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ACOUSTIC SYSTEM WITH SUBWOOFER

Nowadays, audio players that reproduce the sound from a magnetic tape are not in use. Personal computers reproduce the sound of much higher quality. Moreover, the advantage of a personal computer system is a huge number of music that can be stored in a computer memory. High-quality sound is also required for games and movies that can be viewed from a CD. Only a high-quality acoustic stereo system, which is divided into several bands, with a subwoofer can effectively and spatially reproduce the sound.

The requirements for sound quality of musical compositions and the various sound effects used in films and computer games are increasing. Very few people are satisfied with the sound amplifiers of the past generation. The amplification of sound in such devices was mainly carried out on several transistor cascades. The large mass of elements through which the sound signal passes, by its nature introduces a certain level of noise and peculiar amplitude-frequency distortion. In this case very low and very high frequencies are impossible to reproduce. They are simply lost when passing the amplifying path.

The development of active acoustic system with a subwoofer is currently a topical task.

The solution to this problem is as follows. The audio signal must be divided into ranges. It is necessary to amplify the signal independently between the right and left channels and the ranges using analog circuits. Though microcircuits are more expensive than transistors, they have the advantage of excellent quality, sound clarity and small overall dimensions. For high-quality playback of the lowest frequencies it is advisable to use a subwoofer, the so-called low frequency amplifier.

Usually 2-5 main speakers and one subwoofer are used. Only one subwoofer is used because a human ear does not take the direction of the low frequency wavelength. The wavelength is much greater than the distance between the ears and the phase difference between the right and left ear is minimal and it can be neglected. Therefore, the sound from the right and left channels can be reduced to one and given to the subwoofer.

As an example, we can remember so-called cinema "Multiplex", that is popular in Zhytomyr. It looks like a renovated usual cinema with the usual cinema projector, which was used in the past. So, why is it so expensive to watch a movie there? The reason is in the sound. Due to the skillful arrangement of a certain number of loudspeakers with a certain turnaround, they achieve a complete reproduction of sound. If the screen shows the car approaching from the right, then the sound is heard from the right side as well. Besides, this acoustic system can not do without subwoofers, because it's impossible to reproduce the noise of cars, the buzzing of aircraft engines and other equipment, with

normal quality loudspeakers. The described system of sound reproduction creates the so-called effect of "presence".

The acoustic system with a subwoofer can be used at home as well. The subwoofer provides the highest quality and completeness of the reproduced sound. This work shows the order of system development and gives examples of work with the system. The issues on system design and reliability of its work are considered. The ways of improving the control through the WiFi mechanism and the expediency of using dual speaker systems or a possible replacement for three or four band speakers are regarded.

The principles and technologies of realization of the device basic characteristics are researched. The dependence of audio quality on the parameters of the sound paths elements and characteristics of the basic units is determined. The ways of the device improvement are analyzed. Options for the construction on the basis of microcontrollers and FPGAs are considered, as well as program adjustment of channel parameters and their number, taking into account the features of the room configuration.

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