

Memphis Electronic Music: Finding Soul in the Age of Lifeless Machines

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From a very young age, I had a very intimate relationship with music. I would always listen to many different genres like classical and film music to trap and R&B. After listening to so much music, it instantly grew my desire to create music myself. However, when you come from a poor family like myself, the options to create music are severely limited, even if you come from Memphis, the capital city of blues and soul. For a long time, many of the options to create music in Memphis could only be used by the people who could afford the instruments and instruction or people who knew others who could afford these things. However, there are many ways that people can use tools to create music, most of which can be done with little expense.

What I wish to argue with my project is if it is possible to create inexpensive tools that create music, how Memphians create their own tools to create music, and should these tools can be called “musical instruments” like the music instruments we have today. Building a synthesizer will help me answer this question because it allows me to demonstrate that musical instruments can be made with little money and little experience in electronics. It also allows me to present how this synthesizer is just as much of tool for creating music as the musical instruments that we have today and present the history of how these present day musical instruments first began as just tools. By researching the electronic musicians in Memphis, it allows me to show how other people created tools for music and shed away the myth of how complex it is to create these tools. Though my project is mostly creative, I believe that this project has the same academic value as a research paper because this project is relevant to me as a Computer Science and Music double major. By demonstrating an inexpensive and simple tool for creating music, it allows for other people to express their own unique sounds and have those sounds survive in a place that doesn't recognize them.

While discussing this synthesizer project with other colleagues and professors, one question kept appearing: “Of all things that a Computer Science major can do, why build a synthesizer? Why not a robot that does something?”. After taking some Computer Science classes at Rhodes, I felt like something was wrong about how we think of computers and how we research them. In the tech industry, there is a very strong demand to create new things that *replace* other things or services instead of *enhancing* the things we already have. For example, Apple always creates new computers, tablets and phones, but each version doesn’t do anything different. Each version is just the same idea but bigger: more pixels, more RAM, more memory storage. Thus, when they come out with a new iPhone, all it does is replace the previous version. This replacement idea is the same across the entire tech industry. After working in the RIRS, I noticed that this idea of “replace instead enhance” is also strongly prevalent throughout the city of Memphis. One very standout example is the Memphis Pyramid. Built in 1991, the Memphis Pyramid was a 20,000-seat arena that was mainly used as the home court for the University of Memphis’s men’s basketball team and the Memphis Grizzlies. After many occasions of flooding, the City of Memphis built the FedEx Forum to serve as the new home of the basketball teams. However, there was a contract between the City of Memphis and the Memphis Grizzlies that prevented the Pyramid to be used without the Grizzlies permission. Thus, the Pyramid was closed down in 2005, and no one could improve it. Essentially, Memphis’s major attraction got replaced with something new even though both arenas have similar purposes and capacities. My problem with this ideal of replacement is that we’re always replacing but never enhancing the things we already have. Why spend a thousand dollars on a fancy new laptop when you can just change the parts of an old computer and get the same thing for less? This might sound frugal of me, but this is how some people get their money: by profiting off the technological ignorance of the average

person. I chose to build synthesizer from an old piano from the Harris Lodge not to replace it but to enhance it so that a person can express more sounds than before, and so I can teach people how to make their own instruments so that they won't get taken advantage of because of ignorance.

Before I talk about how I built the synthesizer, I will first talk about electronic music and the relationship between Memphis and electronic music. Many people have the misconception that electronic music is type of music genre like EDM or dubstep. However, electronic music deals with tools used to make music. According to *Physics and the Sound of Music*, "Electronic Music is a medium of expression, not a specific type of music." (Rigden 266). Electronic music is just music created from electronics, circuitry, and/or computers. Electronic music gets its roots people hearing sounds live and manipulating those sounds in more unconventional ways, such as recording, sampling, and mixing, to express their own unique idea of "art". One opposing opinion to this definition of electronic music is that computer and electronics cannot produce something as human as art. However, all the tools for creating art that we have today weren't originally made for art. One example of this idea is the guitar. Many centuries ago, someone had the idea of taking the guts of a sheep, turning the guts into strings, attaching them to a piece of wood, and somehow created sound from this weird contraption. The sound of this weird contraption became popular and became the basis for lyres and other stringed instruments in the Classical period. From then on, people continued to improve upon this idea by refining the wood and strings, and the guitar was eventually created and would become one of the most popular instrument in the world. Art is never about the specific tools used to make art. It is about people using the things in their environment to express something. Back then, sheep guts and wood were some of the only things they had to express something. Now, in this digital age, computers

and electronics are some of the most common things a person has in their environment.

Therefore, people use electronics and computers to express something, of which electronic music is one form of this expression. In the end, many believe that electronic music will replace the music of the past. However, electronic music is just another evolution of the same idea of “art” that humans were thinking of since the dawn of human art.

To find the connection between Memphis and electronic music, you would first have to look at religion in the South. Ironically, electronic music in the South is mainly caused by the significant amount of religious practice in the South. When you go down a street in a city in the South, especially Memphis, you will notice that there is a vast amount of churches on that street. Since music plays an integral role in religion, there was a high demand for the pipe organ sound in each one of those churches. However, many of these churches could not afford or were too small to have a pipe organ. To solve this dilemma, the electronic organ was made, which was first developed in the 1930s. The original purpose of the electronic organ is to imitate the sound of pipe organ in a more affordable and portable way. This sound was created from tonewheels, which are a group of rotating discs with a certain amount of bumps that will create a certain frequency when they are close to a magnet and electromagnetic coil. According to *The Musician's Guide to Acoustics*, “The forerunner of the modern electronic organs was the Hammond organ introduced in 1935.” (Campbell 503)

The Hammond organ became the most prevalent type of electronic organ in churches at the time. This presence allowed people to experience the magnificent sound of the Hammond organ, and soon people began to take this sound and use it in genres outside of the church. According to “Clonewheel Heaven”, “The Hammond was originally aimed at the churches that couldn't afford a pipe organ, so it found its way into blues, rock, and Motown by way of gospel music. That

sound, which everyone recognizes... is vital to almost all modern music...[and] more viable than ever.” (Fortner). Musicians such as Jimmy Smith first brought the Hammond organ to jazz, which opened the door for other musicians to bring the Hammond organ into blues and rock. Because of this widespread use, the Hammond organ became increasingly more popular with one specific model of the Hammond organ, called the Hammond B-3 organ, becoming the most popular electronic organ in the 1960s and 1970s.

Another phenomenon also happened at the same time as the Hammond B-3 rose in popularity: the rise of Stax Records and the “Memphis Soul” sound. The Hammond B-3 organ became well connected to the “Memphis Soul” sound by way of Booker T. Jones, who was the lead pianist and organist for Booker T. & MG’s and for other Stax musicians. According to *Soulsville U.S.A.*, “Booker was playing a used Hammond M-1 spinet organ... Booker’s eventual organ of choice...[was] the Hammond B-3.” (Bowman 38). One day during his early days at Stax Records, Booker went to the Hammond M-1 organ that Stax Records had the time and started improving chords and melodies. One sound engineer had heard this improvisation and suggested to Booker to record it as a single. This single will later become “Green Onions”, one of the most popular songs from Stax Records and deemed “Best Soul Instrumental of All Time” by Oxford Music. Later in his career, he moved to the Hammond B-3 where he continued to play with his band and other Stax musicians. Booker T. Jones himself says in “Booker T. Back on Top with Hammond B-3”, “The Hammond B-3 has a warm sound, and at the same time its electronic. You can manipulate it, you can sound like a lot of different things.” (Toronto Star, Howell) While the Moog-type synthesizer gaining popularity in the northeast of the United States, musicians from the South like Booker T. Jones manipulated the sound of the Hammond B-3 to express more soul and R&B sounds like a synthesizer.

When these Stax musicians performed overseas, many countries became so infatuated with the “Memphis Soul” sound that the musicians of those countries strongly desired to emulate that type of sound. This desire was easily fulfilled by the start of the development of microcomputers in the 1970s. According to *The Musician’s Guide to Acoustics*, “The advent of the microcomputer has now made it possible to build much more flexible systems based on the concept of additive synthesis.” (Campbell 510). Additive synthesis is a type of sound synthesis where sine waves are added together to create certain sounds. This type of synthesis allows a person to create more unique sounds than before and sufficient emulation of existing sounds, such as the “Memphis Soul” sound. With additive synthesis and microcomputers, companies such as Korg and Roland were created to build and research more affordable and portable synthesizers that could more accurately imitate the sound of the electric organ and other musicians like Stax musicians. Korg, in particular, has a preset sound in many of their synthesizers, such as the CX-3 and the Kross, called “Memphis Soul”. This preset sound was an emulation of the R&B and Funk sound made by “Memphis Soul” musicians. Memphis is the only city in these synthesizers that gets its own preset sound. Even though the original Hammond organs have been discontinued, there are some Memphis musicians today who also built their career off newer Hammond synthesizers. Marcus L. Malone is one Memphis Hammond organist, who now serves as the CEO of Total Experience School of Music, a music school known for its affordable music instrument lessons. Ralph T. Lofton is another Memphis Hammond organist who was the organist for *Bobby Jones Gospel*, a gospel television program that aired on Black Entertainment Television (BET) for 36 years. The last of the well-known Memphis Hammond organists is Jethro Pollard, also known as “Duke Jethro”. Jethro Pollard was the lead pianist and organist for B.B. King.

Electronic music continues to be present in Memphis through the Memphis Concrete Festival. The Memphis Concrete Festival is a three-day experimental electronic music festival held at Crosstown Arts, where electronic musicians from the Delta region can perform with the electronic instruments that they made. The festival first occurred in 2017 as a means for electronic musicians to show off their sounds and meet other electronic musicians. During each day, performers had scheduled 45-minute sessions to perform their music, and at the end of the day, there was a movie where one of the performers would do a live music scoring to the movie. I attended the festival this year and was stunned at how many performers there were and how they created their own sound. Out of all the musicians there, I was surprised by how none of them had a similar sound; each performer had their own unique sound. Some of the impressive musicians from Memphis included Mike Doughty, James Dukes (known as IMAKEMADBEATS), The Pop Ritual, Robert Traxler (Director of the festival), and Jack the Giant Killer.

During the second day of the festival, I was writing down notes when I coincidentally overheard a conversation between George Clanton, a famous electronic musician and performer at the festival, and some of the festival staff. One staff woman asked Clanton why he chose to do something as weird as electronic music. Clanton laughs a little bit and answers, “What am I without my gimmicks?”. This answer really stuck to me. What are you without the things that make you special and unique? Many people use their special and unique characteristics to define their identity, but what happens to that identity when you take away those special characteristics? Apply this to the city of Memphis. The “Memphis Blues” sound was during the 1910s to the 1930s. The “Memphis Soul” sound was during the 1960s and 1970s. The “Memphis Rap” sound was started in the 1990s and started to die down in early 2010s. Now in 2018, the city of Memphis is no longer using music as its main “gimmick”. However, music has made Memphis

famous for nearly 100 years. If Memphis is no longer using the thing that made them special, what is the identity of Memphis in 2018? Without an identity, Memphis became an example of a city that is stuck in a time stasis, profiting off the past but inhibiting the future. Many Memphis musicians tend to dislike Memphis because of this time stasis. The common belief of these musicians is that Memphis is so attached to the “Memphis sounds” of the past that present-day Memphis musicians feel that Memphis doesn’t support their sound because it’s not the “Memphis sound”. This lack of support for the musicians has made them feel disrespected, and eventually they move out of Memphis to other cities that accept their sound. Other musicians like James Dukes and Robert Traxler and organizations, such as Memphis Slim, took this lack of support from the city and decided to create their own “support” by creating networking opportunities for Memphis musicians. Despite the lack of support from the city itself, this wave of Memphis electronic musicians might become the next evolution of the “Memphis sound”.

By staying in a time stasis, Memphis’s identity became a blank state, which allows anyone to rewrite the narrative that connects the “Memphis sound” of the past to the digital present. These new narratives can sometimes ruin Memphis reputation, erasing the positive reputation of the past. An example of this idea can be found again in the Memphis Pyramid. The Memphis Pyramid previously served as a major symbol that connected Memphis, TN to Memphis, Egypt, connecting African-American Memphians back to Africa. However, the city of Memphis allowed the closure of the Pyramid. This closure then allowed other people, specifically Bass Pro Shops, to rewrite the narrative of the Pyramid, turning a historically African-American symbol into a hunting and fishing shop whose core audience is white men. This idea of rewriting narratives also exists in music as well. In 2013, Justin Bieber releases an album called *Journals*, on which is a song called “Memphis”. Even though it is already bizarre

enough that no one featured on the song is from Memphis, TN, the song itself has nothing to do with Memphis, leaving no explanation about why it's called "Memphis". In the song, Bieber speaks to a girl, saying that she's on his mind 24/7, a theme that appears in many of Bieber's songs. However, what does that mean for Memphis? By titling this song "Memphis", Bieber implies that "Memphis" is like a girl that is on his mind all of the time. But what does that mean and what does that say about Memphis? The song "Memphis" takes the history of Memphis and compresses it into a vague description about a girl that Bieber likes.

After researching how the "Memphis sound" affects the digital age, I started to build my own synthesizer. The first thing I did to tackle this project was dismantle the M-Audio Keystation Pro 88, which was in disrepair and donated to me by Dr. John Bass. By dismantling and looking at the circuitry of this piano, I soon learned how the electronics worked in the piano. To put it in simple terms, electronics is just a huge and complex game of connect the dots, where the negative power supply (-) is connected to the positive power supply (+). The negative supply contains electrons that are full of energy (electrons are negatively-charged). When positive power supply is connected, the electrons are attracted to the positivity and flows to the positive supply. Therefore, when a battery "dies", it means that all the electrons from the negative power supply have moved to the positive power supply. The electrons cannot move back naturally because the negative power supply repels the negatively-charged electrons away. A synthesizer is powered by connecting its parts to this electron-flow circuit. As the electrons flow through the parts of the synthesizer, the electrons provide energy and the parts turn. There are three main parts to my synthesizer: the keyboard controller, the microprocessor, and the output. The keyboard controller serves as the interface that the user submits input in the form of key presses. The interface looks like a set of piano keys so that the average person can understand what

they're inputting. The microprocessor serves as the brain of the synthesizer. The microprocessor, an Arduino Mega in this case, processes the electric signals from the inputs and outputs according to the instructions it gets from the code that was programmed into the microprocessor. The output serves as the translator that translates the digital output of the microprocessor to the language of another input computer or analog language that a human can understand, in this case, sound. These three parts work together to make the synthesizer.

Some of the functions of the synthesizer cannot be done by just connecting wires together. To solve this problem, the microcomputer must be programmed with some type of code. This code will give instructions on how to handle the signals that flow in and out of the microcomputer. In my synthesizer, two functions were needed: a function to figure out what key on the keyboard was pressed and a function to create and output sound. Inside a keyboard, there are wires that connect to each one of the keys. However, there is not organized in a way where each key has its own wire because it would be terribly inefficient and slow. To reduce the amount of wires, the keys are digitally organized in a "key matrix" inside the microcomputer. This key matrix organizes the keys like a chart where each row of keys connected to one wire and each column of keys is also connected to one wire. This organization creates a "net" of keys, in which each key has two wires connected to it. Using this organization allows the microcomputer to figure out what key is pressed. In my synthesizer, the microcomputer sends electricity through the set of wires that represent the columns of the key matrix. When a key is pressed, the electricity jumps from the wire of the column of the pressed key to the wire of the row of the pressed key. This electricity exits the piano and is read by the microcomputer. The microcomputer then figures out which row wire was activated and crosses that information with the column wires to find the exact key in the key matrix. In simple terms, the row wires are

constantly being scanned by the microprocessor. When a row is activated from the key press, it takes the row number finds the key that is at the intersection of the row and one of the columns in the key chart, like finding a point on a graph using ordered pairs. The second function processes the sound that is outputted. The second function takes the output of the first function to figure out what pitch to make from the key pressed. It takes this key identification from the first function and converts it to its corresponding frequency through a pre-made key-id-number-to-frequency mathematical equation. The microprocessor then outputs a square wave with the same frequency as the one found from the equation. This square wave flows through circuits until it reaches a speaker where the digital wave is converted to physical sound. This code allows the microprocessor to take input from the user, efficiently process it, and outputs it in a way that the user can understand it.

In the end, I managed to make sound from my synthesizer, but it is still a work-in-process. One problem with this synthesizer is that one note can be played at a time. This problem stems from the fact that only one square wave can flow through the circuits. If you wanted two or more sounds to play simultaneously, you would have to have a circuit system for each sound, which can quickly get expensive to create. I hope to solve this problem by researching more into digital signal processing, which allows a more efficient way to process signals. I also plan to improve more on my synthesizers and possibly interview with Memphis electronic musicians to figure out their narratives. I really appreciate the Rhodes Institute for Regional Studies and the Mike Curb Institute for providing me with this opportunity to learn in a very experimental and creative way and to learn about Memphis from many different perspectives. I highly valued my time with the institute and would strongly recommend others to work in the institute as well.

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