

detector and the equivalent electrical signal (voltage) is obtain at its output. [2]

3.2 IC LM35:

Is a 3 terminal temperature sensor IC measuring the temperature in °C in the range of -55 °C to 150 °C with accuracy of $\pm 0.5\%$. Universally the body temperature is measured in °C and hence the IC LM35 is chosen.

3.3 Instrumentation Amplifier:

Receives both the above measurand. Basically a Differential amplifier equipped with input buffer amplifiers (To eliminate the need for input impedance matching). Hence useful in measurement and test equipment from heavy duty industrial automation to precision medical devices.

When light from LEDs passes through tissues the interference of unwanted light signals (noise) takes place and the signal received by the photodiode may be with noise. The Instrumentation Amplifier has an advantage to measure small signal in noisy environment and hence are used for great accuracy and stability.

3.4 Open loop Comparator:

Compares, One Analogue signal with another or a reference voltage and outputs a binary signal based on the comparison. The comparator is basically an analogue-to-digital converter.

3.5 Microcontroller:

Needs to be programmed for the inputs received from the open loop comparator and sending the result i.e. Pulse Rate, Percentage Oxygen saturation in the blood and the body temperature in °F to LCD display. All computation part is done inside the controller.

3.6 LCD Display:

Is a 16x4 LCD Display used for displaying the actual Pulse rate, Percentage Oxygen saturation in the blood and the body temperature.

3.7 Reset Circuitry:

Resets the microcontroller, clearing the display so as to take the next measurement. [3]

4. Data processing:

Here the data for three major parameters namely percentage oxygen saturation in blood and heart rate from the photo detector's output and the body temperature from the IC LM35 will be received by the instrumentation amplifier at the first stage

where the noiseless data will only be outputted by the instrumentation amplifier as it being the quality of an instrumentation amplifier and will be forwarded to the microcontroller through the open loop comparator (where these parameters will be compared with the standard or reference values for the further processing; for which the microcontroller needs to be programmed. On manipulating these parameters with the help of microcontroller the result will be displayed at LCD output. After taking the readings from the display to reset the system the reset circuitry is used, this will allow taking the readings for the next. [4]

5. Conclusion:

Ultimate intention behind the designing of pulse oximeter is to have quality and in time health assistance and is a great concern and the basic need in the medical field. Though, today's Multispecialty and Superspecialty hospitals are equipped with the high-tech facilities, they are complex and quite expensive. Under such circumstances the proposed design could have been proved to be much effective. The design as above using Red LED, IR LED, photo detector and IC LM35 for measuring the body temperature in degree Celsius. The components, design & technology used makes the system cost effective.

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