

**METHOD AND DEVICE TO DETERMINE
THE PERIPHERAL BLOOD CIRCULATION LEVEL
AND OXYGEN SATURATION**

¹Kozlovskaya T.I., ²Sander S.V., ¹Zlepko S.M., ³Vasilenko V.B., ¹Pavlov V.S.,
¹Klapouschak A.Yu.

¹Vinnitsia National Medical University, Department of General Surgery,
21018 Ukraine, Vinnitsia, Pirogova Str., 56;

²Vinnitsia National Technical University,
21021 Ukraine, Vinnitsia, Khmel'nitske Dr., 95;

³Universidade Nova de Lisboa, Faculdade de Ciências e Tecnologia,
2829-516 Caparica, Portugal

Introduction. Violation of peripheral blood circulation is a common pathology, which can indicate a particular disease. Depending on the stage, age, features and terms of obliteration and reactivity, circulatory disorders of certain body parts are formed in each patient. Early diagnosis of such disorders is an important task for modern medicine, that requires the development of new and improvement of existing diagnostic tools [1, 2].

Today there are many diagnostics methods, which are based on the use of laser and optoelectronic devices. Among them is photoplethysmographic method, which allows measuring the blood flow as it moves through veins, arteries and capillaries. In comparison to other methods for diagnosis biological object (BO), for example photoacoustic method, photoplethysmographic method can improve the reliability of registration hemodynamic blood supply [1, 2].

Method. The development of photoplethysmographic diagnostics devices, that based on the detection of reflected or passed through the biological tissue optical radiation, is very important. But the intensity of the radiation, that is recorded by photodetector, depends on the absorption capacity of tissues. Primarily, it depends on electronic structure of molecules and atoms, the radiation wavelength, absorbing sample thickness, temperature and absorbing centers concentration.

Practical realization. We have developed device to determine the level of the peripheral blood circulation, which determines the basic parameters of peripheral blood circulation and oxygen saturation level.

The device consists of two sensors: infrared sensor 3, which contains the infrared radiation source 1 and photodetector 2, and the red sensor 6, which contains the red radiation source 4 and photodetector 5 (Fig. 1). The outputs of the sensors connected to the inputs of the amplifiers 7 and 8. The outputs of amplifiers connected to the inputs of the microcontroller. To mobility of device, is used a graphical liquid crystal display 12, which depicts the value of heart rate, blood saturation and blood circulation diagram. This allows diagnosing the patients without a personal computer (PC); it is important for examining postoperative patients. In addition, the device has a 14 slot for Secure Digital memory

card, that is connected to the microcontroller; it allows you to store data and transfer them later to a PC [3, 4].

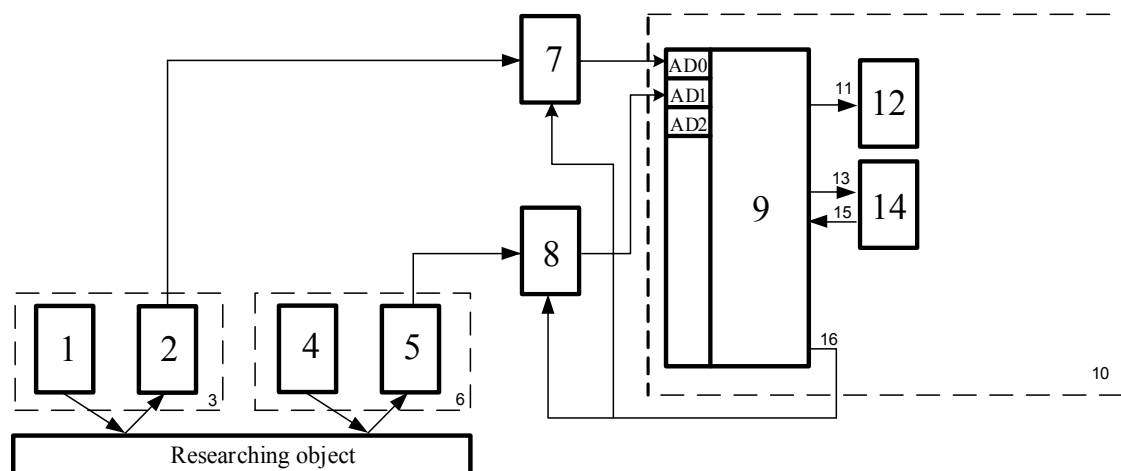


Fig. 1. Block diagram of the developed device

The practical realization of this device with three models of optical fibers have been implemented.

Conclusion. In the article have developed the device to determine the level of peripheral blood circulation and oxygen saturation. The equations were composed to determine the blood saturation, and displaying of obtained information was represented. Besides, the ways to use the fiber optic sensors in device were proposed.

References

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