EXHAUST QUALIFICATION WORK ON THE BACHELORATE PROGRAM:
Electronic tutorial guitar playing

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Direction of training
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Self-teachers of the last century

Classic version of the paper self-instruction manual.
Disadvantages: inconvenience, lack of clarity of presentation, a small information base, small naglandnost

Online-Instructor **Get Instinct**
Disadvantages: the need for a computer or laptop, lack of autonomy, low visibility

Prototype of foreign developers «FletX»

Disadvantages:

1. Low learning effectiveness
2. A large amount of time wasted
3. Lack of autonomy
4. Lack of visibility
5. Small range of songs
6. High price
7. Foreign production

Criteria for our device

- Cheapness
- Simplicity of construction
- Ease of use
- Autonomy
- Large base of musical compositions
- Domestic production

Block diagram of the device

Display ← Microcontroller ← Button block

Microcontroller → LED matrix
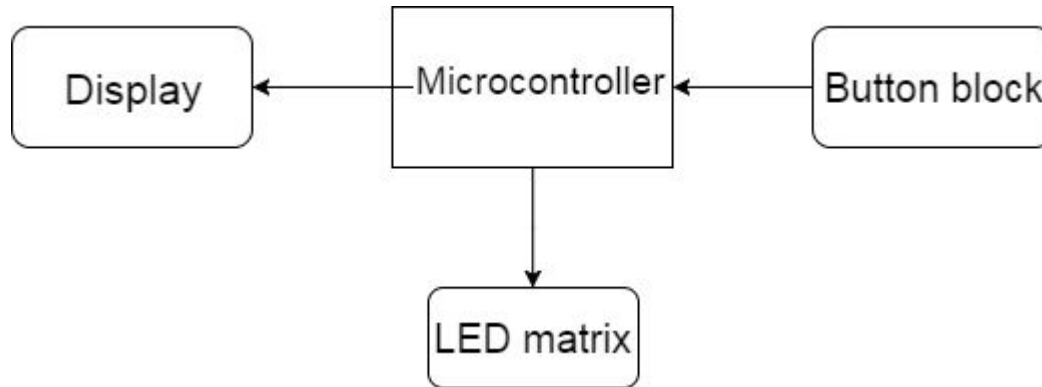
To operate the device we need:
 -Control element that corrects the operation of devices. Such an element acts as a controller.
-To control the device are 4 buttons
-To display information, the names of the songs and the chords used, a display is used which, to reduce the number of pins used, is connected to the microcontroller through the port expander.
-The sequence of reproduced chords is output through an LED matrix, also connected via a port expander

ELEMENTS USED: Controller

- **As the control element, I choose the Arduino Uno controller**
- **The controller is needed to manage all the functionality of the device.**
- **Ideal for our project, as well as the number of ports controller.**
- **Microcontroller:**
- **ATmega328**
- **Operating voltage**
- **5 V**
- **Input voltage (recommended)**
- **7-12 V**
- **Input voltage (limiting)**
- **6-20 V**
- **Digital Inputs / Outputs**
- **14 (6 of which can be used as PWM outputs)**
- **Analog inputs**
- **6th**

LCD 1602 I2C

- **Liquid Crystal Display (LCD) 1602 I2C.**
- **We use it as a visual input-output of information.**
- **I chose this model because of its low cost and high reliability**
- **Also this display is chosen because of the convenience of working with Arduino, since it has ready-made libraries.**
- **Supply voltage 5 V;**
- **Display type character with the ability to load characters;**
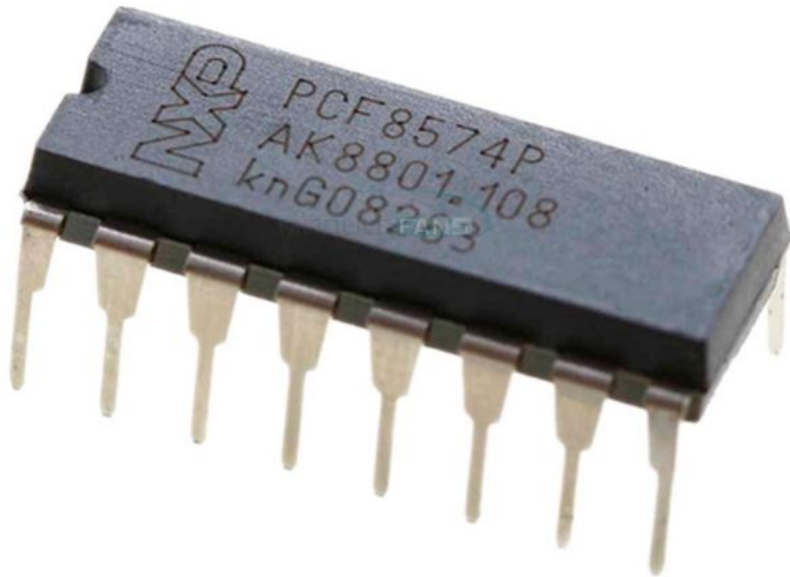- **Display format 16 × 2 characters;**

Button

- **To control the microcontroller I use the buttons.**
- **I chose them because of their ease of use, cheapness and reliability**

Port extender PCF8574P

- **We use to connect devices to the microcontroller using the I2C protocol**
- **I chose this model because of its low cost and high reliability**
- **This display is also chosen because of the convenience of working with Arduino, as there are ready-made libraries.**

Chip-LEDs
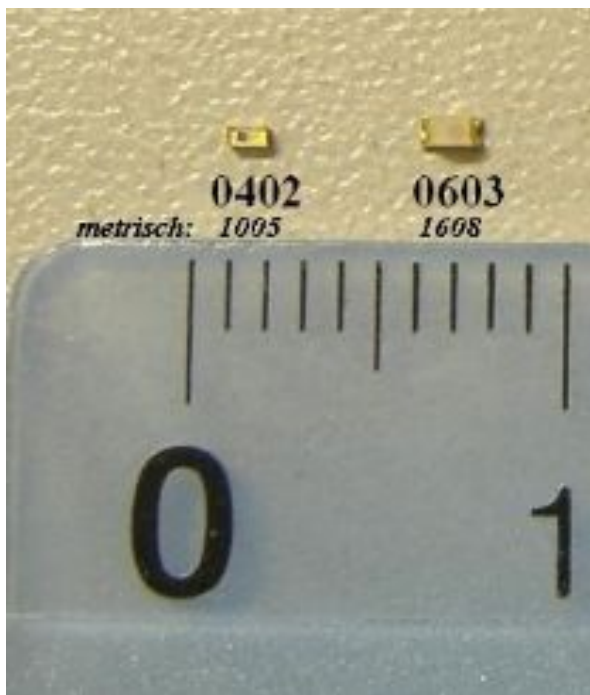
- **We use to output the light indication**
- **These LEDs have a small size, which will not create difficulties in training**
- **I chose this model because of its low cost and high reliability**

Electrical circuit
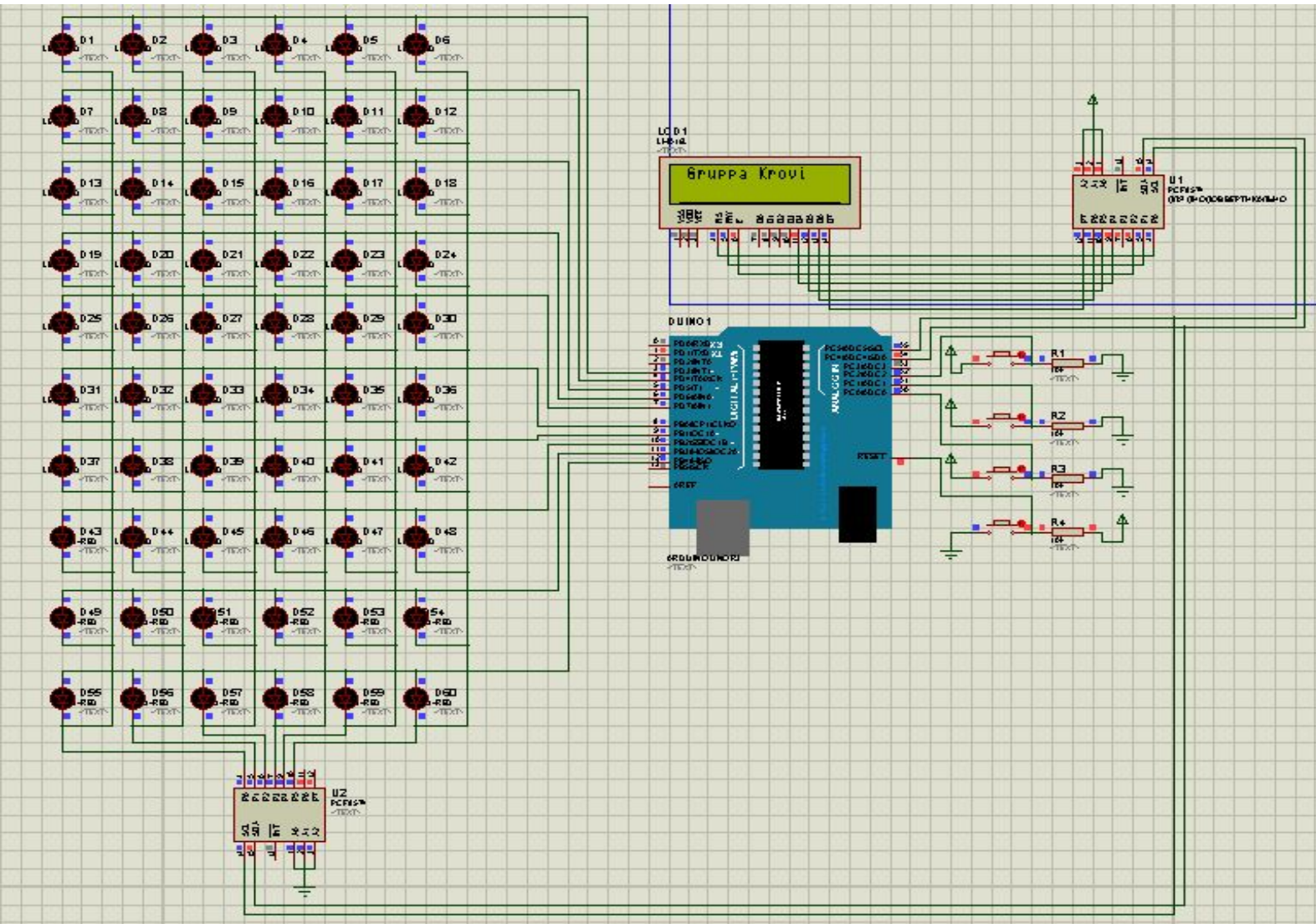
To model the project, the Proteus program was chosen.
We use it for convenience and to understand if the pattern will work correctly when we sew the model. The figure shows the display, where information is displayed, about the selected song.
When you press the buttons on the ports A0, A1, A2, you can switch to the selection of other songs

Block diagram of the program
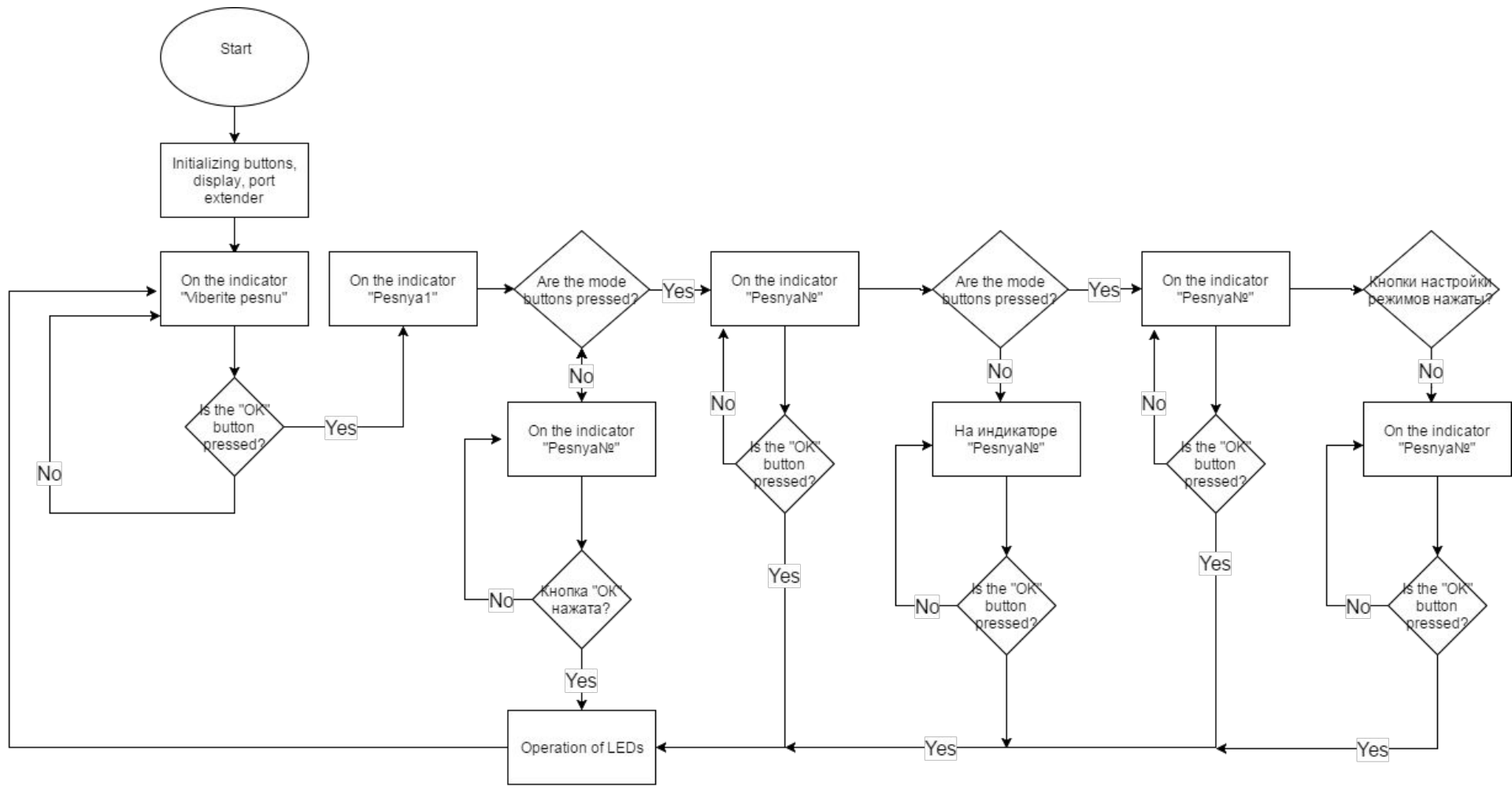
Conclusion

In this final qualification work, an electronic device for learning to play the guitar has been developed. The device is tested in the Proteus simulation environment. The circuit is assembled on an Arduino platform and tested in hardware. The device turned out to be optimal in price and functional in terms of capabilities and can be widely used in the learning process.