
SELECTION OF ELEMENTS FOR THE DEVELOPMENT OF A BEDSIDE PATIENT MONITOR

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Abstract. The bedside monitor is a modern high-tech device, without which not a single intensive care unit of an inpatient and intensive care unit of a hospital can do today. All the increased requirements for patient care and safety, for the quality of diagnostics of diseases [1-5], for control over the conduct of medical procedures, make the bedside monitor an indispensable medical equipment in modern hospitals.

The bedside monitor occupies its niche in the Ukrainian medical equipment market. Today, many manufacturers offer consumers a large selection of bedside monitors, which differ in their capabilities and equipment, size, screen diagonal, and price. Improvement of the base unit of the bedside monitor with the help of a modern element base makes it possible to increase the technical and metrological indicators of the control of vital physiological parameters of a patient and ease of maintenance.

At all times, doctors used different methods of treatment, but all had one goal - human health. Our lives very often depend on doctors. Until a few centuries ago, medicine was powerless to treat many diseases and there were no special devices to help doctors detect the disease in the early stages of its development. Now, it has become much easier to control treatment processes thanks to new technologies.

After a special examination, we can detect the disease in its early stages and begin treatment in time. Many hospitals are already equipped with modern equipment, which has gained popularity and has become indispensable in resuscitation. The bedside monitor [6-7] has become an indispensable assistant for all patients.

The bedside monitor is a high-tech device that monitors the patient's condition, and in case of deterioration of the patient's condition, doctors, thanks to this monitor, will be able to provide the necessary assistance in a timely manner. The bedside monitor is needed not only in the intensive care unit, but in any modern ward, as well as high-quality medical clothing. A monitor can help determine how effectively a patient is being treated. We can monitor the cardiovascular and respiratory systems. The purpose of work – the improvement of the basic block of the bedside monitor for control of vital physiological parameters of the patient due to use of the newest element base. The resuscitation monitor is intended for control of vital physiological parameters of the patient: the electrocardiogram; the heart rate; the non-invasive and invasive

blood pressure; the body temperature; the respiratory rate; the saturation of oxygen in the blood; the photoplethysmogram observation; the observation of capnogram; the measurements of CO₂ content in exhaled air. The base unit includes: the module "CS" for coupling with the central station; the "VIDEO" module for pairing with external video monitors; the color TFT display; the inverter for display backlight lamps; the thermal printer; the capnograph; the blood pressure module; the CPU board; the invasive pressure module; the module of oxygen saturation in the blood.

As an element based we choose the following elements as [8]:

UC3843BD1G - a high performance fixed frequency current mode controller, designed for Off-Line and DC-DC converter applications offering the designer a cost-effective solution with minimal external components;

MAX8546EUB - voltage-mode pulse-width-modulated step-down DC-DC controller, have a wide 2.7V to 28V input range, and do not need any additional bias voltage;

PIC16F628 - FLASH-Based 8-Bit CMOS Microcontroller, have enhanced core features, eight-level deep stack, and multiple internal and external interrupt sources;

AD8541 -single rail-to-rail input and output single-supply amplifier featuring very low supply current and 1 MHz bandwidth, guaranteed to operate from a 2.7 V single supply as well as a 5 V supply, provide 1 MHz bandwidth at a low current consumption of 45 mA per amplifier;

LM339 - Quad Single Supply Comparator, designed for use in level detection, low-level sensing and memory applications in consumer automotive and industrial electronic applications;

HCF4013BE and HCF4013BM - two-stroke D-flip-flops, a monolithic integrated circuit fabricated in metal oxide semiconductor technology available in PDIP14 and SO14 packages;

MAX1640 and MAX1641 - step-down pulse-width-modulation controller use an external P-channel MOSFET switch and an optional, external N-channel MOSFET synchronous rectifier for increased efficiency, CMOS, adjustable-output, switch-mode current sources operate from a + 5.5 V to + 26 V input, and are ideal for microprocessor-controlled battery chargers;

LM809M3-2.63/NOPB - microprocessor supervisory circuits provide a simple solution to monitor the power supplies in microprocessor and digital systems and provide a reset during power-up, power-down, and brown-out conditions.

When choosing a bedside monitor, it is important not just to compare the cost of different systems, but be sure to correlate the price, functionality and quality of equipment. Calculations of the coupling of elements with the nodes of the electrical schematic diagram of the base unit, developed assembly drawing of the printed circuit board of the base unit and the drawing of the printed circuit

board indicating the technical requirements for thickness and width of printed conductors, distance between conductors.

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