SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
Coimbatore-35

DEPARTMENT OF BIOMEDICAL ENGINEERING

19BMB303 & Fundamentals of Microprocessors and Microcontrollers

Unit V - 32- BIT ARM PROCESSOR
III Year/ VI Sem

Dr. K. Manoharan,
ASP / BME / SNSCT

MICROCONTROLLER BASED SYSTEM DESIGN

Reduced Instruction Set Computer

Design Physiology

RISC Vs CISC Architecture

ARM Processor Architecture

ARM Core data flow model, Barrel Shifter

ARM processor modes and families

Pipelining

ARM instruction Set and its Programming

Pulse oximeter using ARM processor

Pulse oximeter using ARM processor
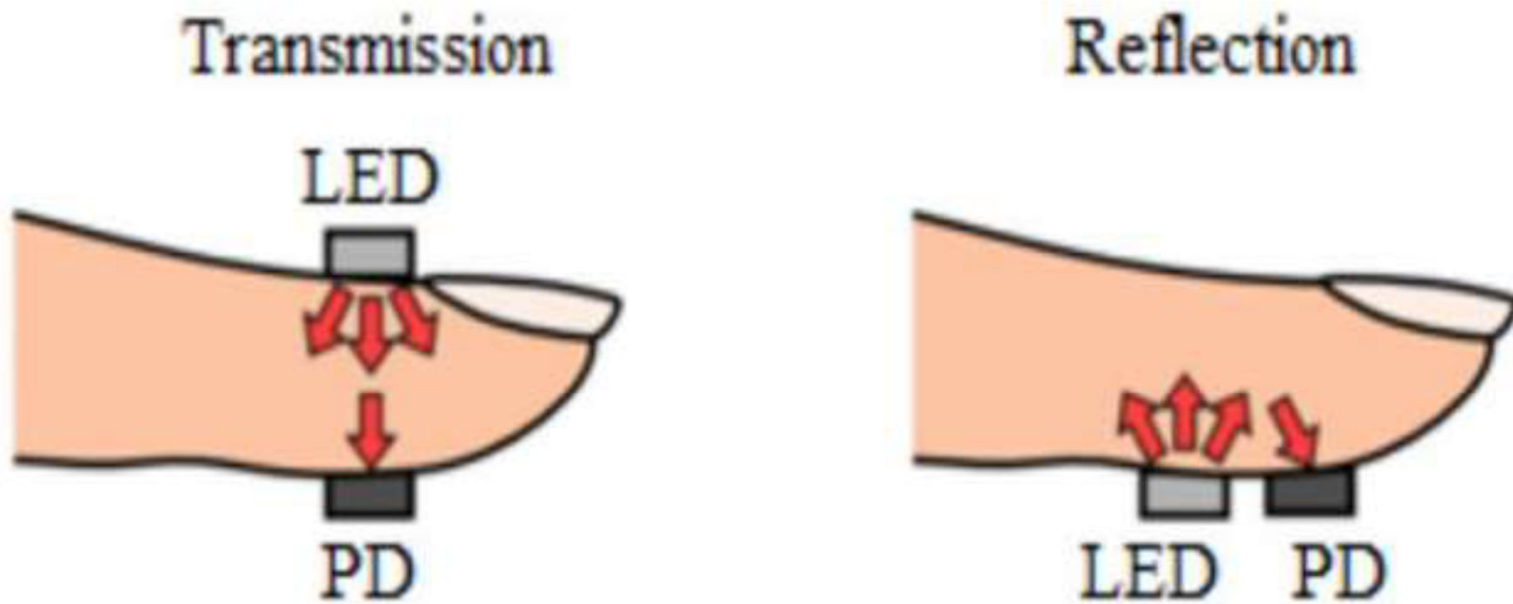
Transmission and reflection approaches for pulse oximetry

Pulse oximeter using ARM processor

- **Noninvasive Measurement:** Pulse oximeters measure the oxygen saturation of a patient's blood hemoglobin in a simple and efficient manner without the need for invasive procedures.

- **Multiple Measurement Sites:** These devices can be used on various body locations, including the chest, wrists, forehead, and feet.

- **Vital Signs Monitoring:** They determine both **oxygen saturation and heart rate**, serving as key indicators of an individual's overall health condition.

- **Portable and Versatile:** Owing to their **compact size**, pulse oximeters are widely used across **different settings**.

Pulse oximeter using ARM processor

- **Continuous Monitoring:** The device provides ongoing measurements, making it effective for detecting arterial hypoxemia.

- **Clinical Applications:** They are utilized in diagnosing and monitoring conditions such as respiratory diseases, sleep apnea, heart failure, pneumonia, asthma, chronic bronchitis, pulmonary edema, emphysema, and chronic obstructive pulmonary disease.

- **Measurement Process:** The device operates by placing well-perfused tissues, such as a fingertip or earlobe, between a light source and a detector to assess oxygen levels.

Pulse oximeter using ARM processor

The operation of the system is as follows:

(a) the receiver has received the most signal sent from the SpO2 sensor,

(b) the low pass filter has been used for filtering the noise

(c) the high pass filter has been used to filtering the DC components,

(d) the remain AC signal then amplifying before sampled by the ADC,

(e) AC signal is then converted to digital signal that is readable for the microcontroller via ADC,

(f) SpO2 and heartrate has been calculably program that embedded within the microcontroller, and

(g) displaying the SpO2 value in LCD screen

Pulse oximeter using ARM processor