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METHODS FOR DESIGNING ELECTRONIC DEVICE CIRCUITS IN THE “PROTEUS” PROGRAM

Annotation: In the field of electronics, modeling programs are of great importance. Before any electronic device is created, its virtual model is created in special programs, and the desired results are obtained by virtual analysis. After the successful implementation of the Virtual modeling process, an experimental sample is created in the laboratory conditions of the electronic device. From the created device, results are obtained using real measuring instruments. The results obtained are compared with the results obtained virtual.

Keywords: virtual model, simulation, virtual analysis, circuit diagram, oscillography

Currently, full-fledged computer programs are used in the design of electronic devices. Programs that design electronic devices are also in turn divided into several types. When designing a device, its principal scheme is initially drawn up and analyzed using virtual instruments. Analysis can be performed using different virtual instruments, depending on the type of device. Another advantage of Virtual modeling programs is that in the element library of such programs there is a virtual model of any measuring instrument, which does not require special laboratory equipment to check any device. At the second stage, the printed circuit board and design of the created device will be designed. Modeling programs can vary, i.e. programs that only work with principled circuits (e.g. MicroCAP) or programs that only design printed circuit boards (e.g. Sprint layout). There is

another type of modeling software that allows such programs to include assembling the principal Circuit of the device, analyzing it, designing the printed circuit board and 3D view design of the device. Such generalized programs are mainly used in higher and secondary special education institutions that train engineers in electronic constructions to teach students virtual analysis and Design [1, 2].

This article shows the stages of working in the Proteus virtual modeling program, presented by the application developer Electronics lab center, which is part of the above-mentioned Program list, and modeling a two-cascade amplifier circuit in it [2-4].

The Proteus program interface was originally tried to make it as understandable as possible to the learner using it. The program's item library is also very large. With the help of the program, it is possible to assemble and analyze circuits that are much more complex, from simple electronic circuits. There are also virtual models of microcontrollers, which are currently the most common in the element library. The Proteus program consists of three parts. In the first part, the principle scheme of the device is modeled and analyzed. In the second part, it is possible to write a program on the electronic components that are programmed. Programming is done using special block schemes, the assembler programming language, and the "C" programming language. In the third part of the program, the printed circuit board of the device is designed and a 3D design is created. The presence of schemes of different difficulty in the structure of the program provides convenience for early learners. There is a special "website" of the Proteus program, and with the help of this site it is possible to download newly produced element models and create virtual models of electronic devices from them. When the program is launched, a window for creating a new project will first open. It is possible to create a new project through the window or change ready-made projects [5, 6]. When the Proteus program is

launched, the initial project is created by selecting the “new projekt” command from the following section of the window (Figure 1).

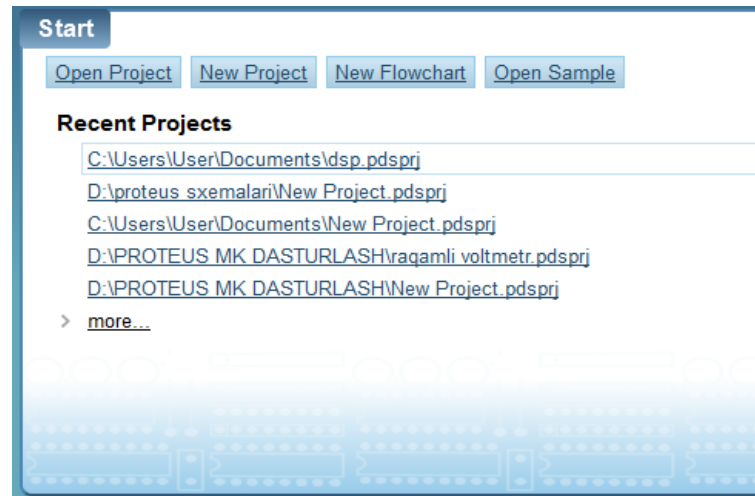


Figure 1. Window for creating a new project in the Proteus program

Once the new project (new Project) command is selected, a window for selecting the type of project will open. Using this window, the name of the project and its storage location in memory will be displayed. The program initially selects it itself automatically, and it can also be changed manually. At the next stage, several ready-made boards are offered in the project. It is up to the designer to decide whether to use them or not. Examples of such plates include the “Arduino” plate.

Let's look at the stages of designing a simple amplifier circuit in the Proteus program. First of all, an electronic circuit of the device is created and, being analyzed using measuring instruments, the result is achieved. When creating an electronic circuit of the device, it is advisable to use as many existing and multi-use components as possible. Because, the use of outdated or non-manufactured components can not achieve the expected result. The scheme shown in Figure 2 used the most common components. The circuit shown in the figure is a low frequency power amplifier. Weak sound signals can be amplified using the device.

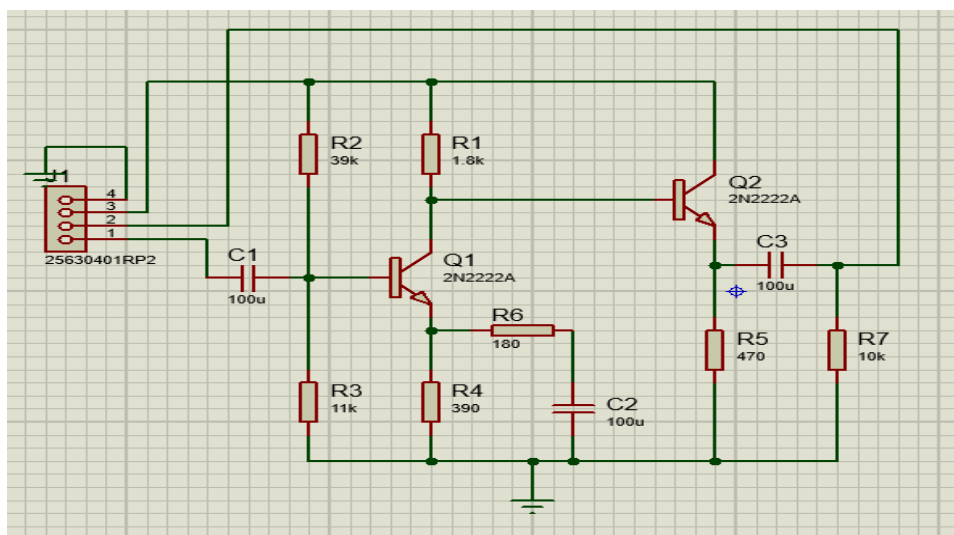


Figure 2. Electronic circuit of the amplifier device

To analyze the device model, the measuring instrument is selected depending on the task that the device performs. In the analysis of the amplifier circuit, an oscillography is mainly used. In this case, the differences between input and output signals are checked (Figure 3).

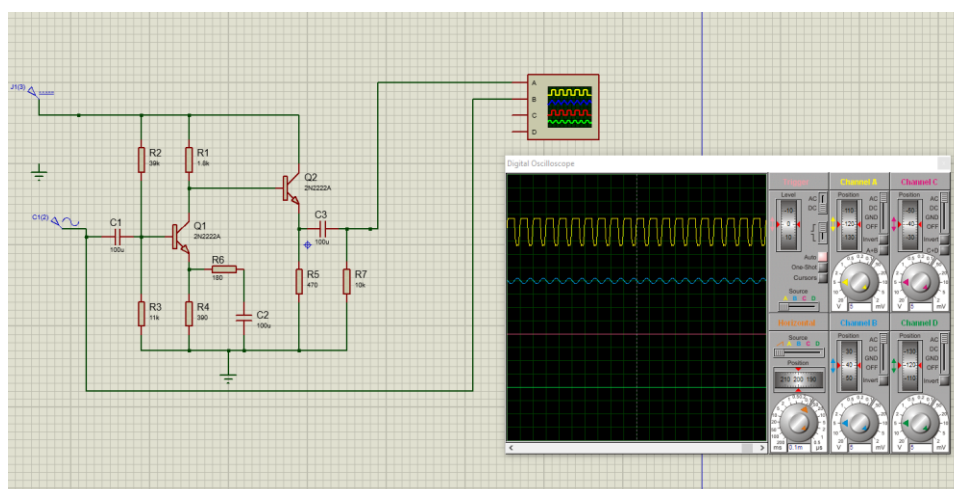


Figure 3. Analysis of the amplifier circuit.

Another advantage of the Proteus program is that it allows you to design the printed circuit board of the device using the program and also see its 3D appearance (Figures 4-5).

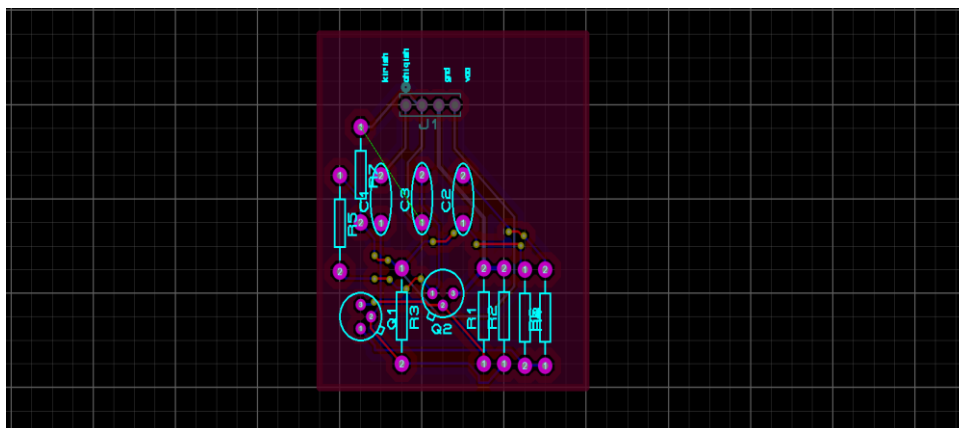


Figure 4. Printing plate of the Amplifier

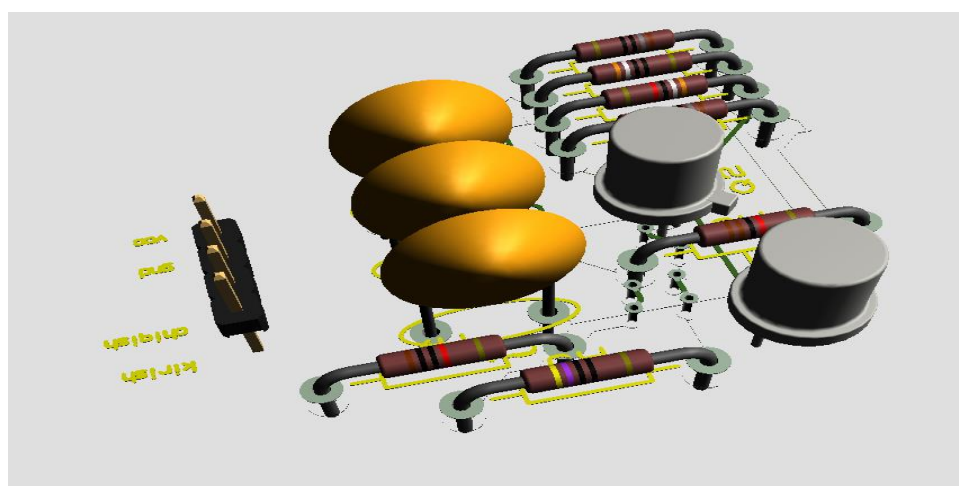


Figure 5. 3D view of the amplifier device

In conclusion, it can be said that the “Proteus” program is a convenient and reliable software tool when Future Electronics Engineers have such skills and skills as designing devices by modeling analog and digital electronic circuits at different levels. Learning the stages of designing electronic devices through the program and having the skills to be able to apply it in practice is one of the important tasks facing future industrial electronics engineers today.

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