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4. Operating Instructions

4.1 Turning On the System

1. Power on the ESP32 by connecting it to a power source.
2. The system will initialize, and the LCD will display "Initializing..." during startup.

4.2 Monitoring the Baby's Status

1. Use the potentiometer to simulate baby behavior:
    - Turn the potentiometer to a low value (0-400) to simulate the baby sleeping.
    - Set the potentiometer to a medium value (401-2500) to simulate the baby being awake.
    - Increase the potentiometer to a high value (2501-4095) to simulate the baby crying.
2. Observe the corresponding LED and message on the LCD display:
    - **Sleeping**: Green LED ON, LCD shows "Baby is sleeping."
    - **Awake**: Yellow LED ON, LCD shows "Baby is awake."
    - **Crying**: Red LED ON, LCD shows "Baby is crying."

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5. Troubleshooting

Issue	Possible Cause	Solution
LCD not displaying anything	Incorrect I2C address	Use an I2C scanner to find the correct address.
LEDs not lighting up	Loose or incorrect wiring	Check all connections and ensure proper wiring.
System not responding	Code upload failure	Re-upload the code and ensure no errors.
Potentiometer values inaccurate	Faulty potentiometer or poor connections	Replace the potentiometer or rewire properly.

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6. Maintenance and Safety Tips

1. Ensure all components are securely connected to avoid short circuits.
2. Handle the ESP32 and other electronic components with care to prevent damage.
3. Disconnect power when modifying the wiring or components.
4. Keep the system away from water and high temperatures.

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7. Frequently Asked Questions (FAQs)

Q: Can I use a different microcontroller?

A: The code is designed for ESP32, but you can adapt it for other microcontrollers with necessary modifications.

Q: How do I expand the system?

A: You can add features like a buzzer for alerts or integrate cloud storage for remote monitoring.

Q: What is the range of the potentiometer?

A: The potentiometer outputs values from 0 to 4095, corresponding to the baby's status.

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8. Contact Information

For additional support or inquiries:

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Thank you for using the Baby Status Monitoring System! 😊