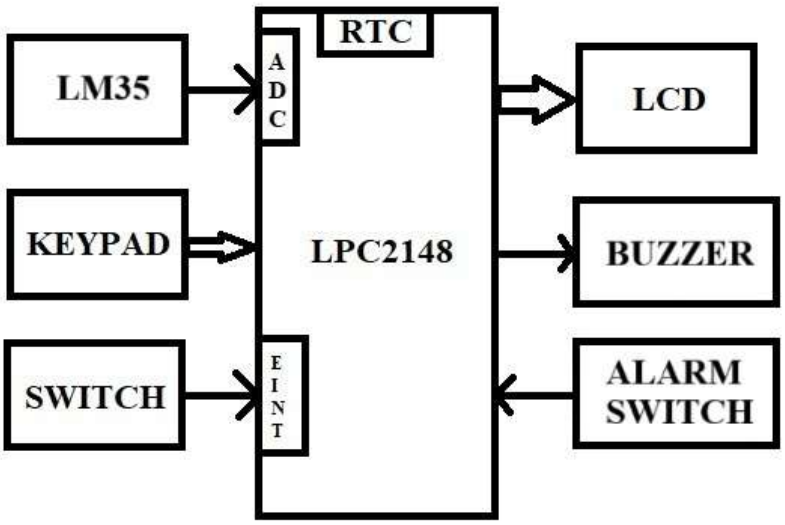
ENVIROCLOCK: MULTIFUNCTION ALARM CLOCK WITH ROOM TEMPERATURE DISPLAY

OBJECTIVE:

EnviroClock is a simple project using LPC2148 that shows the current time, alarm, and room temperature on an LCD. Users can set or change the time and alarm using a keypad. When the alarm time is reached, a buzzer sounds. The system combines clock, temperature sensing, and alarm features in one easy-to-use device.

BLOCK DIAGRAM:



REQUIREMENTS:

HARDWARE REQUIREMENTS:

- LPC2148
- LCD
- KEYPAD
- LED'S
- LM35
- BUZZER
- SWITCHES

SOFTWARE REQUIREMENTS:

- PROGRAMMING IN EMBEDDED C
- KEIL C COMPILER
- FLASH MAGIC

PROJECT WORK FLOW:

In this project, first the required peripherals such as the LCD, LEDs, keypad, RTC, ADC (for LM35) and external interrupt are initialized inside the main function before entering the super loop.

Inside the continuous loop, the system reads the current time and date from the on-chip RTC and displays it on the LCD along with the day information. And additionally reads the current room temperature from LM35 sensor and display it on LCD. If the current time matches with the alarm time, activate the buzzer to alert the user. To stop the alarm user, need to press the alarm stop button otherwise after one minute alarm need to stop.

To ensure proper system operation, it is essential that the RTC always displays the correct time. If the displayed time is found to be incorrect, the user can press a dedicated switch to generate an interrupt request. Upon receiving the interrupt, the system temporarily halts its normal operation, and the LCD displays a small menu with three options for the user to choose from.

1. EDIT RTC INFO

2. SET ALARM 3. EXIT.

If the user selects exit, the program simply resumes the main loop; but if the user selects the **EDIT RTC INFO**, the LCD shows a second menu allowing modification of hours, minutes, seconds, day, date, month and year along with exit option.

The user can navigate these options through the keypad, enter new values, and each input is validated against allowed ranges (e.g., hours 0–23, minutes/seconds 0–59, date 1-31 or depending on month and leap year, month 1–12, etc.). Invalid inputs prompt an error message and a retry request, while valid inputs update the RTC registers. The editing continues until the user chooses the

exit option from this menu, after which the LCD confirms that the RTC is updated and the system return back to menu. If the user selects the **SET ALARM** option, they are prompted to enter the alarm time in the format **HH:MM** using the keypad. The entered time is then validated and stored in a variable for alarm functionality.

This process supports an interactive multifunction clock and environment monitor where the system runs real-time timekeeping with room temperature display, alarm functionality, and a user-friendly time and alarm editing routine via interrupt and keypad input.

**********ALL THE BEST **********