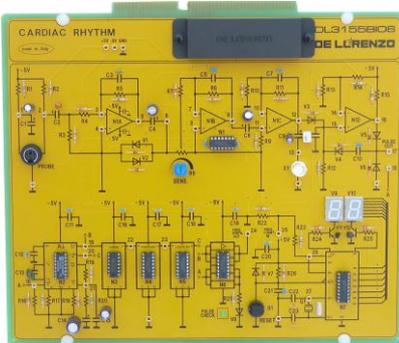




PULSE RATE



DL 3155BIO6



At every heartbeat the arterial blood pressure raises (systolic period) and the dimension of the tips of the fingers slightly increases, while the higher oxygenation causes the decrease of the optical density of the skin tissue.

During the cardiac relaxation period (diastolic period) the pressure decreases, the density increases and the physical dimension of the tips of the fingers decreases. Since these cyclical variations follow the cardiac rhythm, they can be used to measure the frequency of the peripheral pulsations.

This board does not substitute the medical device under study. The results of the experiments have no medical value. They are just for demonstration purposes.

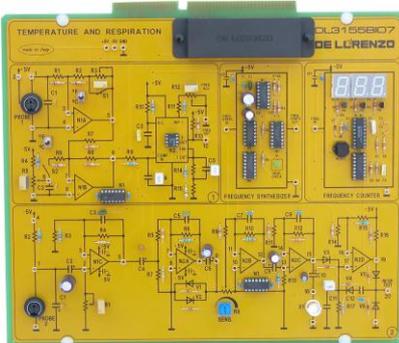
Theoretical topics:

- Concept of cardiac rhythm and typical values, in different subjects and in different conditions of the subject
- Measurement of the cardiac frequency
- The use of optical sensors
- Comparator with hysteresis for the processing of the signal provided by the optical sensor
- PLL, frequency dividers, PIC and their role in the measurement and visualization of the cardiac rhythm

Circuit blocks:

- Recordings of the peripheral pulsations in a finger
- Effects of breathing and exercising on the frequency of the pulsations
- Effects of the temperature on the measurement of the frequency of the pulsations

TEMPERATURE AND RESPIRATION



DL 3155BIO7

The temperature of the body is mainly regulated by the hypothalamus. This region of the brain regulates the homeostatic mechanism that promotes both the production and the loss of heat. In spite of the changes in the environmental conditions, the hypothalamus keeps constant the internal temperature. Moreover, the external temperature of the skin is controlled by both the hypothalamus and the thermal sensors that cause both the afflux of blood to the skin and the perspiration. The breathing system transfers the oxygen to the blood and expels the carbon dioxide in the atmosphere. The breathing frequency can be calculated by measuring the expansion or the contraction of the chest and also by measuring the movement of air that enters and exits from one nostril.

Theoretical topics:

- Anatomy of the respiratory airways or tracts
- Measurement of the body temperature
- Temperature sensors
- Temperature meter
- Measurement of the respiratory frequency

Circuit blocks:

- Variation of the temperatures on the surface of the body
- Advantages of the use of the electronic instrumentation with respect to the classic mercury thermometers for the measurement of the temperature
- Main functions of the breathing system
- Breathing frequency while relaxing and while exercising

This board does not substitute the medical device under study. The results of the experiments have no medical value. They are just for demonstration purposes.