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ENG 119

Research Project
"How to Build an Electronic Music Studio"

If you have ever wondered how to build an electronic studio but were never quite sure on where to start, then you are reading the right paper. In these pages, I will discuss how to build an electronic music studio, what it will cost, and how you can take your time doing so if you prefer.

The first thing that I would recommend that you do is purchase some electronic music recordings. By listening to different recordings, you will have a better idea of what is possible with electronic music equipment. The first CD that I would recommend is the album, My Life in the Bush of Ghosts by Brain Eno and David Byrne. This album contains work that in my opinion, is very complex and absorbing music. Keep in mind however, that not every instrument on this CD is purely electronic. This will just give you an idea of what is possible with some of the electronic equipment available. I recommended this album first because it covers a wide range of styles of music which may give you a better idea of what you can record. If you want to listen to a album that has been created completely with electronic keyboards, and is also a little less complex, then I would recommend the album The Shutov Assembly by Brain Eno. This recording is very relaxing and meditational. If you can not find these particular albums in the music stores, then someone at the store should be able to order them for you. I would also look for any of the recordings of Jean Michel Jarre. Electronics make up a higher percentage of the recordings by this artist, so you may have a better idea of what is possible with only using electronic equipment and not adding vocals or other acoustic instruments. (Acoustic instruments are instruments such as Congas which are not electronic).

The artists that I have mentioned so far have made a impact on the electronic music scene and they have also made their mark in some of the electronic music history books as well. The same can be said of the music group Tangerine Dream.

The next thing that I would recommend that you do is buy an electronic keyboard. Electronic keyboards are also known as sound modules. You can buy other kinds of sound modules such as samplers and sample players, but I recommend that you start out with the keyboard known as the Korg Karma. It costs about $1700, but in my opinion, it is worth that price. I purchased my Karma at Music Box. Music Box is located on Van Dyke not far from Twenty-two mile in Utica. The Karma may also be purchased at Guitar Center. Guitar Center is on Gratiot in Roseville just off of Thirteen Mile Road. If you are not sure what kind of keyboard you want to buy, then you can try out a Karma and many other sound modules at either Music Box or Guitar Center. Sometimes you may find something used at these locations as well.

The Karma has good MIDI implementation. This means that it can communicate well with computers. In addition, the Karma has a unique pattern generator that can also be used as a drum machine. The only drawback about the Karma is that it has limited expandability compared to the Korg Triton Rack. On the Karma you can only install two PCM sound cards and on the Triton Rack you can install eight. If you want to be serious about recording music that contains the sounds of realistic pianos, strings, and percussion, then this may make a difference with your music. Two PCM slots on the Karma are still enough to add some professional sounds, just not as many as on the Triton Rack. However, a drawback about the Triton Rack is that it doesn't have a keyboard attached to it so you will need to buy an additional keyboard in order to play the sounds off of it. The Triton Rack and another keyboard will then end up costing more than the Korg Karma. When the word "rack" is attached to the name of a keyboard that means it is just a sound module with the sounds in it and no keyboard is attached to it. This might be an advantage for someone who already has a good keyboard but just wants access to more sounds. Adding a rack to a studio instead of a keyboard is that it may save valuable studio space.

The Karma and Triton both offer a headphone jack so you can listen to your music in stereo. If you don't purchase some external speakers you will only be able to use headphones. I suggest that you purchase a good set of external speakers. These are also referred to as monitors. A big advantage to working with monitors instead of headphones is that two or more people can work on the music easier as they won't need to go around the studio with headphones and dangling extra headphone cords. There are many different kinds of monitors to choose from. I have been told that the Event TR8N speakers are good and only cost $149. They have built-in amplification so they do not need an external amplifier. They can be purchased at Guitar Center.

On both the Karma and on the Triton, you have a nice three band equalizer. This tool will allow you to control low, high, and middle frequencies of the sounds that you use so your overall mix of the music will sound more professional. Look to the right of the visual below for the three band EQ.

<Visual of Karma screen>

Both of these sound modules also let you add a variety of effects to your sounds. In the visual on the previous page, you will see two of the effects on the upper left hand corner of the visual. There are all kinds of effects but the ones that you will most likely need are the reverbs and delays. Reverbs are a lot like quick echoes similar to when you hear a piano in a large church or cathedral. The reverb that appears on the visual is a Reverb Dry Plate. This plate reverb simulates dry (light) reverberation. (Shimotakaido, Chome, and Suginami-ku 197) A delay is similar to a quick echo, but it can be set to a longer time period if desired.

One of the nice things about the Karma is that it has a sequencer built into it while the Triton does not. A sequencer is what will allow you to layer sound patterns or melodies on top of one another. It is the primary tool used to create a song. I myself do

not use the sequencer on the Karma because of the sequencer that the computer runs which in turn is hooked up to both my Karma and Triton. A sequencer on the Karma is still nice, however, because there may be a need to transport the Karma to another studio or to a music hall. A sequencer on a computer takes the form of software and is usually more powerful than hardware sequencers built into keyboards or sound modules such as the Karma. The sequencer that I use on my computer is called Logic and is made by the company Emagic. There are different levels of this program, some more expensive than others. I use an older version called Logic version 5.5. I purchased this at Guitar Center for $250. You may not see this version in stores anymore, but you may be able to find someone who wants to sell their copy. The version that is available now is the new version 6.4, and it comes in two levels: Logic Pro and Logic Express. Logic Pro lists for $999 and Logic Express lists for $299. Logic Express may not be as powerful as Logic Pro, but will be good enough for getting started and is good enough for basic to moderately complex song writing.

If you don't want to spend money on a computer and sequencing software, you can get the songs from your keyboard recorded to a tape deck instead. For about $150-$200 you can get a pretty good tape deck. I use the Sony model KA1ES which has Dolby S noise reduction for high recording and playback quality. Keep in mind however that recording into a tape deck will not give you the same kind of quality that recording into a computer will. However, If you just want to get started, a tape deck with Dolby S will suffice. If you still want the same quality that a computer will give you but don't want to spend quite as much, you could purchase a Digital Audio Tape deck, or DAT. You could probably get a Tascam DA-20 for around $1000. This may seem like a lot of money, but a DAT will be ready to use without software, although a computer can also be used as a sequencer.

Before buying anything more, take your time to learn how to use the keyboard that you have purchased. The Karma offers a unique pattern generator that may also be used as a drum machine. Take your time to experiment with some of the different sounds. A good percussion pattern to start using is number 15: "All Was Lost", which is located in Bank A. The Karma must be in Combination mode while you make this selection. Just press the COMBI button to the left of the display. On the Karma there are four banks with 127 different sounds in each bank. Additional banks are available if you want to add new sounds later with a PCM card.

If you do decide to get a computer I would recommend the Apple iMac G4. You could purchase a Apple Macintosh G5 tower but it may end up costing more money. Generally a new computer will cost about $1100-1500.

In addition to getting a computer, there is some hardware that you should buy for it as well. First, you should buy a MIDI interface for the computer. MIDI stands for Musical Instrument Digital Interface. It is a specialized format for representing musical information in terms of standardized computer data, which enables electronic musical instruments to communicate with computers. (Avenmarg Appendix 2.4) I recommend that you purchase the Unitor 8 by Emagic. There are other less expensive products but by purchasing the Unitor 8, you will get good compatibility from

Logic as it is made by the same company. Software and hardware that is made by the same company is usually very compatible. Such is the case with Logic and the Unitor 8. In other words, Logic and the Unitor 8 work well together. In addition to good compatibility, you will get eight MIDI in ports and eight MIDI out ports. This means that you can hook up as many as eight keyboards or other MIDI devices to your computer. The Unitor 8 runs for about $500.

If your computer doesn't have a jack for audio recording, then you will need to purchase an audio interface. I recommend the MOTU 828. With the MOTU 828 you have six quarter-inch inputs so you can hook up as many as three keyboards and record them into Logic or Logic Pro. (Each keyboard will occupy two inputs). The MOTU 828 runs for about $700.

If you would like to record vocals into the computer using Logic or Logic Pro, then I would recommend the Audio Technica DM-3700 microphone. It costs about $150-$200 and will give you a professional sound. You will also need a device that will power this microphone with +48 volts. I myself use the Digitech VTP-1 preamp. This unit has a switch that adds +48 volts to a mic input, and it also has a good equalizer along with some other nice features. This unit is no longer being made but may be found used for about $500. If you want something new, you can find a similar preamp at Music Box or Guitar Center. If you wish to spend less money you can purchase a Rane preamp and that will only cost you about $200.

If you do decide to get an expensive preamp like the Digitech VTP-1, you may have an input in the back of this unit labeled "loop" or "effects loop." This input will allow you plug in an external effects unit. I understand that you already have effects in Logic or Logic Pro, but what if you want something more portable? The T.C. Electronic M-One unit is the perfect solution. Not only do you have access to reverbs and delays but you also have access to many other kinds of effects such as pitchshifters. Pitchshifters do what their name implies: They change the pitch of the sound. You can change the pitch by just a little or you can change the pitch to a large degree. You may want this kind of effect if you are trying to achieve an unusual sound or if you are trying to create soundtrack music for a film. The T.C. Electronic M-One effects unit runs for about $400.

If you wish to expand your sound library, there are a number of ways to do so. As mentioned previously in this paper, you can buy one or maybe two PCM cards for the Karma or Triton. These sounds are very professional and load into the sound module in just a series of steps that should only take a few seconds. They are then ready to be selected even after the Karma or Triton have been off and have been turned on again. This is an advantage over other sound formats. Other sound formats may need to be loaded again after the sound module has been turned off.

One of my favorite ways to expand a sound library is to purchase audio CDs that are full of sounds. You may not get instruments like cellos or pianos, but if you are interested in creating environmental recordings then this may be the way to go. You can purchase a CD with rain, wind, thunder, and other similar sounds. A company called the Hollywood Edge has helped me extensively in this area. They record many

different sounds on each disc, and all of them are categorized and labeled as well. There are many other audio CDs available such as the Fields of Motion audio CD. This is an example of how sophisticated sound effects are available for the consumer electronic musician. Once you purchase your desired audio CD, then you should use the software called Peak by the company Bias to import the sounds from the CD into the computer. There are other programs that you could use, but I would recommend that you use Peak.

Another way to expand your sound library is to create your own sounds from scratch. One way to do this is to purchase a mini-disc recorder and a good microphone for it. Guitar Center sells them and can recommend a good setup for your needs. Chances are you will want to take a walk in the woods and record some sounds of some birds or frogs. Once you get all the sounds that you like on to your mini-disc recorder, you can transfer them to your computer with a USB cable. Once those sounds are in the computer, you can add many different kinds of effects to them depending on what kind of software you have. One of my favorite software effect programs is Hyperprism made by the company Arboretum. Hyperprism offers many different effects. Some of them are usual effects like Single Delay and Multi Delay, while others are more unusual such as the Pitch Time changer. The Pitch Time Changer is like a pitch shifter, but it is more complex. It lets you vary the playback speed or duration of the sound, and also the pitch of the input signal, (Roads, Jaroslaw, and Fano 126). Like the pitch shifter, this effect is useful for creating sound effects for film or New Music. Hyperprism can be purchased for about $250.

Keep in mind that recording music requires some patience, time, and especially a lot of money. Make sure you have thought about your decisions before you spend a lot of money on equipment. You can listen to some of my recordings by visiting http://www.ethodius.com. Also, if you read the following interview you will get an idea of how someone can build a setup that consists of different equipment but how it is still effective for recording.

The following interview was done via email between myself and Marc Breckenridge from the band Siegemachine...

From: "Marc Breckenridge" <mb601@comcast.net>
To: "'Matt from Ethodius'" <ethodius@gatecom.com>
Subject: RE: looking for some input
Date: Wed, 21 Jul 2004 23:34:14 -0400

What is your name?

Marc (and Donny) of Siegemachine

What recording artists gave you an interest in electronic music?

Howard Jones
Information Society
Skinny Puppy
NIN

What CDs should someone buy that might give a newcomer an idea of what is possible with electronic music? Be as general or as detailed as you want.

I recommend the following:

Rick Ocasek - This Side of Paradise
The Best of OMD
Pet Shop Boys - Introspective, Actually, Behavior
The Best of Howard Jones
The Tear Garden - Tired Eyes Slowly Burning
Skinny Puppy - 12" Anthology
NIN (Nine Inch Nails) - Pretty Hate Machine
Front Line Assembly - Hard Wired + Plasticity single

What keyboards or sound modules do you own and use?

2 Kurzweil K2VXS's
2 KurzweilK2000RS's
Roland jv-2080
Virus
Roland D-50
Clavia Nord Lead
Sequential Circuits Pro One
Oberheim Matrix 6R*μ*

What kind of sequencer do you use?

We're pretty settled on Cakewalk Pro 9, after trying four
different sequencer programs.

Do you use a computer for your music? If you answered yes then state what kind it is.

Pentium III

If you answered yes to the previous question, what kind of MIDI interface do you use? Also mention if you use any other accessories such as a MOTU 828 or MOTU 2408.

Digital SoundBlaster w/MPU401

What kind of external effect units do you use?

2 MPX 1's
Lexicon MPX 500
Digitech Studio Quad
Boss Pro SE50
Zoom 1204*µ*

What kind of Mics do you use?

C414B-TLII
AKG C4000B

If you use a preamp, what kind do you use?

Focusrite ISA220

What kind of mixer do you use? (If you depend entirely on the mixer in your computer software, then you can skip this question.)

Mackie 32-8 + 24-channel expander + meter bridges

Do you use any other additional software such as Hyperprism, Peak, or SoundForge?

Sound Forge, and occasionally other little programs for various and miscellaneous stuff.

Is there anything else that you wish to add?

Visit my site at:

http://www.siegemachine.com
or at:
http://mywebpages.comcast.net/mb601/

Oh, and if music isn't fun, don't do it!

Thanks for doing the interview.

You're welcome. I like talking about music gear.

In conclusion, I hope that this has elevated your knowledge of how to build an electronic music studio. There are many other things you can add to a studio so that it is more flexible, but you should be able to get a basic setup going with the things I mentioned in this paper, and perhaps even more than a basic setup.

Works Cited

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