содержалась в питательной среде состава: 4% сахара, 96% дистиллированной воды. Подсчет клеток осуществлялся при помощи камеры Горяева.

В результате работы выявлена зависимость выживаемости микроорганизмов от характеристик поля для различного времени воздействия. Найдено пороговое значение магнитного поля, которое запускает деструктивную реакцию в клетках.

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МНОГОФУНКЦИОНАЛЬНОЕ УСТРОЙСТВО КОНТРОЛЯ ЖИЗНЕННЫХ ПОКАЗАТЕЛЕЙ ЧЕЛОВЕКА

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MULTIFUNCTIONAL DEVICE FOR MONITORING HUMAN VITAL SIGNS

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The goal of the work is to develop a device that allows measuring such physiological indices as ECG, skin resistance and photoplethismography.

To date, it is impossible to imagine medicine without the use of electronic medical equipment, whose primary purpose is to monitor the human health.

The relevance of the work is required because the interest in human health has increased, and the development of compact and portable devices have been gaining popularity now, especially wireless and long-distance data transmission.

The purpose of this work is to develop device that allows the conduct of evaluation measurements such human physiological characteristics as electrical activity of the heart (ECG), skin resistance and photoplethismography.

Device development was carried out in the Altium Designer program. It is a PCB and electronic design automation software package for printed circuit boards.

To ECG measurement operational amplifiers AD620 was used. It designed specifically for measuring biological potentials. For the skin resistance measurement an usual non-inverting amplifier was used.

Switching between the circuits of skin resistance and ECG measurement are carried out using analog switches controlled from a microcontroller.

To control the device clock buttons will be used. In total there will be 4 of them: on /off, 2 control buttons and an input button.

The microcontroller will use the following data interfaces: I2C and SPI. I2C interface is used in the chip for measuring photoplethysmography, the SPI interface is used in electronic potentiometer to adjust the gain in an ECG measurement circuit.

One of the important development parts is the organization of the device power supply. The device has both digital and analog components, so it is necessary to create separate digital and analog power and ground. The power requirements for the various components of the device are as follows:

- 1.8 V for power in the chip for photoplethysmography;
- 3.3 V to power the microcontroller;
- 5 V analog for powering operational amplifiers;
- 5V digital for display power.

In systems with mixed signals, it is desirable to physically divide the ground into digital and analog. This is done to ensure that currents flowing in digital circuits interfere with sensitive analog signals. Separate buses for analog and digital grounds were organized in this device. Their integration on the board will be through the low impedance jumper.

As a result, the electrical circuit of the device was developed and the PCB was traced. Due to the presence of digital and analog circuits in the device separate power and ground buses were organized, voltage converters were selected for this purpose.