УДК 534.2

THE ART CREATED BY ELECTRONIC MUSIC

Mamytov H.K.
Scientific supervisor – Assistant professor Alekseenko I.V.

Siberian Federal University

Electronic Music

The 20th-century developments in electronics and computer technology have changed many things about the world, and while it often seems like these technologies are most directly tied to the sciences, the truth is that they've also changed a great deal about the art world. Technology has changed the way many people create and view art, and these technologies have the power to touch every field of art, including painting, writing, sculpture, music, theatre, and film. The most significant changes, however, have been in the fields of visual art and music. A great deal of visual art is now created on a computer screen instead of by hand, but that is a topic for another place. This page is about making music through electronics.

Electronically-generated music is so significant that it has not only generated its own totally separate field of music, but several sub-genres. The field of electronic music comprises such subtypes of music as house, trance, jungle, industrial, and many other even more obscure niches. This is not surprising, considering that an electronic music synthesizer (or "synth", as they are often called for short) is capable of creating sounds that are quite unlike any other instrument known to mankind. With a synth, you can make sounds that are simply not possible to make with a piano, violin, or even a bassoon. Indeed, it was for this very reason that around the 1970s, many popular bands which had formerly considered themselves guitar-driven changed to predominantly synth-based music. (Depeche Mode comes to mind as an example of one such band.) This is not to say that the sound of a synth is better or worse than the sounds of traditional instruments (after all, "better" or "worse" are subjective terms when applied to music), but rather that electronic music deserves recognition as its own separate genre.

Today, many people believe that we're entering a new era of artistry in which people can create their own art with relatively inexpensive home equipment instead of the multi-thousand-dollar studio setups that were required of artists not too long ago. It wasn't that long ago that a person wishing to record professional-sounding music needed a great deal of recording equipment which was well out of the range of most general buyers. Today, however, home computers are common and inexpensive enough that almost everyone can have one. Certainly, anyone who can afford to live inside a building (i.e. someone who is not homeless) can afford a computer. With a computer, you can create world-class music using very inexpensive setups. Of course, if you are going to record instrumental music, you will need to buy instruments, but if you are going to create purely electronic music, the only instrument you need is the computer itself. The only additional requirement is software.

For those who prefer a somewhat more fancy arrangement, you can buy electronic music synthesizers for quite reasonable prices (about what an acoustic guitar would cost). There are so many ways to make music these days that it can sometimes be a bit overwhelming trying to decide on the best technique. This page intends to introduce the reader to the concepts behind electronic generation of music, so that people might hopefully have a better idea of some techniques and options available.

One of the fascinating things about electronic music is how many fields of human knowledge and endeavor it draws from. Obviously, it entails knowledge of music, but beyond that, creating and using electronic synthesizers and related sound equipment involves considerable aspects of electrical engineering, physics, and math. Using synthesizers to create music is a field where all of these seemingly disparate branches of knowledge come together to produce what is quite possibly the most elegant fusion of art and science currently known to humanity.

But making electronic music is not easy. Using a synthesizer is decidedly different from using a guitar, violin, or piano. Part of this stems from the fact that synthesizers, like most types of electronic equipment, vary widely in layout and features. If you know how to play a guitar, you can pick up pretty much any guitar in the world and start playing it pretty quickly, but different synthesizers tend to be quite different from each other, and the operator should be familiar with the synthesizer before starting to make music. But beyond that, synthesizers are also not as intuitive as traditional instruments. A person can pick up a guitar and, with no musical background or training whatsoever, start to produce some pretty good music on that guitar just by trying different sounds for a while. Synthesizers are more difficult to get the hang of.

A bit of background in audio and music theory is certainly helpful when learning how to use a synth. To that end, this page also intends to be a brief introduction to various different fields of theory which, hopefully, will be helpful to the budding electronic musician.

The Physics Of Sound

Sound is movement or vibration

A sound is actually nothing more than a movement. When you tap your finger on a table, the vibration causes the table to shake a bit, and it also sends vibrations out through the air around the table. These vibrations shake your eardrums when they reach your ears, and the result is what we perceive as sound.

It becomes apparent, then, that sound cannot travel through a vacuum. Because sound is nothing but a series of movement waves propagating through some material, a sound needs a carrier, even if that carrier is simply air. This is why the seminal sci-fi movie Alien used the catch line "In space, no one can hear you scream."

An electric speaker, not surprisingly, creates sound by vibrating. It does this by using an electromagnet; within the speaker is a coil of wire which functions just like any other coil electromagnet, except this coil is called a voice coil because it's used to produce sound. When you send electrical current through an electromagnet, the electromagnet creates a magnetic force. Since the voice coil in a speaker is suspended within a permanent magnet, the magnetic forces exerted by the voice coil cause it to move around. If the electric current is varying rapidly, the voice coil vibrates rapidly, producing sound waves.

It should become apparent by this description, then, that the only way to make sound with a speaker is to use varying electrical voltage. In other words, you cannot simply apply a constant voltage (i.e. DC, direct current) to the speaker and expect to hear anything. You must apply some sort of varying electrical level.

Volume And Sound Energy

The volume of a sound is perceived by our ears as how loud the sound is. In terms of physics, the volume of a sound is how much energy the sound wave carries. Since a sound wave is just movement of matter, some amount of energy is required to create the sound wave. As the sound wave moves, it carries energy along with it. Bear in mind that the louder a sound is, the more energy the sound wave contains, and therefore, the more energy is required to actually generate the sound wave. (This is an example of the conservation of energy law, familiar to physicists.)

Music Theory

Notes

The only real difference between different musical notes is their frequency. A musical note is defined by how many oscillations its sound wave produces per second. Electrical engineers will quickly recognize the concept of "cycles per second" in a wave as being measured in hertz. One hertz equals one cycle per second.

Modern DJs write music by means of electric categories of transformer Tesla

This only thing from inventions of Tesla carrying his name today is possible. It is the device making a high voltage at high frequency. It was used by Tesla in the several sizes and variations for its experiments. Transformer Tesla also known as coil Tesla is used today in various applications in radio and television. But here such application you hardly saw. Modern DJs by means of two and more coils Tesla do pieces of music and simply good music.

Transformer Tesla, also coil Tesla - the device invented by Nikola Tesla and carrying his name. The resonant transformer is making a high voltage of high frequency. The device has been declared by the patent of the USA № 568176 from September, 22nd, 1896, as "the Device for manufacture of electric currents of high frequency and potential".