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INTEGRATED REAL-TIME MONITORING AND SAFETY SYSTEM FOR LPG GAS USAGE IN HOUSEHOLD ENVIRONMENTS

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Abstract: The Real-Time Monitoring and Safety System for LPG Gas Usage in Household Environments is a crucial device designed to ensure the safety of individuals and properties by detecting potential leaks of LPG (Liquefied Petroleum Gas) gas. This abstract outlines the system's architecture and functionalities. The system utilizes a PIC16F877A microcontroller interfaced with a USART (Serial Communication Interface) to facilitate communication. It incorporates a load sensor to accurately determine the percentage of LPG gas remaining in the cylinder by subtracting the weight of the empty cylinder from the total weight. This information is displayed on an attached LCD, providing users with real-time updates on gas levels. In addition to monitoring gas levels, the system features an LPG sensor module that detects gas leakage. Upon detection, the microcontroller triggers an audio alert through a buzzer and displays a warning on the LCD screen. Furthermore, for enhanced safety measures, a relay disconnects the household AC power supply in the event of a gas leak. The microcontroller is programmed using embedded C in MPLABX IDE with XCS compiler. Powering the circuit is achieved through a power supply unit comprising an LM7805 regulator IC, which delivers a regulated output of 5V DC from a 9V DC adapter. In summary, this comprehensive system offers real-time monitoring and safety features for LPG gas usage in household environments, ensuring prompt detection and mitigation of potential hazards. Its integration of multiple sensors and communication interfaces makes it a reliable solution for enhancing safety and peace of mind in residential settings.

Keywords: Buzzer; Interface; Microcontroller; Safety