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THE MAD SCIENCE OF HIP-HOP:
HISTORY, TECHNOLOGY, AND POETICS OF HIP-HOP’S MUSIC, 1975–1991

by

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A dissertation submitted to the Graduate Faculty in Music in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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This manuscript has been read and accepted for the Graduate Faculty in Music in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.
Abstract

by
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Adviser: Professor Peter Manuel (Ethnomusicology)

In 1979, the first commercial recordings of hip-hop music were released. The music’s transition from the parks and clubs of the Bronx to recorded media resulted in hip-hop music being crafted and mediated in a recording studio before reaching the ears of listeners. In this dissertation I present a comprehensive investigation into the history of the instrumental component of hip-hop music heard on recordings, commonly referred to as beats. My historical narrative is formed by: the practices involved in the creation of hip-hop beats; the technologies that facilitated and defined those practices; and the debates around these two aspects that established the aesthetics of the music. The span of years covered in the dissertation are bookended by the establishment of precision breakbeat compositions on turntables in 1975 and the technological, economic, and legal developments in hip-hop music and culture that became a turning point for the practice of beat making and the sound of hip-hop music beginning in 1991.

Beat makers, producers, and engineers—the recordists predominantly responsible for the sound of a hip-hop recording—are cultural producers involved in the social practice of cultural production. As such, the history in this study is informed by ethnographic research in the form of interviews and participant observation. Musical analyses are also utilized to illuminate the historical development of hip-hop music, particularly to display the ways that beat makers created their sound arrangements through the functions of certain technologies. This dissertation explores the intermingling of technology and human practice and serves as a foundation for further inquiry into the effect of technology on music making practices.
Acknowledgements

Let’s precede on the hypothetical that ten years ago I was asked the question many undergraduate students are posed, “Where do you see yourself in ten years?” Ten years ago, as a sophomore in college, I do not believe I could have conceived the thought of completing a doctoral dissertation. Thus, I am very grateful to Peter Manuel, my advisor, and Jane Sugarman, my first reader, for their support and patience as I completed this project while going through several personal and professional transitions. In addition, I thank Mark Spicer and Ray Allen, the readers on my committee, for their resources and suggestions that enabled this project to properly come together at the end. While they were instrumental during the final stages of my doctoral work, endings are reverberations of strong beginnings. As such, I must thank Dr. Stephen Blum for the motivation and guidance he provided me as I got my bearings as a doctoral student. Reaching back one more step in my journey, I thank the Mellon Mays Undergraduate Fellowship, specifically professor participants Juan Flores and Barbara Hampton at Hunter College, CUNY, for initially encouraging my doctoral studies and my pursuit of hip-hop music as a research topic. Lastly, I thank the Macaulay Honors College for providing academic resources and challenges that resulted in a foundation of a sound undergraduate education that buttressed my doctoral studies.

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his house, and the more than three hours Qiniso Mdladla sat with me in Union Square Park after only meeting me the week prior. These are only a sample of the invaluable and engaging experiences that I had with consultants as we discussed and worked on hip-hop music. I am grateful to you all and the publicists and managers that made certain interviews possible.

Lastly, I want to acknowledge the people that probably had the biggest stake in where I saw myself ten years ago: my parents Willa Mae and Fred Rivers, my brother Deon Rivers, my mother-in-law Larisa Elkina, and my wife Yevgeniya Rivers. I love you all and I appreciate the love and humanizing distractions that kept me well-balanced as I completed this dissertation. Each one of you has influenced my growth over the past ten years and I appreciate the patience and understanding offered by you all as I periodically disengaged from family life. One more thing, thank you baby Naomi for being real cool while I wrote the bulk of this project during your first seven months.
Preface – Living Hip-Hop Music History

The surface bootlessness of talking about art seems matched by a depth necessity to talk about it endlessly.

– Clifford Geertz (1983, 95)

I don’t think it’s just me. While I am not yet intellectually equipped to prove this, I know that I exert a proper amount of metabolic and kinetic energy as I process and absorb beats and rhymes, even when casually listening to my favorite recordings. I assume that the minds and bodies of other enthusiasts have had similar responses to hip-hop music. Regardless of the tempo, recordings of hip-hop provoke shoulder bouncing, an array of body contortions, reflections on American society, and revelatory celebration in listeners. The variety and intensity of these reactions have propelled hip-hop music from assumed fad in the early 1980s to its contemporary status as Top 40 mainstay, and have kept dancers moving at clubs and fresh mix tapes consumed at a weekly pace.

For a long while, the stimulation I received from hip-hop music and its role in my recreation blinded me to its suitability as a subject of study. During my high school music studies and into college, I never saw a reason to study hip-hop, even though I had been engaged with the music as a consumer and practitioner since my childhood. Instead, I dove intellectually into classical music and jazz and continued indulging in hip-hop, and R&B for that matter, as a separate endeavor. I would ask myself questions like, “why study something you know so well?”; or “why study something that has this other purpose in my life?” I came to realize that growing up where I did, around particular friends and family, and listening to the trajectory of hip-hop gave me a particular perspective and wealth of knowledge on hip-hop music that I could not bring to another musical practice and history. I really needed to research and write about hip-
hop music. I understood that my experiences and interactions with the culture and the music, while not prerequisites to researching hip-hop, could serve as a starting point toward acquiring more knowledge about the musical practice. Despite my initial ambivalence toward studying hip-hop, my maturation as a music scholar revealed my “necessity to talk about it endlessly.”

While there were several scholarly activities that initiated the early stages of this project, the initial idea to research hip-hop music through advances in technology arose around 2004/2005, after playing a game with my brother. In the early 2000s, the local cable provider in Brooklyn, New York established a set of channels in the 900–1000 range that played music from a particular genre and its sub-styles all day, every day. The channels only played audio, no music videos, and they displayed standard information (title, year, and record label) and some “fun facts” about each recording. The audio and accompanying information were enough to keep my brother and me occupied when the other two hundred channels my parents paid for every month refused to keep us from doing our homework. Using the music channels, my brother and I played a game that consisted of him flipping between the different hip-hop and R&B channels while I turned away from the television and guessed the release year of the recording being played. The majority of times I would get it right or come within two or three years of the answer. I knew the years of many recordings because I could connect them to different events of my childhood and adolescence (Frith 1996). In instances where I had no connection to the recording that was playing, I was able to successfully select the correct year because the instrumental sounds, the sound quality of the recording, and/or the type of vocal delivery informed me immediately of when the song was released. In other words, the recording and the quality of its performance components presented temporal signs (Holm-Hudson 2001), many of which were a result of
contemporaneous technologies that were available to and popular amongst the creators of hip-hop and R&B.

Shortly thereafter, in 2005, I started putting together my undergraduate honors thesis. I decided to interview my dad, a deejay that was active in the 1970s, and my music production mentor, a producer/engineer from the 1980s and 1990s, and use my experiences and interactions as a novice beat maker to form an initial timeline for hip-hop music based on how the technologies my consultants used impacted their practice. The project ended up being about the development of rhythm in hip-hop beat making. Technology served a significant, though secondary, role in the project (Rivers 2007). Early in the process of conceiving a dissertation project, I considered researching a music and topic completely unrelated to my honors thesis. I returned to the history of hip-hop beat making and production because my training as an ethnomusicologist exposed aspects of my activities as a hip-hop producer to a more critical eye. Once again, I found a “necessity to talk about it endlessly.”

The history of hip-hop production was ever-present around me. The practices of making hip-hop music have been around for approximately thirty-five years, thus many of the people and places that participated in, defined, or represented the development of the music were accessible. In his book, *Living Black History: How Reimagining the African-American Past Can Remake America’s Racial Future* (2006), the late historian Manning Marable defined his approach to uncovering and researching history:

> Reconstructing the hidden, fragmented past of African Americans can be accomplished with a multidisciplinary methodology employing the tools of oral history, photography, film, ethnography, and multimedia digital technology, an approach I call “living history.” (Marable 2006, xx)
For Marable’s project, reconstructing history entailed more than the use of traditional texts and documents. Access to people and a variety of dynamic texts, along with the ability to visit historical spaces (like the driveway of Medgar Evers’ home in Jackson, Mississippi), informed his historical inquiry. The living history approach imbued his project with a social history procedure more common in the social sciences. It also enlivened his text as the past was put in conversation with the present and prospective future of the experience of race in America.

I was able to approach this project through “living history.” I walked through Quad Studios in Times Square, the facility where recordings by The Notorious B.I.G., Jay-Z, and LL Cool J were recorded, to interview engineer Anthony Daniel. Gold and platinum album plaques—acknowledgement of a successful record’s sales from the Recording Industry Association of America (RIAA)—decorated the halls I passed through on my way to one of the main control rooms, ostensibly used to make those recordings. I had conversations and conducted formal interviews with a number of beat makers, producers, and engineers who collaborated in crafting the sound of hip-hop music from its formative years to the present. And, perhaps most importantly, I was able to gain access to and use some of the technologies that beat makers have used in order to understand how the history of hip-hop’s music was, and is, intertwined with user interface design and advances in micro processing technology. While hip-hop music is still employed as a recreational music that I nod my head to at home or in transit, critically engaging with hip-hop music as a scholar has given me a deeper appreciation for the music that defined my adolescent years and has continued to stimulate my senses.
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Introduction – Decoding the Mad Science: Researching Hip-Hop Music Inside and Outside of Academia

The twenty-first century began with hip-hop music as arguably the most marketed and listened to popular music around the world. Since originating in the South Bronx and thriving in numerous underprivileged areas of the United States, hip-hop music, in its various aspects and overall culture, has been translated into a variety of media. The growing ubiquity of hip-hop culture has enabled it to pervade the lives of those who embrace or reject it. While never explicitly rejected, though perhaps disregarded, hip-hop has been embraced within academia. The dynamics of hip-hop culture have made it a constant subject of scholarly inquiry. Sociologists and American studies scholars have been intrigued by the circumstances of the population from which the culture arose (Rose 1994, Chang 2005). For their part, performance studies scholars have gravitated toward the gender representations revealed in lyrics and live performance (Berry 1994, Smalls 2011).

The embrace of hip-hop culture in academia did not initially result in musicological research. This situation left the function and structure of hip-hop’s music without scholarly interpretation and analysis and resulted in “scholars who are neither musicians nor musicologists who purport to write about music without writing about the music” (Taylor 2001, 10). The bilateral parts of hip-hop music consist of the rhythmic poetry of rappers, better known as rhymes, and the instrumentals created by deejays and beat makers, better known as beats. Music scholars initially approached hip-hop as the latest expression in the lineage of African-American musical practices, using rhymes as the predominant objects of analysis (Keyes 2002, Smith 2003, Ramsey 2004). Thus, despite the perpetual growth of scholarly interest in hip-hop music, only a fraction of that interest has been given to the beats that have captivated the minds and bodies of
listeners. In the early 2000s, more attention was given to beats (Greenwald 2002, Schloss 2004) and in recent years articles and conference papers on beats have become more frequent. I would argue, though, that there remains an intellectual space between the research and interpretation of hip-hop beats and an understanding of the actual practice of making them. Interestingly, in light of ethnomusicologist Noriko Manabe’s research on Japanese hip-hop (2009, 2013), there has been more revealed about the musical practice of an international version of hip-hop than that of hip-hop in America. This dissertation addresses the lacuna of research on hip-hop beat making by approaching it as a musical practice informed by technology.

“Rapper’s Delight” and “Christmas Rappin’” were two of several recordings released in 1979 that made it possible to purchase vinyl discs containing a sound and vocal delivery that were being attributed to a new music genre and performance style called hip-hop. These recordings represented hip-hop’s progression from the block party and the dance club to the shelves of record stores. The transition positioned hip-hop music on a recorded medium as a commodity, radically extending its reach beyond the multiple New York City localities where it was the foundation of local parties. Consequently, hip-hop music and recordings became creations initially mediated in a recording studio through several technologies before reaching the ears of listeners. In the studio, producers, conventional instrumentalists, and deejays collaborated as the creators of beats—instrumentals that rappers delivered their rhymes over—and the recording as a whole. This model, though, changed during the 1980s as the beat maker emerged as a distinct role and took a prominent place in crafting the sound of hip-hop music. Predominant factors in this transition were the capabilities and possibilities available to beat makers as new music technologies were introduced and older ones gained advanced capabilities.
In this dissertation, I present the instrumental component of hip-hop music from 1975–1991 through the poetics of commercial popular music and the advances in music technology over that period of time. Musicologist Albin Zak identifies the poetics of commercial popular music as “musical composition in the recording studio” that corresponds with “the aesthetic stances of those involved in the recording process [which] are inseparable from the compositional choices they make” (Zak 2001, xvi). Hip-hop beat makers, producers, and engineers compose hip-hop music using the recording studio (Moorefield 2005). And, especially for beat makers, the technologies they use and their notions about how hip-hop should sound define the aesthetic stances that result in their compositional choices. Accordingly, the practices that have encompassed the creation of beats and hip-hop recordings are central to this study: the technologies utilized toward creative means; the social settings of the technologies and their users; debates about practices, products, and technologies; and pressures external to the studio—developments in technology, copyright law, and market demands. A vital component of this study is a historical account of hip-hop production that attempts to correlate the social, cultural, and aesthetic reasons for the content of hip-hop’s music with advancements made in music composition and production technology. In other words, the broader perspective of this dissertation reveals how technology and the social dynamics of making a commercial popular music intermingled along a historical path. In regard to this, I contend that the recognition of multiple dynamics of cultural production is necessary to avoid the presentation of technological determinism, which when applied to studies of education, media, and music tends to incite a general panic or irrepresible optimism about the nature of many technological changes and developments. While technologies can be used for a multitude of means, their original design
concepts can be unrelated to those means, especially as the purposes and ideologies of those that employ certain technologies begin to dictate their use and meaning (Winner 1980).

Applying Zak’s idea of recordists, generally those involved in the sound aesthetic of a recording (2001), I view hip-hop music as shaped by the contributions of beat makers, producers, engineers, and rappers. These actors are cultural producers involved in the social practice of cultural production. As such, this project seeks to document and explicate how hip-hop recordists have created and used the form of hip-hop and manipulated technologies to construct, articulate, and disseminate beliefs of community, region, authenticity, and, in some cases, socio-political agendas (Mahon 2000).

Prior Reporting and Research on Hip-Hop Beats and Beat Making

[T]he late Alfred North Whitehead, mathematician and philosopher … said: ‘the process is the actuality.’ In other words, if you want to understand any phenomenon, study it in motion.

–Pete Seeger (1974, 413)

In her book *Black Noise: Rap Music and Black Culture in Contemporary America* (1994), American Studies scholar Tricia Rose described an encounter she had in 1989 when she divulged her ideas for a study on hip-hop to the chairman of her music department. The chairman assumed that she was going to focus on the social impact of the music of hip-hop culture—mainly the overt political statements from rappers—because, as he put it, “there is nothing to the music” (Rose 1994, 62). Scouring much of the early scholarly documentation of hip-hop can serve as an indication of how widely his opinion was shared. Research and writing on hip-hop
music’s reflection of, and impact on, world society have rightfully been mainstays of scholarly books, papers, and panels, but the emphasis in these writings has been on the lyrical content produced by rappers (Gilroy 1995, Sexton 1995) or the media images and social impact of the rapper figure (Berry 1994, Kelly 1997, Keyes 2002). Examinations of the instrumental component have tended to focus on sampling and its many implications. Since the act of sampling audio and creating new compositions is a phenomenon compatible with aspects of literary criticism and postmodernism, in discussions of hip-hop beats, sampling has supported an academic approach that has resulted in more discussion of the theoretical implications of sampling (Barlett, 1994, Chang 2009, Harkins 2010) than examination of what sampling has entailed as a practice for making hip-hop beats.

The first documentations of hip-hop culture and music came from journalists reporting on a new “thing” coming from the Bronx, New York. In the late 1970s, journalists Robert “Rocky” Ford Jr. and Nelson George began writing articles about hip-hop culture and music for *Billboard* magazine. In the early 1980s, a couple of book-length journalistic reports on hip-hop were released. In 1984, Steven Hager published *Hip Hop: The Illustrated History of Break Dancing, Rap Music, and Graffiti*. The book, as the title states, reported on all the components of hip-hop culture and included interviews with hip-hop music pioneers DJ Kool Herc and Grandmaster Flash that described their aesthetic considerations as they forged a model for a new genre of music. Also in 1984, British journalist David Toop published *The Rap Attack: African Jive To New York Hip Hop*. Throughout the book he gave a glimpse into deejaying and the influence of disco and funk-style R&B music on the sound of early hip-hop, thus alluding to the initial source of the music’s sound. In many ways, these early journalist reports on hip-hop paved the way for
subsequent scholarly work by providing a base of information, especially in regard to the history of the culture and music genre.

Music scholars began engaging with hip-hop music from the late 1980s into the 1990s. A 1990 article by Laura Johnson described the musical techniques of deejays and hip-hop’s connection to West African and African-American musical aesthetics. Her article concluded with a discussion of the institution of hip-hop music criticism and its disconnect from African-American music practice. At the time, most studies treated hip-hop’s instrumental accompaniment only in passing. In the aforementioned Black Noise, Tricia Rose devoted a chapter to the disparate aesthetics of hip-hop and Western classical music and the technology used to create hip-hop music. Her research included a description of how producers employed technology in the name of aesthetic values in regard to the amount of bass and overall decibel levels. Continuing the trend of scholars’ employing hip-hop beats as a segment of a larger discussion on hip-hop, Cheryl Keyes’ Rap Music and Street Consciousness (2002) separated a discussion of the beats into a relatively short section. Her text concentrated on the whole of hip-hop culture as a youth arts movement with historical and diasporic connections to Africa and the Caribbean. A section of a chapter entitled “Hip-Hop Sound Culture” included a staff notation transcription of The Bomb Squad’s beat to Public Enemy’s “Fight the Power” by ethnomusicologist Kyra Gaunt. Keyes’ aim was to display the thick texture of the track and the interplay between the different layers. In this dissertation, I take the next step, explaining how The Bomb Squad used their equipment to achieve that texture. Musicologist Robert Walser (1995) also provided transcriptions of aspects of the beat to “Fight the Power,” juxtaposing them with transcriptions of the rhythmic flow of Chuck D’s lyrics to the song. Perhaps due to the importance of word painting in the musicological research of Western classical music, this
analytical method has been a recurring approach among musicologists. Walser used his transcriptions to detail the aesthetics of hip-hop practitioners and their comparable use of polyrhythmic textures that appear in musics from Africa. Overall, his intention was to dispel some of the critiques of hip-hop’s musicality and display the rhythmic and rhetorical strategies that structure the performative aspect of hip-hop.

More recently, music scholars have written extended studies on hip-hop beats. In *Rap Music and the Poetics of Identity* (2000), the late musicologist Adam Krims sought to correlate hip-hop music’s sound with the creation of regional and cultural identities. In proposing a close reading of hip-hop’s musical component in order to explain the poetics of identity, he was in search of a “music piece as an object” (17) to serve as a means for interpretation. Krims focused on the lyrics of well-known rappers—Los Angeles rapper Ice Cube and the Atlanta-based rap group Goodie Mob—as said musical pieces to qualify his premise and included surface analyses of how certain sounds were employed and organized within different songs. Aspects of Krims’ approach were valid; in this project I also correlate the different sounds of hip-hop with regional identifications. I would argue, though, that the “music piece” he selected for his analysis resulted in problematic classifications, exhibited in the reductive genres he divided rap music into (“party,” “mack,” “jazz/bohemian,” and “reality”). Krims’ analysis and classification of lyrical delivery, or flow (e.g. “speech-effusive” and “percussion-effusive”), certainly indicated regionality and has been beneficial to the study of hip-hop music. I believe a more effective “music piece” for analyzing hip-hop is a recording. The poetics and aspirations that lead to the creation of a recording can serve as a means for interpretation and reveal strategies that establish and represent regional and cultural identities.¹
Ethnomusicologist Joseph Schloss provided the sole book-length inquiry into hip-hop production. *Making Beats: The Art of Sample Based Hip-Hop* (2004) featured ethnographic research on sample-based hip-hop producers and their collective compositional choices. According to Schloss, the ideology of the sample-based hip-hop production community is a set of beliefs, values, and aesthetics that shapes the way the group thinks, acts, and understands their music and the process of making their music. Schloss approached this community through Howard Becker’s theory of art worlds, an approach that helps acquaint the reader with how ideas of music making in hip-hop are collectively created and mediated. *Making Beats* was a pioneering text that remains an important piece of scholarship due to its approach to hip-hop music as a creative act.

While Schloss presented the aesthetic aims of his consultants, he did not investigate the musical results of those aims. When he provided a musical transcription to detail the sonic output of sampling practices, it was for the bass line of DJ Premier’s beat to “Ya Playin’ Yaself” by Jeru the Damaja. Schloss’ decision to represent “flipping”—the rearranging of a sample that has already been used (107–108)—visually was interesting because he chose that technique over other techniques. In addition, in the introduction to the book he explained that transcriptions were not pertinent to his purposes, namely, revealing the processes and negotiations within the music community of sample-based producers (12–14). He also attributed the lack of transcriptions to his position as a trusted member of a sample-based producer community that insisted on certain insider knowledge remaining inside. However, the figure that he included demonstrated the need to visually explicate many of the concepts and techniques that he and his consultants discussed. Notation, specifically staff notation, may not be suitable in describing
some of the sonic output of hip-hop production techniques, but it is useful when trying to illustrate the results of the aesthetic decisions a beat maker makes with samples.

Schloss’ book was based on dissertation research done largely during the 1990s. During that time beat makers were very secretive about their practices, as Schloss detailed with a 1996 DJ Premier diatribe against people revealing sample sources for compilations. It is thus possible that his field of research was an environment where inquiring about certain samples and uses of technology could have ended his project before it began. Thus, his focus was more on sample-based beat makers, a community of cultural creators that negotiate their values in regard to certain behaviors, like sample disclosure and uses of technology.

In recent years, music theorists and musicologists have approached hip-hop music in search of a means to understand its structural elements and organizing principles. Kyle Adams wrote two articles (2008, 2009b) that analyzed hip-hop lyrics through their relationship to beats. Though he supposed that rappers write to or rhyme over completed beats, Adams revealed certain possible rhyming strategies that rappers used to interact with a beat. Overall, his analyses focused more on rappers’ response to and interaction with beats than on the actual musical components of the hip-hop instrumental. He continued his analyses of rappers’ lyrical rhythm in his article “On the Metrical Techniques of Flow in Rap Music” (2009b), proposing a valuable approach to syllabic articulation that was also incorporated in ethnomusicologist/music theorist Noriko Manabe’s research on Japanese hip-hop deejays and producers (2009, 2010). Her approach also centered on the text-music relationship and utilized staff notation to display the rhythms rappers employ to effectively rap on a beat and diagrams that revealed the patterns used in a rapper’s lyrical delivery. In contrast to Adams, though, Manabe’s analysis derived from her ethnographic research and was more attentive to the aesthetic negotiations that occur between a rapper and a producer.
In 2013, musicologist Justin Williams, a student of Krims, published *Rhymin’ and Stealin’: Musical Borrowing in Hip-Hop*, a book whose aim was to place hip-hop music within the field of musical borrowing. The book was a series of case studies that elucidated how inherent borrowing is to hip-hop culture and music and how different forms of borrowing interact with one another, such as how the early 1990s rap group Digable Planets sampled jazz music in their recording “Rebirth of Slick” while also borrowing the iconicity of jazz for their performance persona. In Amanda Sewell’s 2013 dissertation, “A Typology of Sampling in Hip-Hop,” and her 2014 article, “Paul’s Boutique and Fear of a Black Planet: Digital Sampling and Musical Style in Hip-Hop,” she presented a taxonomy of the samples used in the beats on *Paul’s Boutique* by the Beastie Boys and *Fear of a Black Planet* by Public Enemy, and used that to conduct style analysis of hip-hop music. Sewell’s taxonomy is thorough in its description of the layers of a sample arrangement and the purposes served by different samples.

As music theorists and musicologists, Adams, Williams, and Sewell researched hip-hop beats from an outsider perspective without much, if any, interaction with beat makers. Each scholar’s approach was productive and his or her work thoroughly researched. However, in terms of revealing information about a currently vibrant musical practice, what they presented seems limited. Particularly in regard to Williams and Sewell, whose texts deal more with beats, their perspectives emerged from a base of abstraction that did not acknowledge how beat makers conceive of their compositions or how they consider the practices of beat making as creative acts. There is no indication in their work that they are beat makers or that they spent a significant amount of time attempting to make beats that sound cohesive and rhythmically satisfying. In general, there is no evidence that they have socialized with beat makers and rappers, particularly ones groomed during the time from which the records they analyzed were released. As a student of ethnomusicologist Stephen Blum, I recall occasions where he asserted to seminar classes that
we foreground the musical knowledge of skilled musicians when researching a musical practice. In the case of hip-hop music, beat makers are those musicians who also happen to be skilled technicians, and speaking with them illuminates how the musical and technical interact and result in the borrowing and sampling practices on a recording.

In my opinion, the deficiencies of previous studies derived from each scholar foregrounding the musical product of hip-hop music without even an implicit acknowledgement or understanding of the practice as conceived and enacted by beat makers themselves. For the aims of the aforementioned scholars, it was perhaps not necessary to engage with practitioners, but their work lacks a certain dimension which could only be obtained by including the perspectives of beat makers themselves about their art, and also, to some extent, by personal involvement in beat making. The lack of understanding of the practice of beat making is a primary issue that arises in the work of music scholars that have attempted to write about beats. Scholarly knowledge about a musical practice can be posited on premises achieved through listening, but I presume that a large number of music scholars approach their genre and repertoire of study from, at least, some level of amateur training. In the United States, scholars of western classical music and jazz were most likely trained in theory and performance before approaching their academic research, and scholars of non-western musics generally immerse themselves in a practice before engaging in scholarship, though this may be less true when it comes to non-western popular musics. Understanding a basic level of performance and creation provides a music scholar the foundation to support a discussion of a professional or master-level performance or composition that the purely analytical scholar may never achieve. It is my belief that music scholars have not approached beat making as a practice because beat making—as well as deejaying—is not a common area of study at the undergraduate and graduate levels. Further,
that many individuals who have a music background outside of their university studies may not have devoted the time it takes to learn beat-making technologies. With a traditional instrument, learning the technical logistics of the performance interface usually results in an immediate sound product (pressing a key on a piano or getting the proper embouchure on a trumpet mouthpiece), notwithstanding the quality of sound. Learning to make beats, especially from samples, involves acquiring a base of technical skills before producing any sound. It is thus the learning curve that has deterred scholars from truly engaging with beat making and giving their research on hip-hop music a better grounding.

Another issue in the scholarly study of hip-hop music is that scholars have mainly discussed the sampling aspect of beat making, whereas many beats are not sample-based. While sampling is the most common practice of hip-hop beat making (discussed in Chapter Three), beats have been and continued to be made by means other than sampling. In discussing the ethos of sample-based beat makers, Schloss (2004) and his consultants did discuss the use of live instrumentation by some beat makers but only in passing. The focus of his study, on sample-based beat makers, unintentionally framed the discussion in a way that seemed to delegitimize the usage of live instrumentation, despite the fact that beat makers like Larry Smith and Mantronix in the 1980s, Jay Dee and Tim & Bob in the 1990s, and numerous beat makers in the 2000s (as samples became expensive) made beats with drum programs, synthesizer phrases, and electric bass and electric guitar performances. Strangely enough, because of the preeminence of sampling in writings on hip-hop music, writings about other machine-based, electronic popular musics have had to emphasize the use of sampling outside of hip-hop, or contrast hip-hop and the other musics as if compositional procedures do not cross genres (Butler 2006, Harkins 2010).
Since 2003, I have spent many hours attempting to make beats with hardware and software instruments and conversing extensively with beat makers about their craft. While I cannot aver to know every technology and technique used by these practitioners and on hip-hop recordings, I do listen to and analyze beats with a level of insider knowledge that I believe benefits my research and I have spent many hours discussing such matters with beat makers. For a moment, let us consider hip-hop beats as we would a building or structure. While many people can observe a structure and perhaps understand reasons why a certain angle was used or recognize patterns between different structures, an architect that has been trained and has experience understanding and interacting with relationships between humans and design will observe and assess a structure differently and perhaps with better insight than an observer that has not been involved in structure design or building. When listening to a hip-hop beat, there is less of an authorial or performance presence in comparison to previous commercial popular musics. A guitarist shifting across a fretboard, a saxophonist suppressing and releasing valves, and an assortment of human performance functions like foot patting and breathing enliven recordings of blues, jazz, R&B, and rock. In many cases, these recorded phenomena reveal an aspect, even if just a minor aspect, of musical practice that is generally not present while listening to a hip-hop beat. Thus, having knowledge of the creators of hip-hop beats and their practices illuminates compositional activities that are heard but not necessarily intelligible on recordings, such as when beats from two different eras use the same sample in the same way but the practice of each beat’s composer was entirely different because of the devices each beat maker used. The scholars discussed above were limited in certain respects because they could not sufficiently inform their pertinent perspectives with insider perspectives on the logistics of beat making as a practice.
Research on the Impact of Technology on Music

This dissertation is a study of the development of hip-hop’s music as a negotiation with advances in technology. A few studies have traced the impact of technology on a musical practice. Religious studies professor Edwin M. Good expressed his affinity for classical piano music with his book *Giraffes, Black Dragons, and Other Pianos: A Technological History from Cristofori to the Modern Concert Grand* (1982). The book detailed how the various technical changes to the innards of Bartolomeo Cristofori’s original pianoforte resulted in the modern piano. Music and American Studies scholar Steve Waksman conducted similar research on the electric guitar, but with more emphasis on the impact of solid-state components and effects processing on the practice of electronic guitar playing, such as how control over distortion introduced new ways of playing. His book *Instruments of Desire: The Electric Guitar and the Shaping of Musical Experience* (1999) is an analog to some of the research in this dissertation. In *The Audible Past: Cultural Origins of Sound Reproduction* (2003), communication studies scholar Jonathan Sterne approached the more general phenomenon of sound. The book presents revelations about the history of the early mechanization of sound and in it Sterne theorizes how the development of recording technologies impacted how and what we hear, even to this day. While music is only a part of his expansive discussion, his focus on the historical reverberations of technological factors on social practice informed my approach to understanding the historical trajectory of beat making. Musicologist Mark Katz’s *Capturing Sound: How Technology Has Changed Music* (2010) was a spiritual follow-up to Sterne’s book. While Katz’s book also covered the general impact of sound technologies on social practices around sound, his research delved into how sound technologies transformed musical culture in America. Further discussion
of his book and his concept of the “phonograph effect” can be found in Chapter Two of this dissertation.

In the past twenty years, research on the development of musical cultures through technology has become more common. Any Sound You Can Imagine: Making Music/Consuming Technology (1997) by communication studies scholar Paul Théberge was a pioneering work in the formal exploration of the impact of technology in popular music. The book investigated the role of recent digital technologies in the production of popular music. Théberge approached his subject through cultural studies, specifically Raymond Williams’ The Sociology of Culture (1981). He examined music technology through the interrelationships of institutions, formations, means of production, and forms as he focused on the shifts in the technological basis of musical instrument design. His theorizing about the development and subsistence of technology-based practices through the production of electronic components and devices inspired my approach to the drum machines and samplers that I discuss. Continuing the cultural studies approach to music and technology, musicologist Timothy Taylor’s 2001 book Strange Sounds: Music, Technology & Culture explained the dynamic between technology and human agency as musical cultures transitioned to technology-based creative cultures. In particular, he posited that both the Frankfurt and Birmingham Schools of social theory and cultural studies, respectively, inspired reductive views of the impact of technology on human agency. According to Taylor, the Frankfurt School approach favored the idea of technological determinism: technology as a force that creates new ways of life. In contrast, the Birmingham School favored technological voluntarism: technology as a force that creates materials and tools for a new way of life that can be invested in, or not. Taylor believed that music technology is not a thing to be analyzed and theorized alone. Rather, it has to be connected to a social system that advertises it, purchases it,
uses it, etc. Further, music technology is engaged with a complex dynamic of forces and, in order to understand the role of technology in a musical culture, ethnography should be used to understand how everyday people use everyday technology to create, distribute, and listen to music.

Taylor’s position that ethnography serves a valuable role in understanding the impact of technology on musical cultures became the focus of two edited volumes from the Wesleyan University Press Music/Culture series. *Music and Technoculture* (2003) and *Wired for Sound* (2005) featured ethnomusicological research on music technology and its impact on the field of ethnomusicology. While further expanding the range of musics and musical practices documented through ethnomusicological methods, neither volume included an essay on hip-hop’s beats. Featuring ethnomusicologists and anthropologists with a variety of musical and regional interests, these volumes exhibited how the recording studio and music technology alter the creation, articulation, and mediation of music in various societies. While there probably were a myriad of reasons why a chapter on the technology of hip-hop was not included—such as the previously discussed lack of scholars engaging with beat-making technology—hip-hop music scholarship could have benefitted from the type of treatment Jeremy Wallach gave to the impact of technology in “Indonesian music in Engineering Techno-Hybrid Grooves in Two Indonesian Sound Studios” (in Green and Porcello 2005).

Due to it being a cornerstone of popular music studies, it is not surprising that rock music has consistently been analyzed and critiqued. Technology in rock music has its own dynamics and, accordingly, has inspired writings that document and explain them. In discussing the purpose of his book *The Poetics of Rock: Cutting Tracks, Making Records*, musicologist Albin Zak stated that he wanted “to present a picture of a compositional milieu by exploring its
elements and giving an account of issues and concerns faced by artists” (2001, xii). The milieu was the recording studio and his book revealed the process of negotiation that occurs between rock recordists and the technology they use. In presenting the actions of recordists Zak made it clear that the book was not focused on musical analysis, criticism of techniques, or the history of technology or techniques; however, the book did sprinkle in analysis, criticism, and history in order to elucidate certain points. Composer and music scholar Virgil Moorefield also investigated the significance of technology in the production of rock music, but focused his study on the evolving job description of the producer. In The Producer as Composer: Shaping the Sounds of Popular Music (2005), Moorefield asserted that, due to advances in technology, recording has gone from being a solely technical practice to an artistic one. This transition has resulted in the contemporary producer being more of an auteur, in the filmmaker sense, than the manager, promoter, or overseer roles that initially comprised a producer’s job description. Interestingly, he disagreed with Zak’s concept of “recordist.” Moorefield did not view all attendees in a recording studio as active participants in the production. His argument correlates with his use of the term auteur, but perhaps oversimplifies Zak’s argument and does not take into account factors such as the cohesiveness of certain bands resulting in better sounding records in comparison to the records of bands that lacked unity during recording sessions.

Associating hip-hop beat making with theories and concepts used to analyze the interactions between technology and rock recordists could have been counter-productive because of the disparate dynamics that have informed beat makers’ access to and usage of certain technologies. However, the writings on rock recording production were valuable as I considered the distinct facets of making hip-hop beats and recordings. Ethnomusicologist Michael Veal’s research on the studio craft of dub-style reggae also benefitted my research. In particular, his
book, *Dub: Soundscapes and Shattered Songs in Jamaican Reggae* (2007), exhibited a scholarly approach to a technology-based musical genre that successfully blended sociocultural, aesthetic, and historical analyses. It is my intention that this dissertation will augment what has been researched and written on music and technology, and supplement this area of music scholarship with insights into how certain technologies become adopted by a musical culture and how the combination of social dynamics and technological advances impact usage of music technologies.

**Becoming a Beat Maker and a Music Scholar**

Technically, my first participation in the practice of beat making was in the summer of 1996 when I made my first pause tape. Discussed in Chapter Three as a gateway into production for beat makers that did not have access to a drum machine or sampler, pause tapes were the initial entry into beat making for several of my consultants and myself. I learned about pause tapes from Jason, who lived in the apartment building adjacent to my building in the Flatbush section of Brooklyn. My typical interactions with Jason were on a basketball court or hanging out with our group of friends, where discussions about the latest hip-hop album and recitations of the best rhymes passed the time. Jason and I were very dedicated to playing basketball and often went to the park and played one-on-one when everyone else slept through the morning. On one of these occasions I went to Jason’s apartment to meet up. Before we left to go to the park he played me a tape with his mix of “Everything Remains Raw” by rapper Busta Rhymes. I was very familiar with the recording; it begins a cappella with two layered versions of Busta Rhymes’ voice describing the impact the upcoming song is going to have on the listener. As the kick—hip-hop and rock production vernacular for bass drum—drops into the two-bar introduction, Busta Rhymes’ first lines are: “On time, showin’, you the, rhythm / As I get wreck
and get raw.” On Jason’s tape, the playback I heard went: “On time, On time, On time, showin’, you the, rhythm / As I get wreck and get raw, get raw, As I get wreck and get raw.” The lyrics sounded even more mind-boggling because of the echo delay on Busta Rhymes’ voice in the recording. Three bars and a few lyrics later, I heard: “Knucklehead flow that make you act Real Dumb, act Real Dumb, act Real Dumb / On time, showin’, you the … .”

I asked him how he did that, and he showed me on his dual cassette deck—a piece of technology that, in the wake of CD-Rs and CD burners, was to become a relic within seven years. With his cassette pressing of The Coming (1996), Busta Rhymes’ solo debut album, in the right-hand or “play” deck, and a blank cassette in the left-hand or ‘record’ deck, he used the dubbing function of his stereo to manipulate segments of the official cassette toward his own creative imaginings. With the “record” deck recording to a blank cassette, after Busta Rhymes’ first words, “On time,” occurred he: 1) paused the “record” deck; 2) rewound the “play” deck; 3) released the pause button on the “record” deck in anticipation of the “On time” lyric. He could have repeated any section, phrase, or beat that he liked, but we had to go play basketball. Jason was three years older than me, so a part of me listened to everything he said and imitated everything he did (I still credit him with fixing my jump shot). Thus, later that day I went to the 99¢ store, purchased a blank cassette tape, and started making my own mix of “Everything Remains Raw.” In two years time, Jason was deejaying local parties as DJ Rugged Man. I was playing double bass in my school’s orchestra.

Despite my initial experimentation with pause tapes, I was not aware of beat making as a practice. At that time, pause tapes did not pique my interest, nor did deejaying. When Jason got a deejay set up (two turntables, a microphone, a mixer, two speakers, and recordings) I went over to his house and watched him mix some records, but I did not attempt to deejay. At the time I
knew that rappers rhymed over beats, but if I was told that beats were made by live musicians recreating the sounds of R&B records I would have accepted that explanation, especially considering that some of my favorite beats used samples from R&B records I recognized. In general, like many of my friends and family members that comprised my peer group, I was more attracted to rapping and could recite numerous verses from my cassette collection.

The music video for “B.O.B. (Bombs Over Baghdad)” by OutKast introduced me to the E-mu SP-1200 and the Akai MPC 2000 samplers. Between BET, MTV, Video Music Box, The Box, and other local cable access video shows, I watched numerous hip-hop music videos, many of which exhibited a deejay using turntables. Even as deejays were becoming less prominent after the mainstreaming of hip-hop increased the celebrity and influence of rappers, the image of a deejay scratching was maintained as an icon of the culture and the music. While there were probably earlier music videos that displayed the drum machines and samplers utilized by hip-hop beat makers and producers, there was none that I recall impacting me like the music video for “B.O.B.”

The “B.O.B.” music video, with its fantastic color palettes and frenetic energy, debuted in 2000 and partially revealed the studio mediation that culminated in the beats heard on hip-hop recordings. The breakdown section at the end of the song was visually accompanied by a performance scene featuring dancers, a choir, a deejay scratching on turntables, and OutKast and members of the production team Organized Noize tapping the pads of an SP-1200 and two MPC samplers. Their gestures on those instruments were in sync with the beat of the song, creating the illusion that the video captured a live performance of the actual instruments used to composed the beat:
To this day, I admire that scene in the music video for “B.O.B.”; however, my first viewing of the video did not inspire me to start making beats. Without Internet access in my house to do a web search for “cool drumming machines in OutKast video” or friends and family members to introduce me to beat making, my fascination with what I saw in that video remained just that. I continued to be unaware of what the practice of beat making entailed.

*Embracing the Practice*

The first time I interacted with any type of beat making technology was during my senior year of high school. One day, my jazz band instructor, who spent his off-hours working on acid jazz compositions, brought his Akai MPC 2000XL sampler to the room where we practiced after school. He brought the device to school so the informational technology staff person, Mike, could look at it and help him repair whatever was malfunctioning. Upon seeing the MPC I
inquired about what it was and received a detailed explanation and demonstration of the musical magic they were creating using the machine. They showed me how the MPC sampled sounds and how they were using the device to program drum patterns and sequence samples from recordings and of my teacher’s saxophone playing.

During my freshman year of college I made several visits to my high school to make music with computers and digital technologies; as I was learning music theory in college, my jazz instructor was teaching me the basics of using a Korg Triton keyboard with ProTools. Immediately after my freshman year, Mike, the IT staff person, invited me to hang out at his home studio during his sessions with vocalists and other producers. Though he still made hip-hop music, at the time he was mostly producing house music. Looking back on the summer of 2003, it was the beginning of my beat making education and my intrigue with recording studios. In his living room/recording studio Mike had: a 24-track analog mixer that output to two JBL three-way studio monitors; a Korg Triton keyboard with eighty-eight weighted keys; an E-mu Proteus 2000 rack mount sound module that expanded the sound options of the Triton keyboard; another rack with several pieces of outboard gear that were connected to the mixer through a patch bay; an Akai MPC 2000XL; and an Apple Macintosh desktop computer that he used for digital sequencing in Opcode’s Studio Vision software. Soon after I started hanging out at Mike’s home studio he gave me time to work on my own music. Throughout my years of knowing Mike he has been generous with his time, knowledge, and equipment to people interested in learning music technology and making records. Recently, I asked him why he started mentoring me in 2003:

I think that I have a pretty strong set of ears, you know. And amateurish or not, you had something going, and I heard that. And I was like, “you know, given
time, there’s going to be something that comes out of this that is going to be solid. He understands the concepts, he understands the theory behind how this works and given time, given an understanding of a little bit more of the spectrum of music in general, he’s going to really have a solid understanding and ability to really get further.” (Interview with author, New York City, March 21, 2013)

Despite working mostly in hip-hop and house music, Mike listened to everything and he encouraged me, as an aspiring beat maker, to expand my listening. He told me that in order to sample and make beats I had to establish an understanding of what makes different types of musics groove. I am still appreciative of his comments about my early prospects, especially because my first beats were not particularly good.

When it comes to the adoption of certain technologies, beat makers typically start using machines or software programs that were recommended to them by a peer or mentor. Following a suggestion from Mike, I used the majority of my salary from working as a summer camp counselor to purchase a used MPC 2000XL for $1100. While that purchase ensured that I was going to begin the fall semester without any money, I was satisfied that I could make beats in my own space and on my own time. In an interesting convergence of my musical interests, that prior spring, I was finally able get my own double bass. By the fall, though, my attention toward playing bass, an activity I took more seriously every year for seven years, was diverted by my interest in learning how to make beats. Prior to getting an MPC, music practice involved playing bass and working on piano exercises. That fall, though, I was like a mad scientist in my dorm room figuring out how to use the MPC: how to make it work with my MIDI keyboard, how to program loops and arrangements, and how to incorporate my traditional music skills into beat making. Most of my first beats on the MPC were elementary arrangements of percussion and
instrumental sounds from my electric piano; one was a poor attempt at imitating a beat from OutKast’s Speakerboxxx/The Love Below (2003). Initially, I did not use the sampling function on the MPC. One reason for this was that I was still learning how to use the machine; the other reason was that I had no idea what to sample or how to be creative with samples. Despite listening to numerous beats before I had my own sampler, I was unable to crack the creative code of making music from samples. I understood the basic concept of looping a section of audio, but my favorite beats did not contain basic loops. I recall my early stages of working with Mike when I intended to solely program drum rhythms because I did not know how to contribute to the other parts of a beat. I did not know how my bass and piano playing skills could help with making beats and my ears were below par when it came to making groove-based music from samples.

My breakthrough came sometime that fall. I was at Mike’s house playing for him what I was making in my dorm room and he decided to show me some details of the craft of sampling (discussed in Chapter Three). We decided to sample Marvin Gaye’s “Inner City Blues (Make Me Wanna Holler)” from his seminal album What’s Going On (1971). The song begins with a succession of E-flat minor seventh chords that are sustained for one bar. We sampled the first occurrence of the chord and placed it on one of the sixteen pads of the Akai MPC 2000XL. Then, Mike went to the end of the recording to find something else to sample. “Inner City Blues” ends with Gaye singing in a declamatory style with only piano accompaniment. Before this coda-like section starts, the song concludes with a prominent A-flat seventh chord that decays; Mike decided to sample that piano chord.

The moment Mike started triggering the piano chords in rhythm was the moment that my ears loosened up; it had been years since I experimented with pause tapes. He also showed me
how to chop up Gaye’s scat vocal into multiple pieces and program them into a two-bar rhythm. On a ZIP disk I still have the file of the beat that Mike and I created that day. Now, after years of chopping up samples, I realize that before that moment I heard hip-hop beats as complete entities and did not effectively decipher individual components or how they were interacting. As a music student performing in orchestras and jazz ensembles, I was unable to think of using segments of an audio recording in that way. Once I was shown how to search for useful segments of audio and heard the combination of the two nonconsecutive moments in a recording, a light bulb came on that still illuminates my musical thinking.

**Beginning Research and “Entering” “the Field”**

I am unable to distinguish between the feeling I have for life and my way of expressing it.

—Henri Matisse

It is impossible to ignore the impact of my musical activities prior to formally researching hip-hop beat making and production as a topic of study; especially considering that, as I was learning how to make hip-hop beats, I was also exposed to the literature on hip-hop music. In the fall of 2004, I was assigned to write a paper on a Bach chorale in my first music history class. When I ventured into the music section of the library to find the score and some texts on Bach, I paused while passing through the popular music section. I saw a binding with the words *Making Beats*. I tugged the book from the shelf and was excited when I saw a book cover displaying an Akai MPC 2000XL with some closed-back Sony MDR headphones. In proximity to Schloss’ book I saw the titles *Hip-Hop America, Rap Attack, The New Beats*, and *Black Noise*. Subsequently, I spent the fall semester reading those books. I had read newspaper and magazine
articles about hip-hop but that section of the library was my introduction to book-length examinations. Though I was quite late in discovering those books—*Rap Attack* had been published twenty years prior—indulging in those texts roughly a year after purchasing my MPC gave me a profound respect for the breadth of the music and culture that I revered during my adolescence. The next year, I began researching hip-hop beat making for my undergraduate honors thesis.

As an academic discipline and approach to researching music (Rice 2008), ethnomusicology has constructed “the field” as a metaphorical place where living and research are integrated (Stock and Chenier 2008). Traditionally, an ethnographic research approach in ethnomusicology implied becoming embedded in the social milieu of a non-Western music, at which point participation in and observation of performance practices ensued. However, as Stock and Chenier (2008) noted, from the establishment of local ethnomusicological research in many countries and the growth of fieldwork curricula at American universities to the concentration of immigrant communities in certain domestic regions, there has been an increase in ethnomusicologists doing ethnographic research on musics they have more familiarity with and in fields of research closer to home. As I read a portion of books on hip-hop and began researching hip-hop beats for my thesis—all while participating in beat making—I had casually entered what would become my field of research for this dissertation. Thinking about my early research inspires reflection on my early impressions of beat making as a learner with those as a researcher. For example, I hung out with beat-maker friends for numerous hours. We listened to records, ate lunch, conversed, and created. I now view those actions as functions of a musical practice that results in music products: beats and recordings.
Methodology

This dissertation combines a history of the instrumental component of hip-hop music with music analyses and sociocultural inquiry. It features a considerable amount of oral history and sonic analyses that detail what was unique about hip-hop music making practices from 1975 to 1991. The primary methods of data collection were interviewing hip-hop recordists, archival research into documented accounts of and statements on beat making from periodicals, books, and Internet multimedia, and close listening to numerous hip-hop recordings from the pertinent time period.

As part of a larger project on the history and current status of beat making, this dissertation is also informed by observations that I made as a member of the beat-making community in New York City at large. I participated in and documented interactions and practices that took place before, during, and after beat making and recording processes. These events resulted in a meaningful practice for those involved and led to discussions on the use of technology and its impact on practice and opinions on older practices and recordings. I have been a contestant, documenter, and production team member for America’s Next Hot Music Producer, a hip-hop producer competition and showcase for some of the best talent in the tri-state area and Los Angeles. In addition, I have attended beat-making competitions and events held by iStandard, the popular B.L.A.P. (Beats Love and Alcohol Party) events hosted by producer !llmind, and a variety of talent showcases for up-and-coming local hip-hop artists.

Progressing from a novice to an amateur, and then to a semi-professional beat maker and producer was invaluable as I began to conceive of how to research and write about hip-hop’s music and the processes that go into creating it. Thus, of all of the people and practices involved in the creation of hip-hop music, beat makers and making beats receive the majority of attention.
in this history. As hip-hop recordists, beat makers provided the initial raw arrangements of samples, synthesizer motifs, and drum patterns that producers and engineers shaped into a recording along with vocal content. Deejays were the original composers of hip-hop’s music; however, differentiating between beat makers and deejays became paramount as technologies in the mid-1980s allowed beat makers to make hip-hop music without the prerequisite of being a deejay. Interestingly, despite its association with recorded media, hip-hop’s music was initially encountered in a live context where it was created and curated by deejays. Therefore, the relationship between hip-hop beat makers and the dynamics of recording technology is significant, not only because of the primacy of recorded hip-hop in the genre’s relatively short time as a cultural phenomenon, but also because the development of that relationship reveals shifting conceptions of the composer of hip-hop music and the “hip-hop producer,” replete with notions of authenticity, aesthetics, ownership, and collective creativity.

Since 2010, I have conducted twenty-nine formal interviews with beat makers/producers, deejays, engineers, rappers, music industry insiders, event organizers, and witnesses to the history of hip-hop. Each interview featured questions about the consultant’s participation in hip-hop culture, their education in and use of different technologies for creative means, the details of their work in recording studios, and their perceptions of the past and present of making beats. My consultants represented almost every level or status in the music industry, and speaking to those who practiced beat making without reaching a high level of notoriety or financial reward was as insightful as speaking to those who worked on a platinum selling recording. Despite the stratification of my consultants, I admit that much of this historical study considers better-known names and recordings from hip-hop’s history. I found this approach to be necessary because
many hip-hop recordists cited well-known producers and recordings as influences on their practice and, in general, those recordings displayed the developments in beat making.

For interviews, recording sessions, and producer events and showcases I used a four-channel ZOOM H2 digital audio recorder to capture audio and a Canon PowerShot SX130 IS digital camera and Sony HDR-CX200 Handycam digital camcorder to capture visuals. This research was undertaken with the understanding that hip-hop recordists, as a group of culture creators with aims toward making commercial products, can be reluctant to disclose aspects of their activities or have them documented, particularly visually. Thus, cameras were only used when approved by consultants, which was rare. Ethnographically, it was also difficult to convince beat makers to make a beat while I documented them, the exceptions being Rick Hertz and Clipsmoke. In our current, social media-infused society, where many beat makers post videos on the Internet of themselves constructing or reconstructing a beat, I was fascinated that even my beat maker friends did not want me to film them “in the lab” putting together a beat. I believe there are two reasons as to why I ran into this push back from my consultants. First, when crafting the beginnings of a beat, many beat makers work alone and then proceed to creatively work things out with a partner if they have one. In Ronnie Reese’s oral history of producer Jay Dee’s (James DeWitt Yancey) career, rapper Phat Kat (Ronnie Watts) relayed the following story about a studio session with Jay Dee:

We’d be down there laughing and smoking, but when he’s getting ready to make a beat, he’d tell everybody to step out of the room. Niggas would walk out of the room, then four or five minutes later he’d be like, “Alright, y’all can come back in.” Then he’d play them the shit on the loudspeaker … You’d come back in the
room like, “What the fuck?!? What’s going on, dog … what’s going on?”

(emphasis in original, quoted in Reese 2006, 110)

As I developed this project and reflected on my practices and the people I interacted with, it became apparent that being a beat maker and a doctoral student (especially during dissertation writing) share a state of creative solitude that is undoubtedly disrupted by a non-participating observer. Secondly, because of the raised profile of beat makers and producers in the past decade and the growing opportunities for publicity across the Internet, the beat makers that document their creative process are savvier about controlling the image and narrative of who they are and what they do. In many ways, producers have matched rappers with regard to their ability to create a following. This brings into question the risk/reward balance of having less flattering moments captured, even by the camera of an ethnographer. As this project continues, I will continue to seek beat makers that are comfortable with being observed as they construct a beat.

Returning to my methods towards understanding the history of beat making, my knowledge of not only hip-hop recordings but also R&B recordings facilitated much of understanding of beat makers use of samples. As a child, I mostly listened to R&B/soul music because that was what my parents and grandparents played (Clarence Carter, James Brown, Esther Phillips, the O’Jays, McFadden and Whitehead to name a few artists). Absorbing R&B recordings as a child allowed me to have a prepared ear when I really started listening to hip-hop around 1995, and be able to cite where some hip-hop samples came from. My understanding of R&B and soul music has also benefitted my beat making, as rapper Slow Cash (Olayinka Bosede) explained when he discussed what initially attracted him to my beats:

The thing is your beats—you’re probably the most, when it comes to urban music, you’re the most acquainted with the urban musical tradition in America than any
of the producers that I’ve worked with, period. Probably even more than some of
the people who are “urban” producers professionally because of your
concentration and your studies and stuff. So when I hear a song like “Break da
Bill,” where you’re actually playing bass on it, that first joint—and that like
evolved even over time—was just straight up like a soulful type vibe. (Interview
with author, Long Island, NY, June 11, 2012)

Even with this background, I still used online sample databases to find sample sources that I was
not aware of—the-breaks.com, whosampled.com, and Wikipedia.org, gave me access to lists of
samples used in hip-hop beats that I confirmed through the records that I have in my music
collection.

Lastly, I also found it germane to utilize user manuals from different machines and
software as historical research documents. These manuals (first discussed in Chapter Two) reveal
how music technology companies adapted to advances in technology (see Ensoniq’s explanation
of sampling in their Mirage sampler manual) and are valuable because they disclose and depict
the options available to a user of a particular technology. In some cases, as with Akai’s
disclaimer about the impact of heavy filtering on the sound of samples, the information in a user
manual correlates with the resultant sounds heard in a hip-hop beat.
Recording and Audio Analysis

The use of recording technology has further altered the potential for studying musical systems over time, primarily by enabling the scholar to juxtapose the past with the present. Our understanding of what comprises an historical process has been revolutionized by the capabilities of recording technologies...

–Kay Shelemay (1991, 287)

In the article from which the above quote is sourced, ethnomusicologist Kay Shelemay summarized the discipline’s history with recording technology and the recording industry. As ethnography and analysis became more dependent on recordings, scholars of the discipline wavered in their support of recording technology because of its association with urban commercial music. In the passage prior to the quote, her historical narrative ends with the cassette, a technology she saw as disruptive to the hegemonic power of colonialists but also as a destabilizing force to the recording industry and the field of ethnomusicology: as indigenous locals in several countries attained access to the ability to record and distribute their musical practices, recordings by outside parties were not as necessary or desirable. Lysloff and Gay’s introductory chapter to *Music and Technoculture* (2003), “Ethnomusicology in the Twenty-first Century,” continues Shelemay’s investigation into ethnomusicology’s relationship with recording technology and its industry by bringing into question the position that ethnomusicologists have taken towards audio technologies. In particular, they discuss the long-surviving position that mass-mediated, technology-based musics are “falsifying” or unnatural in comparison with traditional musics. They indicate the emergence of the world music industry, which began recording musicians and practices usually documented by researchers, as a
definitive moment that entrenched some ethnomusicologists’ views of recordings as mass-mediated, inauthentic representations. Lysloff and Gay problematize this position towards technology by putting the technology of the researcher into context and proposing questions of researcher authenticity and authority. Returning to Shelemay, she concludes her article with a prescription for the use of recordings in ethnomusicological studies:

Finally, as recording technology displaces musical notation as the primary mechanism for the preservation and transmission of music, it simultaneously dislodges notated musical traditions from the top of the ethnomusicological pecking order and agenda. (Shelemay 1991, 287)

Early in the twentieth century, composers Igor Stravinsky and Béla Bartók saw recordings as a pedagogical tool to document the manner of playing a piece (Zak 2001). Recordings are paramount in hip-hop and in many cases exhibit the compositional techniques of beat makers. This dissertation features object-based musical analysis in the form of annotated waveforms aligned with notated transcriptions. Beat makers and producers invest certain sounds and certain arrangements of sound with certain meanings (Erlmann 1996). Due to the diversity of technology and regional aesthetics, hip-hop’s music has a varying set of organizing principles that add a challenge to analyzing beats over a span of history. While visually representing beats is pertinent to the analyses in this study, the figures that are used illuminate the ways that beat makers make sense of their sound arrangements, and ethnographic accounts explicate the process through which sounds are, or perhaps are not, infused with meaning. In his argument that art theory is indeed cultural theory, Clifford Geertz utilized art historian Michael Baxandall’s notion that a picture is a record of visual activity that is learned and understood by those within a culture system (1983, 108–9). Ethnomusicologist Veit Erlmann paraphrases Geertz in his discussion of
isicathamiya in South Africa in support of his approach to looking at a song or a piece of music as a record of aural activity (Erlmann 1996). In adopting Erlmann’s notion, I regard hip-hop recordings as commodified chronicles of the creation, arrangement, and manipulation of sounds through a variety of music technologies. Through ethnography connected to musical analysis, I have been able to represent the development of the use of different technologies and the resultant instrumental techniques and sounds in hip-hop beats. I believe that this method gives the reader insight into the technical, temporal, and regional motivations spurring hip-hop recordists’ utilization of certain sounds, rhythms, and audio techniques.

I have used waveforms of a recording’s audio as a graphic system of musical communication. The visualization of audio is effective in displaying how sounds from hip-hop recordings are organized and manipulated. When I spliced and reorganized the waveforms of a recording’s audio I felt as if I was replicating the internal logic of how beat makers conceive of and construct their compositions. In previous analyses of hip-hop beats, scholars have disregarded or taken for granted what producers were actually doing with segments of audio. Through interviews and other sources I have avoided unsubstantiated statements in regard to what beat makers actually did during the creation of the beats I discuss. Figure I-2 is an example of how I annotated the waveform of a recording’s audio that a beat maker sampled from:

**Fig. I-2: Model Waveform Annotation**
Through this method I was able to highlight the pieces he extracted while displaying the context of the individual pieces. Figure I-3 is an example of how I rearranged the annotated parts from figure I-2 to represent the sample arrangement that is heard in a hip-hop beat:

**Fig. 1-3: Model Sample Arrangement Visualization**

In order to create the figures above, I imported the relevant audio files into Logic Pro 9 or Snapper, an audio visualizer program that allows for easy manipulation of audio and was less taxing than Logic Pro on my computer’s processor. I then saved a screenshot of the section of audio I needed for the figure and imported it into Adobe Photoshop, software that enables image manipulation. In Photoshop I annotated the waveform to highlight the points I make throughout my text or, when applicable, cropped and rearranged parts of the waveform to create the representation of a hip-hop beat’s arrangement.

In regard to getting access to all of the recordings I discuss in this dissertation, years ago I used Roxio Toast to convert the majority of my compact disc collection into the highest quality compressed audio files possible. Doing this allowed me to travel around with my large hip-hop
record collection on my 240GB modified iPod Classic and listen to and compare numerous hip-hop recordings. To grow my collection, over the years I have exchanged files with friends and consultants, ripped compact discs from library collections, and, in cases where I could not find a recording, extracted audio from YouTube videos. In most cases recordings were listened to on my Macbook Pro through iTunes, though on some occasions I played audio in Logic Pro 9 or Snapper. Lastly, I typically listened to recordings on my Sennheiser HD 280 headphones or Dynaudio BM5A MkII active studio monitors.

Most of the recordings discussed in this dissertation feature rappers. Hip-hop beats made solely to be consumed as instrumentals have been around since 45 King (Mark James) put out "The 900 Number" in 1987, and reached a higher level of publicity when DJ Shadow (Josh Davis) released *Endtroducing* in 1996. The practice of creating instrumental hip-hop has had different aims, from theme-based albums to use in battles and showcases. I chose to focus on beats that have been in service to rappers’ lyrics because, from my perspective, these beats have been—and will probably continue to be—more salient and applicable to the development of hip-hop’s music. Regardless of how extraordinary or sublime an instrumental beat is, it will never have the popular impact of a Marley Marl beat for LL Cool J, an Easy Mo Bee beat for 2Pac or the Notorious B.I.G., or a Timbaland beat for Jay-Z. Hence, throughout the dissertation I do not discuss or reference beat makers and producers like Double Dee and Steinski, DJ Shadow, or, more recently, Flying Lotus. This group of producers is generally perceived more as experimental and the majority of their compositions have been packaged as instrumentals. The producers of instrumental hip-hop, though, particularly DJ Shadow, have been influential on several of the beat makers that I do discuss.
Lexical Logistics

Beat makers use the term “hip-hop” in many ways, with different connotations, even when compared to rappers, break dancers, graffiti writers, scholars, journalists, and the average consumer. This is especially true when considering hip-hop as a music genre. Are hip-hop and rap music the same thing? No. But people that have been devoted to this music for a long time and some of the more experienced and accomplished beat makers and engineers that I have consulted use the terms interchangeably.

In statements made by the gatekeepers of hip-hop’s history, particularly Afrika Bambaataa, KRS-One, and journalist Davey D, the consensus reached has been to emphasize “hip-hop” as the culture and “rap” as a component within the culture, comparable to graffiti writing or break dancing. I agree with this designation, but for the sake of all the music that is going to be discussed in this dissertation I want to further explain how the term hip-hop will be used in relation to music. Hip-hop was not an agreed-upon term for the culture until the early 1980s, particularly in the wake of the commercial success of The Sugarhill Gang’s “Rapper’s Delight.” Upon the release of that recording, the label of “rap music” was how people separated recordings from Sugar Hill Records, Spring Records, and others from disco releases with a similar sound. Titling this music “rap” was accurate in the sense that rapping was prominent on the first recordings from the culture, but the title ignored the fact that the musical expression of the culture had other forms, particular the breakbeat music of Grandmaster Flash and other deejays. Hip-hop, as a name for the culture and music, gained traction once Fab 5 Freddy and Afrika Bambaataa began espousing the term to acknowledge the culture beyond rap records, and also once media outlets started reporting on the phenomenon in 1981—using the term to define
the youth culture that was happening in the Bronx and in other parts of New York City. In record
stores, though, “rap” was used for recordings.

The issue with using the term “rap music” for all recordings is that music created within
the culture of hip-hop cannot be reduced to music with a rapper. At the time, and probably until
the last decade, a recording with a technologically created beat, heavy bass, and sample ostinato
featuring a lyricist rhyming, was deemed a rap recording and representative of hip-hop’s music.
By the late 1980s, though, using “rap music” to signify the music within hip-hop culture was
reductive because a segment of contemporary R&B music (music traditionally conceived
through and created with live musicians and conventional instruments) utilized the hard drum
beat, heavy bass, and sample ostinato aesthetic that typified “rap” music. In some instances, a
rapper and a singer created individual recordings over the same instrumental created by a beat
maker.

I will use the term “hip-hop’s music” to discuss recordings and beats made by hip-hop
recordists that were and could have potentially been used for a rapper or a singer. Rapping is
musical, and a part of the music, but for the purposes of this dissertation I use the term “hip-hop
music” to denote the instrumental accompaniment or beats. Academic writing on hip-hop
typically lacks inclusiveness of singing and rapping under the label “hip-hop music.” It is rare in
scholarly writing to have a discussion of hip-hop’s music describe the beats of Timbaland,
Organized Noize, and Dr. Dre as being beyond just material for rappers. For specificity, in
certain places the labels “hip-hop/rap” or “hip-hop/R&B” will be utilized. As a result, the labels
“R&B” or “soul” or “funk” music will be used to discuss established ideas of those genres.4

This dissertation is predominantly about the creators of beats. These creators are known
as beat makers (beat smiths in more recent years). Irrespective of the amount of attention
scholars have given to hip-hop beat making and its practitioners, most scholars do not distinguish between the roles of beat maker and producer, and seemingly use the terms interchangeably. Successful hip-hop producer Saphreem A. King acknowledged in his book *Gotta Get Signed* (2005) that producers take on more responsibilities in the recording process than just the beat. These responsibilities can include the running of a recording session, directing a rapper or singer, and ensuring the proper balance between the different audio components or mixing. In his discussion of rock recordings, Zak (2001) described lyrics, tunes, and chord changes as the potential for a song. In hip-hop, the raw arrangement of drums and instrumental components, or what renowned producer Pete Rock called the “Plain Jane” (Manabe 2009), is the potential for a song that is crafted and caressed by a producer and engineered into a recording. King also stated, “[P]eople still seem to overlook the fact that hip-hop is an art form and production is a craft” (2005, 22). The craft of hip-hop production, facilitated through the intimate control of technology, is highlighted in this study because of its focus on beat makers. As this project proceeds beyond this dissertation, the role and work of hip-hop producers will be given more attention.

“Beat” is generally used in reference to the instrumental part of a hip-hop recording, hence phrases like “I’m making beats” or “I’m rapping over that beat.” Some recordists use the word solely in reference to the drum loop and percussion parts of an instrumental. Thus, there have been instances, such as at beat showcases, when the phrase, “that beat has a hot beat,” was uttered among recordists or between hip-hip enthusiasts. “When I say beat I don’t mean the track, I mean actually the drum beat,” stated Bob Power (interview with author, New York City, June 10, 2011) as he clarified his word usage and initiated a definition rabbit hole with his use of the word “track.” In regard to hip-hop instrumentals, rapper Saint used “beat” and “track”
interchangeably: “I hear the beat, and I like it in the sense of I can see myself catching different flows. Not that the track is hot, but I can see myself [flowing in different ways]” (emphasis by author, interview with author, New York City, September 29, 2010). In hip-hop parlance “beat” and “track” are often interchangeable and “beat” can refer to the drums on a recording, however, in this dissertation when ‘beat’ is used it is in reference to a multi-layered hip-hop instrumental.

**Outline of the Dissertation**

This dissertation elucidates the dynamic changes in the sound of hip-hop’s music through the poetics of recordings and documents the craft of hip-hop recordists from 1975 to 1991. Hip-hop is one of the popular musics of the late twentieth century that saw the revision of established practices of its composers as they responded to developments in music technology. Each individual chapter discusses the impact of the introduction of a new technology to hip-hop beat making and presents oral histories documenting how the music was conceived and perceived throughout its first eighteen years. As stated earlier, there has not been much scholarly attention paid to hip-hop beat making as a musical practice, particularly the technologies that have facilitated the practice.

My research extended beyond 1991, but while constructing this project I found that there was a need to acknowledge and organize a wealth of information about the technological and social histories of hip-hop beat making in the 1970s and throughout the 1980s. As I began to consider where to suspend my historical narrative, I deemed 1991 as an appropriate year because of the legal, economic, and technological developments that impacted the practice of beat making and the sound of hip-hop music in 1991/1992. Legally, as is discussed at the end of Chapter Three, Gilbert O’Sullivan’s successful 1991 lawsuit against rapper Biz Markie and
Warner Bros. for the unauthorized use of his copyrighted music initiated changes in how beat makers approached the practice of sampling. Economically, by 1991, most of the independent record labels where hip-hop music blossomed in the 1980s were either defunct (Enjoy Records and Sugar Hill Records), or absorbed into entertainment conglomerates. This process was initially through distribution deals (Def Jam Recordings to CBS Records in 1985, Tommy Boy Records to Warner Bros. in 1985; Cold Chillin' Records to Warner Bros. in 1988; and 4th & B'way Records to PolyGram [via Atlantic Records] in 1989) and then subsidiary deals in the 1990s (Reeves 2008). Though new independent labels were founded in the 1990s, the new economic climate of hip-hop music was gradually altering some of the unfettered rebel spirit that defined the 1980s in order to attain sales goals beyond those of the original hip-hop independents. In 1992, as the legal and economic variables were impacting hip-hop music, deejay/beat maker/producer Dr. Dre (Andre Young) created and released his solo debut album *The Chronic*. The album introduced new production procedures, mainly forms of sample substitution like sampling new performances of older music in lieu of bearing the high cost of sampling from a recording (Fernando Jr. 1994) that were further developed by 1990s beat makers Organized Noize, Timbaland, and others. It is my belief, and further research is needed to confirm this, that the production heard on *The Chronic* made sound modules popular amongst hip-hop beatmakers. In addition, *The Chronic* instituted a new sound and image for gangsta rap that successfully sold hip-hop to the mass audience coveted by major record companies. The Bomb Squad-inspired beats and lyrics and images depicting police brutality and the social inequality of N.W.A. (Niggaz Wit Attitudes) records and music videos became the smooth, midwestern funk-inspired sound of G-funk that supported lyrics and videos that highlighted the urban gangsta lifestyle as cruising, partying, drinking, and subjugating women (Reeves 2008).
Lastly, in 1992, Ensoniq released the ASR-10 (Advanced Sampling Recorder). It was the first 16-bit stereo sampler that gained widespread adoption amongst hip-hop beatmakers, including The RZA, Timbaland, Sean C, The Alchemist, and the Neptunes. Ending in 1991 ensured that I would not present a reductive view of what unfolded in the 1990s as I honed my historical documentation of the development of beat making in the 1980s.

Chapter One focuses on pre-1979 hip-hop music through the first commercial recordings released from 1979 to 1981. Initially, the music was solely created and defined by street deejays who used two turntables and two recordings to loop popular sections of recordings. As such, the practice of making hip-hop music was intertwined with the capabilities of turntables and mixers, and compositional techniques were established through the possibilities offered by two vinyl records and two turntables. In addition, I consider the negotiation and contestation over the early sound of hip-hop music, particularly between the funk-style R&B sound of breakbeats and the disco-infused sounds that rappers rhymed over. The negotiation over the sound of hip-hop then segues into the hip-hop recordings that introduced the world to the genre. Framing this section of the chapter will be the question of how the requisite use of technologies to create recordings impacted who controlled the sound of hip-hop once it became a commercial product.

Chapter Two begins with a description of the effect the first recordings of hip-hop had on the development of hip-hop music outside of New York City. Subsequently, I detail how the introduction of the drum machine into beat making affected the sound of hip-hop music and who had creative control over that sound. Hip-hop music’s dalliances with Afro-futuristic and rock aesthetics are also discussed as I work my way through the persistent contestations over what hip-hop should sound like and how beat makers adapted to new technologies that became available.
The third and final chapter documents sampling as hip-hop’s common practice and how the history of sampling technology is in many ways defined by hip-hop music. When Marley Marl extracted the first sample for a hip-hop beat he introduced the practice most commonly associated with hip-hop beat making. Thus, Chapter Three encompasses some of the discussions from previous chapters and features the most comprehensive historical interaction between technology and the poetics of making hip-hop music. In this chapter, I utilize Kevin Holm-Hudson’s notion of “sonic historiography” in order to construct a historical narrative that unveils the interactions between technology and practice.

Conclusion

In the past decade, access to learning about making hip-hop beats and producing recordings has increased. One factor in this increase has been the availability of software tools and instruments to create beats. Another factor is how approachable many beat makers and producers have become as more people acknowledge their role in hip-hop music. Fifteen years ago, hip-hop beat makers and producers were protective of their sample sources and their techniques. Recently, several of them have become more open to explaining features of their craft and are a valuable source that in many ways made the goals of this dissertation plausible. This dissertation expounds on what hip-hop beats have been during the development of hip-hop culture, the process behind the creation of them, and the people that make them. It aspires to be a worthwhile complement to the fields of hip-hop studies and music and technology, and to further explicate how the sounds heard on recordings are a result of creator’s interactions with their culture and their tools of creation.
As an archetypal character in dramatic and comedic fiction, the mad scientist has been portrayed as a wily, eccentric male who has become obsessive in the pursuit of some scientific innovation to enable him to rule the world (Frayling 2005). I have read about, observed, and been a participant in the recording processes of hip-hop music. While those processes may not be as rigid as fictional scientific discovery and the consequences not aimed at ending world society, I believe the diligence of beat makers and producers in the process of seeking, creating, manipulating, and organizing sounds allows for a similar characterization to be made. Engulfed in consoles, yards of cabling, flashing lights, stacks of recordings and hard disk drives, hip-hop beat makers have spent years constructing the sound of hip-hop. Toiling behind consoles and machines and in front of computer screens for hours, they have also devoted hours to the musical minutia of searching for the correct rhythmic placement of a sample or tweaking a kick drum sound for the most forceful punch. Anxiety tends to be a prerequisite for any creative mind. If it is not caused by the prospect of failure in the eyes of admirers or contemporaries, it breeds from within, causing creators to question every aspect of their work before, during, and after the creative process. Hip-hop beat makers are not exempt from this, and the mad science reveals the cumbersome means used by beat makers to reach their creative ends.
Chapter 1 – Nascent Sounds of a Forging Culture and Aesthetic: 
**Hip-hop’s music before 1979 and the early rap records of 1979**

The free-lance deejay, an independent entrepreneur armed with a portable sound system and extensive record collection, emerged as the new cultural hero in the Bronx around 1975.

–Steven Hager (1984, 33)

Seen through previous musical narratives of African-Americana, the beginning of hip-hop culture and music deftly straddles the line between two narratives. The first of these comprises sensationalized lore of an organic cultural development that was destined to emerge from the young masses yearning to be culturally liberated. This narrative uses poverty as an icon to authenticate hip-hop as a result of a striving for cultural expression amongst young blacks and Latinos (a paternalistic “it is what it is” aesthetically because of their economic situation) (Butts 1995, Lowe and Perry 2004, Gibson 2005). The other narrative is relatively grounded and has been formulated by documented accounts of young people and their activities that were eventually configured around an ethos birthed from a shared environment in the Bronx (poverty is acknowledged, but more emphasis is placed on novel and inventive cultural practices) (Hager 1984, George 1998, Toop 2000, Keyes 2002, Chang 2005). In general, each narrative differs in its supposition of hip-hop culture’s origin in relation to the practices that became representative of the label hip-hop—the lore that declares the first recreation room party hosted by DJ Kool Herc in 1973 as the celebratory space that birthed every aspect of hip-hop culture in contrast to the documented evidence of graffiti writing and break dancing as already existing practices in New York City. Aspects of each narrative can be found in the other, and each type of narrative allows hip-hop culture a position in a black American cultural legacy that features a myth about a
blues man’s transaction with the devil and song repertoires that chronicle circumstances from chattel slavery to the struggle for civil rights. But what does each side mean for the documentation and significance of hip-hop’s history as a music practice?

“Lying up” a hip-hop nation or formally documenting it can skew toward the extremes of fascinating tales of overcoming adversity or facts without context, which are both relevant to hip-hop’s story. Each type of narrative, though, insufficiently presents aesthetic choices made by creators, practitioners, and enthusiasts, choices that were not an inevitable outcome of the conditions in the Bronx (Kelly 1997, Schloss 2004). The availability of more interviews, documentaries, panel discussions, research, and memoirs to illuminate the history of hip-hop culture has broadened our understanding of the actions of people living in the Bronx in the 1970s. And more and more it is revealed that hip-hop culture was initiated by people trying to figure out solutions for obstacles to how they imagined visual art, fashion, language, dancing, and music. So yes, on a macro level the redlining practices of realtors, the race-informed policy of benign neglect by city officials (Wilson 1987), and the lack of compassion in the urban planning of the Cross Bronx Expressway (Chang 2005) created the perceived and lived obstacle of a distinct and limiting social space where the activities of hip-hop were adapted to and flourished in; but, particularly in terms of the music, those circumstances cannot be wholly credited with micro-level aesthetic decisions made by young people that found pleasure in unconventional ways of presenting themselves and creating and consuming culture. Therefore, in discussing this music it is beneficial to use the socio-economic position of its creators and practitioners as a frame or setting, but not as a catalyst, for the personal and idiosyncratic creative decisions that established the culture and the music and propelled their development.
In each of the origin narratives of hip-hop discussed above there is not much contention that a party in a recreation room in August of 1973 was the beginning of hip-hop, a retroactive labeling of that night’s activities. Clive “Kool Herc” Campbell controlled the music on that night. He arrived in the South Bronx from Jamaica as a twelve-year-old in 1967 (Hager 1984, Fricke and Ahearn 2002) and went through his adolescence absorbing and practicing the youth culture of the area. “I was known as a graffiti writer,” Kool Herc told journalist Steven Hager, “I wrote ‘KOOL HERC.’ I also ran the 880 relay on the track team, dressed well and danced” (Hager 1984, 32). As a culture, hip-hop is multi-faceted, with rapping, b-boying, deejaying, fashion, beat boxing, and graffiti writing as the predominant ways that participants live through and express the culture as they engage their surroundings. Graffiti writing is the oldest practice. In the 1960s, young people affiliated with street gangs in Philadelphia and then in New York City began to spray paint public spaces (Chang 2005). It is plausible—if not already recognized—that somebody brought spray paint and tagged up a wall at the 1973 party on Sedwick Avenue. The party, though, is celebrated because of the size of the audience that witnessed it, the presence of Herc—the first luminary of what consolidated into hip-hop culture—and the awe-inspiring sound he produced from his sound system, which no one else in the neighborhood could match.

Herc had been deejaying house parties since 1970; at times he played reggae music for crowds of Jamaican immigrants that lived in the Bronx. After seeing that the partygoers did not respond to his reggae selections, he began playing soul and funk-style R&B records that he sometimes heard played at his mother’s house parties (ibid.). That night, the sound of R&B vinyl records was transferred through a needle, through a mixer, through a Macintosh amplifier, and, finally, through two cleverly engineered Shure speaker columns to a large crowd of young
people invited to a party hosted by Cindy Campbell, Herc’s sister, in a public space (Hager 1984). Music played from a turntable at a birthday party was not novel, definitely not as novel, or socially disruptive, as graffiti writing in the 1960s or the first graffiti as public art displays from 1969 to 1971 (Hager 1984, Chang 2005). What was initially novel was the music-based social practice from Jamaica that Kool Herc attempted to replicate in his new locality: public, mobile, music entertainment that drew attention to the spectacle of audio technologies and engaged a crowd in lieu of a bandleader and live musicians. Several scholars of Jamaican music have described the significance of the mobile apparatus of turntable, amplifiers, and personnel that composed Jamaican sound systems and how they impacted the development of Jamaican popular music (Manuel et. al. 2006, Marshall 2007, Veal 2007). During his early years as a resident of the Trenchtown and Franklyn Town neighborhoods in Kingston, Jamaica, Herc became particularly fond of the sound system Somerset Lane after watching how crowds reacted to them. The selector of Somerset, and a person that intrigued Herc when he was a child, was King George (Chang 2005). The selector of a sound system decided which recordings were going to be played and played them on a turntable: an obvious position of authority and control that Herc recognized before migrating to the U.S. That August night party was the beginning of Herc recreating sound system culture in the context of an emergent youth culture in the Bronx.

The recognition given to that party as the beginning of the culture is an example of the line between lore and documented accounts that has engaged subsequent generations of hip-hop enthusiasts. Mythologizing that party as a seminal event can now be read as an early indication that—despite other components of the culture coming first or being practiced and embraced with much fervor—sound and music were destined to be the chief markers of hip-hop, with the other components subsisting in reference to the music. The 20/20 hindsight of knowing that the
American commercial entertainment industry bet and won large on hip-hop’s music after getting decent levels of market success with the other components lessens the difficulty of arguing the prime positioning of hip-hop music within the culture, especially in a work of music scholarship. Researching the history and questioning people that were young adherents to hip-hop culture, though, have displayed the centrality of the music as a buttress for or gateway into other hip-hop practices. The presentation of sound and music to a group of people and those people responding to those elements marked the beginning of hip-hop as an organized, classifiable culture and practice. The intermittent establishment and development of distinct sound aesthetics and the resultant recordings have been invaluable to the culture’s prevalence and relevancy since the first repeated drum break in the Bronx.

**Hip-Hop’s First Cultural Heroes**

The quote from journalist Steven Hager that introduces this chapter speaks to the ascendency of the first major figure or celebrity of hip-hop’s music, the deejay. But deejays were figures in the Bronx and New York City before Kool Herc established his particular style. What made deejays like Herc and then Afrika Bambaataa, Grandmaster Flash, and their protégés cultural heroes in the Bronx was that they liberated the ears of the young black and Latino person in the Bronx who was exhausted and disengaged from the disco records that dominated the programming on local stations. In particular, the stations played popular disco records in the 1970s and went on to define the urban radio format in the early 1980s with R&B and soul-dominated programming (George 1988).

Kool Herc, as a deejay, was hip-hop’s first cultural hero or preeminent personage. In terms of the music, he and Grandmaster Flash (Joseph Saddler) are significant members of the
vanguard that established the foundation of hip-hop’s music: the breakbeat, a rhythmically defined composition that will be further discussed in the next section. Shortly after deejaying his sister’s party in August of 1973, Herc was the most influential street deejay (playing records in public spaces like community centers and parks), differentiated from the conventional disc jockey (dj or DJ) that curated recordings over radio airwaves. He continued playing recreation rooms and house parties into 1974, incorporating a person that talked over the music while it was playing and moving his operation outdoors to Cedar Park—completing his recreation of a Jamaican sound system. Reggae from his birth country was not popular in the Bronx. The technical skill he used to engineer his set up for ample bass presence and clear amplification at high decibels, though, can be compared to some of the audio engineering practices that had been initiated in his birth country (Veal 2007). Herc’s achievements in sound design gave him an intimidating aural presence in the Bronx and set a low-end, bass-privileging aesthetic and standard for sound quality in hip-hop that other deejays aspired to match and passed down to the creators of recorded hip-hop in the 1980s and onward. In regard to the music, this is where many of the comparisons end. Discussions of hip-hop’s music history present a flawed, if not under-investigated, connection between the musical practices of Jamaica and Herc’s status as a hip-hop pioneer, starting with an assumed connection between the practices of toasting in Jamaica and rapping in American hip-hop. Herc discussed the model for hip-hop’s rap component with journalist Steve Hager: “Jamaican toasting? Naw, naw. No connection there. I couldn’t play reggae in the Bronx. People wouldn’t accept it. The inspiration for rap is James Brown and the album Hustler’s Convention [by Lightnin’ Rod (Jalal Mansur Nuriddin)]” (Hager 1984, 45). The prevalence of academic investigations into rap lyrics or the sampling practices of the late 1980s has resulted in a lack of critical attention to the presumed connection between hip-hop’s music
and reggae-style toasting or the actual sound of hip-hop during its pre-recorded period. The separation between reggae and early hip-hop is heard particularly in the R&B records that lent their rhythmic and harmonic components to the sound of breakbeats. Therefore, the cultural heroes of the Bronx, starting with Herc, emulated the design and purpose of the Jamaican mobile sound system but distinguished themselves by presenting locally popular recordings. The hip-hop deejay in the Bronx inspired a different style of performance than that of his Jamaican counterpart, the sound system selector, by playing sections of soul and funk-style R&B records for crowds.

“Apache” (1973) by Michael Viner’s Incredible Bongo Band has been referred to as the national anthem of the 1970s Bronx. The record is a 04:54 funk-style R&B instrumental that includes a 0:34 break (01:46 – 02:20) featuring two-bar alternations (or trading twos) between guitarist Mike Deasy, trap set drummer Jim Gordon, and percussionist King Errisson—the acclaimed percussionist of The Funk Brothers, Motown’s house band (Lapeyre 2004)—on the bongos, and a 0:32 (02:24 – 02:56) break just highlighting Gordon and Errisson. Instead of being a declaration of the extraordinary qualities of a nation’s spirit and resolve, this anthem declared an allegiance to the funkiest of grooves and to a rhythm-privileging aesthetic that the heralded street deejays of the Bronx were bringing to recreational centers, public parks, and, eventually, to clubs and radios. Lightnin’ Rod’s Hustler’s Convention (1973) featured the drum patterns and wah-wah guitar strum of early seventies funk-style R&B, but was trendy in the Bronx because of the lyrical poetry that wove a hustler’s tale and because it was a repository of the latest slang.

The Last Poets’ 1970 debut recording, with its revolutionary rhymes and minimalist percussion, is also considered an influence for hip-hop rapping; however, “The Last Poets were jazz heads,” as Last Poets producer Alan Douglas explained, “while today’s rappers are into disco, rock and
rhythm & blues. The words fall differently and you get a different feeling. The Poets didn’t care if one could dance to the rap. The point was a story was going down that was memorable” (Hager 1984, 48). Deejays playing Lightnin’ Rod’s style of poetry over beats served as a proto-rap style that became adopted by hip-hop rappers. They were also rewarded for playing rhythm privileging James Brown recordings that encouraged crowd participation on the dance floor (“Get up, get on up”). James Brown’s singles—particularly the trifecta of “Give It Up Or Turn It A Loose” (1968), “Get Up (I Feel Like Being A) Sex Machine” (1970), and “The Payback” (1974)—and the aforementioned “Apache” offered something musically that was not available on the radio: “It hadn’t taken long, but thanks to DJ Kool Herc, ‘Apache’ had become the biggest jam in the Bronx. I didn’t know which was crazier; that everybody was grooving to ‘Apache’ or that a DJ had the power to make a song pop like that” (Grandmaster Flash 2008, 58).

In the Bronx, the deejay was the person offering access to sounds and grooves that were difficult to access or were commercially ignored in favor of the Top 40 sound of disco. Again, Herc understood this but he also recognized that young Bronx residents for a particular reason admired the funky recordings spurned by mainstream outlets. These recordings contained sections where the drummer and/or percussionist, bassist, and, occasionally, guitarist vamped on and developed rhythm-oriented phrases that lent themselves to being repeated as ostinati. These sections were colloquially known as the “get-down part” (Lowe and Perry 2004, Grandmaster Flash 2008) and are now widely known as the “break.” When the record reached this section break-dancers, or b-boys, performed their best moves (Schloss 2009) and the crowd displayed their enthusiasm through more intense dancing. Herc is acknowledged as the first deejay to recognize the reaction of dancers and respond with the appropriate music. By the summer of 1974 he had established a routine in which he seldom played an entire song, focusing his set on
the thirty-second ‘break’ section of multiple records (Grandmaster Flash 2008). Using a process he called the “Merry-Go-Round” (Chang 2005, 79), he played break after break to create an endless stream of the most danceable part of a song. It was the theory and process of break manipulation that funneled into and initiated the sampling methods for creating beats in the 1980s. The image of Herc keeping the young people of the Bronx dancing was awe-inspiring to young hip-hop enthusiasts like Grandmaster Caz (Curtis Brown):

That night in 1974 when I went in that club and I saw Herc, I knew from that day on that’s what I want to do for real, you know? Not as a hobby. I wanna be a DJ.

(Grandmaster Caz, quoted in Fricke and Ahearn 2002, 35)\(^1\)

The deejay as cultural hero used two turntables as conduits for the new type of sound organization. Herc was able to loop the break section by using two turntables, which necessitated owning, at least, two copies of the same record. The break sections of some recordings were not necessarily extensive—each break in “Apache” is roughly 0:30 long and the break from the Jimmy Castor Bunch’s “It’s Just Begun” is about 0:09. This was part of their allure; break sections flaunted possibility then disregarded the funky sensations they elicited once they ended. To extend a break Herc played the break section on one turntable, and then, as it ended, he faded out that turntable and faded in the same break on the other turntable, using a basic volume control on his mixer console. While the break on the second turntable played, he picked up the needle on the first turntable and dropped it on the vinyl where he estimated the break began. The obvious dilemma with this was the possibility that where he dropped needle as he switched to each turntable was not the break. Many times it was not. The lack of precision of Herc’s early sets was a familiar and later criticized characteristic of his deejaying. Chuckling with the shock of “oh no, I didn’t just say that” on his face, DJ AJ (Aaron O’Bryant) proclaimed, in the 2004
documentary series *And You Don’t Stop: 30 Years of Hip-Hop*: “Flash was a deejay. Kool Herc was a record player.”

**Flash, Clock Theory, and breakbeats**

He’s a disco dream of a mean machine  
And when it comes to size, ya see what we mean  
Ya see his name is not found in the hall of fame  
But he’ll shock and amaze ya and make ya feel shame  
He takes a lime from a lemon, and from a lemon to a lime  
He cuts the beat, in half the time  
And as sure is three times two is six  
You’ll say “Flash is the king of the quick mix”

—The Furious Five, “Superappin’” (1979)

DJ AJ’s categorizing of pioneering hip-hop deejays Kool Herc and Grandmaster Flash was not entirely fair but was made because of the precision of Flash’s breakbeat mixes by 1975. Bronx native Joseph Saddler or Grandmaster Flash heard about Herc’s break-focused deejay sets from a friend that attended a Herc party. In the summer of 1974, Flash heard and observed Herc in action for himself. After being absorbed by the fidelity and loudness of Herc’s sound system, Flash focused on the sound arrangement: “Drums. A little bass. *That’s it. That’s the break.* Fuck the melody, forget the chorus, and leave the verses alone; we’re talking about the pure rhythmic groove” (emphasis in original; Grandmaster Flash 2008, 47).

Flash was captivated by Herc’s exploitation of the break and by the fall of 1974 he committed himself to improving upon Herc’s breakthrough. In his memoir Flash details explaining this to his friend: “I need to stop the record on the left and start the record on the right at a precise moment in time so that you, the listener, can’t tell where one stops and the next one
starts” (ibid, 75). The obstacle, as Herc exhibited, was not being sure the break was going to play once the volume on the other turntable was raised. At the time there were other deejays negotiating the limitations of the technology to accomplish their aesthetic goals. DJ Mellow Yellow was a deejay in the 1970s and member of the six-deejay ensemble Circles & Squares. For his workaround he asserted:

DJ Mellow Yellow: You gotta switch. We didn’t have no mixer, we had to just time it, just click from one to the other.

Patrick Rivers: That was the limitation of the equipment?

DJ MY: Yeah, we had two systems but we had to click it over. We had to just time it. (DJ Mellow Yellow, interview with author, New York City, April 16, 2006)

He described having to indeed manually toggle between the sound sources of two turntables in order to keep a groove going. Herc, Flash, and other deejays described being able to see the break on a vinyl recording by locating the spot where there were literally (and ironically) fewer grooves on the vinyl. Dropping the needle in the calculated spot, though, led to mixed results. Flash experimented with holding the non-playing record until it was time to play it. It worked, but damaged his records, hindering further usage.

Interestingly, his first breakthrough in honing the precision of the break came when he broke a rule established and purported by deejays at the time: don’t touch the record with your fingers. This sounds ridiculous now, given the more than thirty years of turntablism, but back then access to a popular recording was not a given and thus its maintenance and preservation took prominence. For Flash, producing the sound he aspired to hear was more important. Thus,
backspinning, or physically reversing a record on a turntable, became a technique to return to the start of the break.

In early 1975, after a practice session of three consecutive days in a basement, Flash figured out how to find the break with a more reliable visual cue. He correlated the face of a vinyl record with the prominent points of a clock. With the label of a vinyl recording facing up, the top, right, bottom, and left points of the label corresponded with 12, 3, 6, and 9 o’clock, respectively:

**Fig. 1-1: Visual Representation of Grandmaster Flash’s Clock Theory**

(Courtesy of Will Fulton)

Flash described how he began to understand the break on a record: “Sometimes a break would start at four, go around three times, and end at nine. Other times, the piece of sound was so short, it would start at two and wouldn’t even hit six before it was over” (Grandmaster Flash 2008, 79), thus he named his method “clock theory”. The utilization of computer-based, software sequencers and digital audio workstations (DAWs) decades later provided hip-hop recordists with visual representations of the audio they were manipulating; expanding the methods of audio arrangement beyond an aural exercise. Examining vinyl recordings for the presence of grooves and Flash’s clock theory method were early examples of hip-hop recordists visualizing recorded audio for the sake of creative manipulation. The clock theory gave Flash the ability to seamlessly loop the break of one record, creating the breakbeat. In addition, the ability to find the break on a record with precision enabled him to quickly transition, or “quik-cut,” between the
breaks of different recordings. Thus, he labeled the product of his technique the “quik-mix” (ibid).

Immediately following his breakthrough, Flash was presented the opportunity to use his clock theory and quik-cut technique. One of Flash’s friends decided to have a break dancing battle in Flash’s practice space. To accompany the battle Flash performed a quik-mix with the breakbeats of “Assembly Line” by the Commodores and “It’s Just Begun” by the Jimmy Castor Bunch. He quik-cut from each breakbeat to signal to each dancer that it was their turn. The arrangement of the battle allowed him to practice seamlessly connecting songs to one another; “Assembly Line” and “It’s Just Begun” have comparable tempos at 113 and 117 beats per minute (bpm), respectively. Figure 1-2 is a visual representation of the arrangement that Flash may have created that day:

**Fig. 1-2: Grandmaster Flash’s First Quik-Mix**

The quik-cut technique between different records was, perhaps, more difficult because it necessitated multiple precise steps. While the “Assembly Line” break was playing Flash had to replace the duplicate copy of “Assembly Line” with “It’s Just Begun,” use his clock theory to find the exact start of the break, and appropriately toggle the volume switches for each turntable on his mixer to quickly cut to the “It’s Just Begun” break. The number of repetitions of each
break in figure 1-2 is conjecture. While the figure shows each break being repeated once, Flash could have continually repeated each break or not have repeated them at all. In fact, he revealed that the repetition of each break became asymmetrical as he gave his friend more time to perform over his break.

The more I spun, the better I got. Cutting back and forth, faster and faster…. It got to the point where nobody could hear where one song ended and the next one began, not even me. But it didn’t matter. We were in the groove.

—Grandmaster Flash (ibid, 80)

Flash had created a new way to groove. What made the breakbeat and quik-mix significant was that they truly made the break of a recording noticeable as a self-contained, continuous, musical entity. The mixes of Herc were special in that he had access to and could play all popular breaks, but approximating the start of the break allowed listeners to reference other sections of a record: other sections that may not have been popular. Flash’s quik-mix made the breaks of records the main attraction and a perpetual rhythmic groove for dancers attending parties he deejayed. Before becoming a rapper in The Cold Crush Brothers, Grandmaster Caz was one of the eager dancers: “Herc used to just play records at random. When the record go off or the beat get ready to go, he’d just slap another one on. Not particularly on time. But, you know, other deejays came and—like Flash—and started cutting on time. So you’d never have to stop dancing” (Lowe and Perry 2004).
Establishing and Diffusing the Nascent Sound of Hip-Hop

Interestingly, the first time Flash did the quik mix in front of a crowd he did not get an enthusiastic response. In mid-1975, at 23 Park on 166th street and Tinton Avenue he dropped the extension of Herc’s style on an unsuspecting crowd. Here’s his analysis of his quik cuts of “Apache”:

I punched in the opening beats of “Apache.” And I proceeded to play it my way.
I extended the horns…
I repeated the breaks…
I paused between the organs and the guitars…
I rearranged the structure of that song at will…
And I never lost the beat.
Then I quik-mixed five more songs. Back to back to back to back to back.
And nobody got it. (Grandmaster Flash 2008, 83)

To Flash, had the people “got it” there would have been an eruption of dancing and celebration over his lack of responsibility for the recorded arrangement of “Apache.” Instead, people didn’t understand what was happening. Neither did deejays, but the technique did catch on. Eventually other deejays followed him.

An important factor in spreading the breakbeat and the quik-mix was the increased accessibility of technology that made the quik cut easier by decreasing the need for Flash’s clock theory method and the specific skill and concentration needed to read a vinyl record. The clock theory method is less necessary today—though some deejays attest to still using the process—because all commercial turntables have a headphone jack and the ability to pre-cue one turntable through headphones. In 1975, though, not many deejays had access to mixers with a cue system.
At the time Flash owned the Bozak CMA-10-2DL rotary club mixer (fig. 1-3), which, in 1971, was the first commercially available, stereo deejay mixer. The ‘rotary’ in the name refers to how the knobs functioned (Kirn 2011); mixers before and after the CMA-10-2DL used sliding faders and crossfaders, respectively. It was a competent mixer but lacked an option to pre-cue the second turntable.

Fig. 1-3: Bozak CMA-10-2DL Mixer (rel. 1971)

(Cropped image from http://www.gearslutz.com/board/geekslutz-forum/110401-gutz-10.html)

Deejays that spun disco, though, had access to a cue system. A couple weeks after introducing the quik-mix to the public, Flash met Pete DJ Jones (or DJ Pete Jones), an Uptown deejay that was well known for spinning disco records for adult African-Americans in the Bronx and at clubs in Manhattan—the adult version of what Herc was to teenagers in the Bronx (McCord 2006). Flash noticed that Pete Jones had a GLI mixer, which allowed him to listen to the record that was not playing through headphones and cue it properly (Hager 1984, Grandmaster Flash 2008). In the Bronx cueing was accomplished through eyesight and holding the record on the other turntable until it was time for it to play, a practice that was not encouraged because it damaged vinyl recordings. Flash watched Jones seamlessly mix records using a cue system and crossfader to control the playing of each turntable, exactly what he worked so hard to accomplish. The only difference was that Jones was seamlessly going from
song to song and Flash worked diligently to loop shorter drum breaks and mix them together—a distinguishing aspect of hip-hop’s music.

Foreshadowing how a lack of money but an abundance of imagination led some beat makers to get creative with their technology, Flash rigged his mixer with a cue system because he could not afford a better one. He elaborated on how he had to customize his equipment to get the function he desired: “I had to actually get a single pole-double throw switch, crazy glue it to the top of my mixer, build an external mixer on the outside just strong enough to drive a headphone, so when you clicked it over you would hear the other turntable in advance” (quoted in George 1993, 49). The headphone monitor on the CMA-10-2DL mixer compiled the audio signals (in the form of analog electrical currents) from each turntable into a single signal that was heard the same through loud speakers or headphones. The single pole-double throw (SPDT) switch, typically used in electric light circuiting, allowed Flash to hear one turntable without hearing the other by flipping the switch to the position assigned to that turntable. Putting the switch in the middle or neutral position allowed him to hear audio from both turntables at the same time.

In 1977, Integrated Sound Systems Inc. released the GLI PMX 7000 mixer (fig. 1-4):

Fig. 1-4: GLI PMX 7000 Mixer (rel. 1977)

It had a cue system, or “Headphone Audition System,” and introduced the crossfader, or “Transition Control.” Mixers allowed audio signals from two turntables to be simultaneously audible and mixed together. The crossfader was a horizontal version of the standard volume control fader and allowed a user to control the volume from each turntable to the loudspeakers connected to the mixer. When the crossfader was in the middle, each turntable was equally audible, but as the crossfader was slid in the direction of one turntable its audio increased in volume and the volume of the other turntable decreased, until only one turntable was audible. Through headphones, deejays always hear each turntable. The crossfader, in tandem with the headphone cue system, further smoothed the arduous task of playing short segments of music in succession. According to a timeline offered by professional audio manufacturer Rane, the PMX 7000 became popular because of its affordability—it was colloquially known as “the poor man’s Bozak” (http://www.rane.com/djtimeline.html).

Flash transitioned to the newer technology and mastered the crossfader. He also began pre-cueing through headphones. These developments resulted in the technical mastery and expansion of the techniques for looping breaks, like backspinning and scratching (the latter will be discussed in Chapter Two) and confirmed turntables—particularly the Technics 1100As and 1200s—as the initial instrument for composing hip-hop’s music: a music made with a crossfader and a hand on a record.13

**Escalation Within a Sound Aesthetic**

The first cultural heroes of hip-hop were such because they offered access—sometimes free access—to rare records and showcased the best part of those records through turntable technology that was also sparsely available. Records, turntables, a mixer, amplifiers, and
speakers were purchased à la carte, and some deejays either did not know about each component or did not obtain the best quality links in the chain of their deejay equipment. The aesthetic of the nascent sound of hip-hop also privileged sound quality. Flash described how Herc used his system and his skill at manipulating sound to intimidate:

I would go to the Hevalo sometimes to check Herc out, but Herc used to embarrass me quite a bit. He’d say “Grandmaster Flash in the house,” over the mike, and then he’d cut off the highs and lows on his system and just play the mid-range. “Flash,” he’d say, “in order to be a qualified disc jockey, there is one thing you must have … highs.” Then Herc would crank up his highs and the high hat would be sizzling. “And most of all, Flash,” he’d say, “you must have … bass.” Well, when Here’s bass came in the whole place would be shaking. I’d get so embarrassed that I’d have to leave. My system couldn’t compare. (Hager 1984, 35–36)

A deejay had to have a great system to be a deejay, or they could actually be blown away by a competitor’s sound. Afrika Bambaataa (Kevin Donovan), the third cultural hero of the Bronx, was an exception. He grew up in the southeast section of the Bronx and joined the Black Spades street gang in 1969. Though he was affiliated with the gang, he spent a significant amount of time rummaging through record bins in search of obscure sounds (Hager 1984). He started deejaying in 1970: “[W]e used to have regular parties where you just put on a record, take it off, if you want to call that deejaying” (quoted in Hager 1984, 14). A few years later Herc controlled the crowds with James Brown and “Apache.” Bambaataa, though, also had an affinity for rock music, the multifaceted sound of Sly and the Family Stone, and practically anything else he could acquire. During a well-known deejay battle with Disco King Mario, Bambaataa played
The Andy Griffith Show theme—taped off his television set—a drum break from a rock record, the theme song from The Munsters, and “I Got the Feeling” (1968) by James Brown (Hager 1984). “Honky Tonk Woman” (1968) by The Rolling Stones, The Monkees’ “Mary Mary” (1967), and The Addams Family theme song were other selections that constituted his set (Toop 2000).

Bambaataa’s extensive, diverse collection defined his sound and was his contribution to the early sound of hip-hop’s music. What Bambaataa played in that battle displayed the diversity of sounds and future strands of practice that were developing in the music. His enthusiasm for a variety of music and his large record collection expanded the range of music associated with hip-hop beyond the breaks from James Brown records or the quickly growing popular sound of disco, and the purview of hip-hop deejays outside of areas like the Bronx. While it is difficult, and perhaps imprudent, to say that Bambaataa’s choice of records led to the eclectic samples beat makers began using in the late 1980s/early 1990s, it is proper to deduce that Bambaataa set a precedent and relieved a cultural bottleneck that may have been developing as a consequence of the insularity of the impoverished areas where hip-hop music’s sound aesthetic was becoming defined. The impact of his playing of breaks and other short segments from records beyond the different styles of R&B cannot be underestimated. Consequently, the perpetual race to find an undiscovered break on a bizarre or offbeat recording was ignited by Bambaataa and continued once deejays and beat makers began searching for more obscure records to sample from in the late 1980s.

While he possessed the sounds, Bambaataa did not possess the sound. Future Soul Sonic Force member and Ice-T deejay Afrika Islam explained, “I heard Afrika Bambaataa play at the Bronx River Center, and the only thing he lacked was somebody that would be behind him,
working with him, who knew the technical aspects of it in order to build a better sound system” (Fricke and Ahearn 2002, 46). Getting a throng of people to feel your music at an outdoor park, where the lack of walls prohibited the enclosure of the sound, required the proper technology. The technological requirements for being a deejay imposed a barrier to entry that was slightly alleviated by the GLI PMX 7000. This relatively affordable, commercial mixer made the status of hip-hop cultural hero more attainable, but quality amplifiers, speakers, and turntables were still impractical expenditures for many in the Bronx.

For many hip-hop enthusiasts the blackout of 1977 provided access to the expensive technological tools for creating hip-hop music. On July 13, bolts of lightning incapacitated New York City’s electrical grid by striking a Con Edison facility (Charnas 2010). Sustained disruptions to electrical power and lights, especially during nighttime hours, have consistently been met with occurrences of looting. Grocery stores and retail outlets are always in the crosshairs of the criminal looter; however, the cultural heroes of the Bronx precipitated a new target, deejay equipment. Electronics stores and widely known nightclubs were unlawfully relieved of what deejays saw as their means of cultural heroism. In the subsequent days and weeks after the blackout new deejays were on the scene tugging at the capes of Herc, Flash, and Bambaataa (Hager 1984, Charnas 2010). New technological features of the deejay mixer and the unexpected opportunities of the 1977 Blackout ensured that the technique and aesthetic of Flash’s innovation could be duplicated. Breakbeats, the nascent sound of hip-hop, though, interacted and had to contend with disco.
The (Thin) Line Between Disco and Hip-Hop

The ascendency of the hip-hop deejay and the specifics of the sound created by this figure were, at first, defined through a dichotomous relationship with disco music. Disco was a 1970s genre of producer-driven dance music that utilized drum machines and sound editing techniques, which, in combination with the first recordings of hip-hop using disco records, invited the comparisons between the genres. This situation prompted many within early hip-hop culture to have to defend what the music was not rather than defining what it was. The struggle for distinction persisted during the first ten years of hip-hop’s existence and its first five years as a commercial product. The dichotomy between disco music and hip-hop is quite significant, probably more significant than hip-hop’s relationship to reggae. Afrika Bambaataa illuminates this point with this statement:

Well before Flash, Herc, and all of us, there was Disco DJs happening in the areas. Flowers, Kool DJ Jones, Lovebug Starski, and Kool DJ Dee. Those were who I follow at one time. Then you started hearing the sound that was coming from my brother Kool DJ Herc. Then when I came out with my system, Herc was like an angel looking over me. (quoted in George 1993, 50)

On the surface, the widespread, mainstream popularity of disco and the grassroots populism that instituted the nascent sound of hip-hop’s music can appear to be historically incompatible. However, a hip-hop and disco symbiosis did occur with hip-hop technologically and sonically benefitting from the relationship even as young people in the Bronx disparaged disco music and its milieu.

Roughly coinciding with the 1975 rise of Kool Herc and the deejay cultural hero in the Bronx was the European craze of disco dancing (Vincent 1996, Jones and Kantonen 2000).
Similar to early hip-hop devotees, disco patrons held the deejay in high esteem as the supervisor of an entertaining evening. And comparable to the hip-hop deejay, the disco deejay and producer’s main objective was figuring out how to keep the dance floor occupied without the use of live musicians. Each deejay manipulated a record to achieve this but utilized different means to get different ends.

Reacting to what the people on the dance floor were doing drove the development of hip-hop and disco’s music. Before Herc understood how to galvanize dancers, entrepreneur and producer Tom Moulton developed a way to make records more amenable and reactive to dancers without a live band to fill that need. Already by the late 1930s, live musicians were becoming more of a financial burden to bandleaders as expensive travel and miserly dance club owners of the depression era decreased revenues. During World War II many of the popular large swing bands decreased in size. The post-war popular genre of rhythm and blues/rock ‘n’ roll generally featured ensembles of five to eight pieces. As the record-selling business escalated through the fifties and sixties the requirement of a live band to support dancers further decreased. As a consequence, the musical flow of a dance party was at the mercy of contemporaneous recording standards instead of musicians who could respond directly to the actions and disposition of a crowd. The seven-inch, 45 rpm (revolutions per minute) single was the most popular type of recording during the fifties and sixties and had a relatively short playtime (Zak 2001). As the medium for popular dance recordings, the 45 commanded the scale and form of human association and action in regard to recreational dancing (McLuhan 1964). Before extended play (EP) twelve-inch recordings, the swapping of one 45 recording for another interrupted the consistent stream of music that was previously provided by a live band.
Moulton saw the problem of staggered record playing in the early 1970s when he witnessed a deejay attempt to mix singles from Al Green, Wilson Pickett, and Sam & Dave. “You could see that they [the dancers] were trying to get excited, but then the other record would come in and ruin the whole buzz. So I thought there had to be a better way to do this, and I tried to do it” (Moulton quoted in Mason 2011, 38). It took him approximately eighty hours; in that time he constructed a forty-five-minute reel-to-reel tape that featured seamless transitions from one hit record to another. The nine or so spliced tapes that he created ignited the dance scene on Fire Island, located off the southern shore of Long Island, NY. These ad hoc creations initiated the creation of the “disco break” in 1971.

Moulton’s creation was more studio manipulation than the real-time exploits that Herc and Flash established. But what he accomplished with tape also became a goal of deejays working the New York City clubs in the early 1970s. Before Flash and other deejays adopted the Bozak CMA-10-2DL, engineer Rudy Bozak created mono mixers that were specialty items for broadcasting and public address systems. Alex Rosner saw the potential of a stereo mixer and in 1971 he invented the “Rosie”—named such because it was painted red by one of Rosner’s technicians (DJ Pro Audio Inc. 2013)—for use at the Haven Club in Manhattan. The resident deejay at the club was Francis Grasso. There is no documented account that Grasso knew what was going on at the parties on Fire Island, but with Rosner’s mixer he was able to smoothly transition between recordings and was thus designated the godfather of the performing deejay (ibid).

To reiterate, the goal of Flash’s ingenuity with his clock theory method and his embracing of the cue system and crossfader-enabled mixer was to play segments of records sequentially while maintaining the tempo. Hip-hop and disco deejays adapted to the crossfader at
relatively the same time, but the cue system technology was introduced to disco deejays earlier, particularly because of the special arrangement between Rosner and the Haven Club. Though the music genres of black Americans in the latter half of the twentieth century are typically related to creative uses of technology, the uneven spread of deejay technology, and the practices related to that technology, represent the first instance of black Americans—particularly lower, working class black Americans—not being associated with the “network effects” within the music production industry. Network effects are assessed by the probability that an actor will adopt a practice—or in relation to this study, a practice in collaboration with a technology—as a function of people in the actor’s social network who have already adopted that practice (DiMaggio and Garip 2012). For many Black and Latino hip-hop recordists, being socially excluded from some professional music networks had positive and negative results. The positives were the idiosyncratic practices that created hip-hop’s sound and modified the sound of commercial popular music. A negative was not having access to recording spaces, technologies, and other perks, like funding for recording projects. An example of a network effect was how Flash rigged his mixer with a cue system around 1975/1976 after meeting Pete DJ Jones, an African-American disco deejay who lived in the Bronx and had early access to a cue system because of his connection to the disco deejay network. What Flash accomplished, pre-cueing the recording on the non-playing turntable to extend breaks, is now known as slip-cueing and was a known practice of DJ Francis Grasso. Grasso was one of the first non-radio deejays to use headphones to cue records. With Rosner’s mixer and headphones he became one of the first people in New York to match the beats of different songs to create real-time mixes that kept dancers on the floor for long periods of time (Jones and Kantonen 2000).
DJ Francis Grasso originated slip-cueing to create a seamless mix of whole recordings at discotheques. Herc loosely cued between the break sections of recordings as hip-hop culture coalesced around music in public spaces. Flash presented the drum breaks popularized by Herc with the accuracy of Grasso to create breakbeats. The progression of deejay techniques appears to have flowed in this sequence, but there is no indication that Herc and Flash interacted with Grasso or his deejaying procedure. The techniques are similar but developed separately; however, the popularity of Grasso and his disco mixes did make extended play an expectation of adult partygoers and, perhaps, laid the ground for the 1974 introduction of the 12-inch disco single, the handiwork of Tom Moulton. Public Enemy rapper Chuck D addressed the connection between disco, the 12-inch single, and hip-hop in the documentary series *And You Don’t Stop: 30 Years of Hip-Hop* (2004): “Hip-hop came out with its use of disco. The disco era was almost like the belief in the twelve-inch record. And the twelve inch meant extended play, which means that the music can go on and on and on ‘til the break of dawn.”

“How excited could you get in three minutes? Not very” (Mason 2011, 39). Moulton asserted this to journalist Andrew Mason in reference to the length of disco singles in 1974. Moulton figured that the aesthetic decisions he applied to create long play reel-to-reel tapes could be transferred to an individual recording to ensure that the energy built up in three minutes could be further sustained. In order to do this he needed access to master tapes: the original recordings of a studio session with every recorded track separated, from which commercial recordings are made (Zak 2001). Mel Cheren, disco luminary and Scepter Records owner, provided such tapes. Cheren frequented the Fire Island fetes and entrusted Moulton with an extra master tape of Don Downing’s 1973 single “Dream World.” With some engineering ingenuity Moulton extended the song from its original 02:36 to 04:13. The extended section was coined the
“disco break.” Moulton’s mix of “Dream World” (Downing 1974) is a document of his specific aural activity, particularly his perception of how to sustain the energy of a song.

Figure 1-5 (next page) is an arrangement chart for “Dream World.” The first line of blocks represents the arrangement of the original recording of “Dream World.” The second set of blocks indicates Tom Moulton’s extension around 02:17. There was an expectation that a commercial dance record would become more vivacious as the verses became choruses, the choruses became bridges, and the bridges segued to the final chorus. Indeed, the energy of “Dream World” increases as the arrangement progresses. Energy is built up in each section through changes in texture, instrumentation, rhythm, and the emotional expression of the vocals.

Returning to the first set of blocks, the gradation indicates the energy of each section of the arrangement: white = lowest energy of the recording; light gray = the standard for the recording; dark gray = the escalation of energy; black = the most energetic and rhythmically dense section of the recording. My use of gradated blocks to represent the sections is done purposefully. The way Moulton extended the record by duplicating and rearranging
clustered sections of audio relates to how current digital audio workstations (DAWs) display audio regions, but with the simplified capability to click and drag blocks of sound to create the desired arrangement.

Moulton did not have digital technology but did have a master recording, a delicate skill at splicing reel-to-reel tape, and a single-minded devotion to making popular recordings longer: “I wanted DJs to be able to go to the bathroom!” (quoted in Mason 2011, 41). The disco break provided time for deejay bathroom breaks and space for dancers to groove on the instrumentals of popular recordings. Whereas the breakbeats of Herc and Flash highlighted phrases of rhythmic density and exploited the minutiae of the recordings, Moulton’s disco break was more about finding the sections of the arrangement that could be extended without disrupting the energy of the song. In the disco break section of figure 1-5 we can see that thirty-two bars out of the sixty-four-bar extension of the arrangement are the chorus section of the original arrangement. In addition, with the exception of the background vocals in the eight bars that transition back to the song proper, the vocals are excluded from this disco break. In the Bronx, the breakbeat was pure rhythmic groove, created in real-time by a deejay, and presented without the knowledge of the recording artist(s) of the record. In 1974, the disco break was a commercial entity, placed on the B-side of several single pressings. The profile of the disco break put its viability with performers under early review. At the 02:12 mark of his mix of “Do It (‘Til You’re Satisfied)” by B.T. Express (1974), Moulton abruptly edited a vocal ad-lib to bring in an organ-led disco break. His aesthetic decision did not make him popular with the members of the band, until their five-minute fifty-three second song was in heavy rotation on the radio (Mason 2011). In contrast, the performers and producers responsible for the records Herc and Flash used probably were not privy to the manipulations that recontextualized the content of those recordings for consumers.
When not attending a deejay-led party in the Bronx, teenagers in 1970s New York City consumed local Top 40 and black radio stations, specifically Inner City Broadcasting’s FM station WBLS, founded in 1974 (George 1988). My mother, who lived in New York City during that period, described to me that during late hours she had to listen to top 40 radio because the FM stations formatted for the black community ceased broadcasting. As a result, while the sounds of James Brown, Willie Hutch, and Aretha Franklin were embedded in her because of black FM radio, she was also knowledgeable about Elvis Presley, the Bee Gees, and all the popular disco records. Due to the presence and popularity of music directed toward black and mainstream audiences in areas where hip-hop culture emerged, the developing sound of hip-hop music, which was closer to Brown and soul music, became a reconciliation of Flash’s breakbeats and the extended groove of the disco break.

The myth-based narrative of hip-hop’s origins can be essentialist, encouraging the perception that once the cultural heroes were established the lone sound of hip-hop reigned. While the practice of the deejay facilitating the consumption of recordings became standard, different areas of the Bronx were listening to different sounds. Breakbeats were popular in the Herc and Flash areas, the west and south sides, respectively. In the southeast, where Bambaataa was based, disco had a hold (Fricke and Ahearn 2002). Not every deejay and later beat maker had access to a large catalogue of recordings. Therefore, some had pet records and genres that defined them. Despite the fact that James Brown breaks were the hottest commodity in the Bronx (Lowe and Perry 2004), other recorded genres and performers were popular in the area. The 1977 deejay battle between Herc and DJ Pete Jones at the Executive Playhouse club confirms this assertion (McCord 2006). At the time, DJ Jones was a well-known, Bronx-based deejay who seamlessly mixed popular records by Donna Summer and the Bee Gees for adults in black clubs.
in the Bronx and Manhattan. Herc was the young people’s champ, playing the breaks from obscure recordings. The anticipation before and the controversial ending of the battle (DJ Jones enlisted Flash into the battle, who defeated Herc) display the contested positions of and devotion to the early hip-hop breakbeat sound and to disco.

In a 1984 interview with Steven Hager, Herc articulated the divide between hip-hop and disco and the impact of Flash’s breakbeat music in causing the divide. When Hager asked Herc about his deejay style being grouped in with Flash and Bambaataa he responded with overt dissent:

Naw, that Flash, he came in and disturbed the style. Not to the people, but in a deejay point-of-view. He started the quick cutting. My style of music, anybody could relate to. Adult and teenager could party to it. A lot of people don’t like the jigga, jugga stuff because it throws you off beat. It’s a lot of work if that’s the style you got…But he really turned on a lot of kids to do it and they don’t recognize good disco music. I’ll always play disco. What Flash did is everybody started hunting for breaks and all of a sudden the disco faded out. (quoted in Hager 2012)

Disco was waning in the latter half of the seventies, but did not completely fade out. Actually, it shaped the sound of the first hip-hop/rap records. In a sense, the disco style rap records produced by Sylvia Robinson validated the deejaying preferences of Herc and DJ Jones. Herc’s style of playing records, unimpeded by scratching (the “jigga, jugga stuff”), though, positioned him on the wrong side of a dividing line in hip-hop. Scratching is a deejay technique that is credited to Grand Wizzard Theodore (Theodore Livingston) (Grandmaster Flash 2008), the son of Grandmaster Flash’s friend who stored Flash’s turntables before he became a Bronx
celebrity. Flash practiced his technique where he stored his equipment, therefore, Theodore was privy to many of Flash’s experiments before and after he perfected his clock theory method and quik-cut technique. Imitating Flash’s experiment of holding the recording on the turntable as a way to cue it on time led to Theodore’s experimenting with the sound that technique created, the “juka” sound of scratching. While practicing at home, Theodore noticed he could create sound effects by shifting a recording back and forth while the needle remained in the groove of the recording (Hager 1984). The sound was not pleasant at first, but as he learned to control the scratch sound it became a novel percussive sound that could either be layered on top of a breakbeat or used to delay the start of a breakbeat and ensure that the beat came in on time. The “juka” sound that was perhaps considered a throw away or a nuisance to other deejays inspired Theodore to append his deejaying practice. Once it became used in hip-hop recordings, it was a distinguishing factor that completely separated hip-hop’s music from any form of R&B or electronic music.

As Herc expressed in the above quote, though, he believed that scratching threw dancers off beat. In other parts of the cited interview with Hager, in order to create clear designations between the different styles of hip-hop music at the time, he refers to his partygoers as “my people.” The style distinctions and contrasting rapper relationships between Herc and Flash formed a rubric for authenticity as the first recordings were on the horizon. Herc did not have the precision or showmanship of Flash, he continued to play disco, and he did not respond to the popularity of rappers. Flash’s techniques and the records he played were more influential to the new deejays with “Blackout of 1977” equipment, and he aligned himself with a group of five rappers.
The social separation of downtown, predominantly white, expansive disco clubs and the uptown, predominantly black and Latino, recreation center, public park, and small club scene meant that the techniques and resulting sounds of early hip-hop and disco had disparate but concurrent origins that overlapped in regard to certain aspects, like technology. Ethnomusicologist Peter Manuel (1995) has explained that the isolation of poverty-stricken cultures—like that of the minorities living in the Bronx in the seventies—can lead the people of those cultures to regard mainstream media content as “duplicitous and meaningless” (1995, 230). While Manuel did not make this assertion with direct reference to the presence of disco in the Bronx, it does correlate with the discursive position of disco in hip-hop histories. Hip-hop’s deejays and first producers had a complex relationship with disco, as DJ Disco Wiz expressed, “[B]ecause everybody was going with this disco trend, but we wasn’t feeling it. It wasn’t for us. We weren’t socially accepted at disco joints; we were pretty much segregated” (quoted in Fricke and Ahearn 2002, 26). The relationship, as the quote reveals, confirmed disco as “duplicitous and meaningless” to a section of hip-hop’s creators and devotees, but the sound products and activities of hip-hop practitioners also displayed the style’s contributions and relevancy to hip-hop’s sound. With age and social restrictions keeping the young people in the Bronx from venturing downtown to a disco club, though, it is difficult to conclude that Grasso, Moulton, or Giorgio Moroder were acknowledged uptown as their innovations began to be intermingled, perhaps unintentionally, with those of Herc, Flash, and Bambaataa.

The techniques used by disco deejays were in the service of establishing a novel social space (the discothèque) and practice (long dance sessions to a single recording or a stream of recordings) through enriching a recorded genre of music. Starting with Flash and moving to other deejays and later to beat makers, the techniques of manipulating fragments of a recording
that were created and used by hip-hop deejays signaled a broad but specific methodology for music creation that resulted in a recorded genre of music. It’s not a coincidence that by 1976/77, rapping over Flash-style breakbeats was developing into a skilled practice and, by 1979, the first rap recordings of hip-hop music were released.

**Give the Rapper Some**

I see myself as the black rap messiah / Colossal, spreading my gospel through electrical wires.

–Krumbsnatcha, from Gang Starr’s “Make ‘Em Pay” (1998)

Expressions of African-American musical culture have been distinguished by the power and idiosyncrasies of the African-American voice. Oratorical artistry and multi-timbral modulations of the voice have provided covert communication for the enslaved, uplifting sermons for striving congregations, and lyrical messages of love, struggle, and social observation for African-Americans who frequented jooks and clubs or purchased recordings. The power of the African-American voice also displaced hip-hop’s first cultural hero figure.

Journalist Steven Hager’s concept of the hip-hop cultural hero was briefly discussed earlier in regard to the importance of the deejay in establishing hip-hop culture as a distinct practice. I contend that this is the personage that is widely recognized as the consummate representative from within the culture at a certain point in time. In general, it is the guiding popular force of personality that is esteemed in the eyes of hip-hop enthusiasts. In comprehending who or what the cultural hero was I assessed several documents of hip-hop’s
history and asked all of my consultants about their first interactions with hip-hop and what inspired them to participate in the culture. I concluded that the cultural heroes were the people or role that: drew hordes of devotees to witness and discuss their practice; impacted the status or function of other roles (i.e. deejay’s musical support of break dancers); or were aspired to by many people that decided to participate in hip-hop culture. The latter measure is quite important as it explains why the graffiti writer or break-dancer was never the cultural hero of hip-hop, as by the 1990s many young devotees of hip-hop were not avidly pursuing those roles. The diagram below (fig. 1-6) details the landmark changeovers of the cultural hero in hip-hop. Considering that this project is about the creators of beats it appears odd that the producer is not present until the 2000s:

**Fig. 1-6: Hip-Hop Cultural Hero Changeover**

<table>
<thead>
<tr>
<th>1973</th>
<th>late 1970s</th>
<th>mid-1990s</th>
<th>2000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>deejay</td>
<td>deejay/rapper</td>
<td>rapper</td>
<td>rapper/producer</td>
</tr>
</tbody>
</table>

The ascent of the producer to cultural hero was achieved when a significant number of hip-hop enthusiasts could attain the tools to be a producer and thus began to acknowledge and generate an appreciation for the craft of creating a hip-hop beat and recording. Later chapters will deal with how each changing of the guard affected the sounds that beat makers and producers created. For now, the rise of the rapper as cultural hero and the momentary snub of deejays will be considered in relation to the sound of the first hip-hop recordings. Some periods in the diagram present two or even three roles. One factor taken into account when charting the changeover of the cultural hero was the stratagem within the expanding market for hip-hop music and the promotional maneuvers by major corporations and media outlets that filtered hip-hop culture.
During these periods, like the triple-headed cultural hero of the ‘rapper/producer/mixtape deejay’ in the 2000s, an allowance was made for the roles that received privileged coverage by the media (television, print, Internet) and had the most value in the market, which is qualified by who is marketed outside of predominantly black markets and who is featured on the covers of releases—it is not always the rapper (e.g. producer Timbaland’s 2007 release Shock Value).

Rapping was a feature of hip-hop culture that was inherited, embraced, and augmented to respond to the new breakbeats that deejays were constructing. The inheritance was from previous forms of African-American lyrical narration. In general, lyrical narration is what Coke La Rock provided over Herc’s deejay sets: he entertained by “shouting out” people in a crowd and getting everyone hyped about Herc and the party. The catalysts for the popular embrace of rapping were James Brown’s short, rhythmic utterances and the aforementioned spoken word album, Hustler’s Convention (1973). While the scatting of jazz singers, the smooth lyricism of Nat King Cole, and the eponymous 1970 recording from The Last Poets are viable antecedents to rappers, it was James Brown and slick talking that were most popular among young people in the Bronx (Hager 1984). DJ Hollywood was the figure in the Bronx that took the rhyming competency heard on Hustler’s Convention and communicated it uptown. The grooves he rhymed over, though, were not the Flash breakbeats but the popular disco sounds heard primarily in the southeastern section of the Bronx. Hollywood was known to rap over “Love is the Message” by MFSB, Philadelphia International’s house band: a groovy, urban dance classic but not the rhythmically dense breaks that Flash and others were looping for their rappers in the Bronx (George 1993).

Flash, in fact, gave credit to members of the Furious Five for bringing a sophistication to rhyming on the microphone over breakbeats: “Kid Creole and his brother Melle Mel were the
first to really flow and have a poetic feel to their rhymes. They were the first rhyme technicians” (George 1993, 52). The way of rhyming that Flash described quickly became popular. In the years leading up to 1979, hip-hop was growing up, expanding from the parks and recreation centers to club residencies. At the clubs, the deejays and rappers were marquee acts (see the flyers in Fricke and Ahearn 2002, Carayon 2006), but the rappers were quickly becoming the aspirational figures, epitomized through the assigning of the title emcee (MC—master of ceremonies).

By 1978, the emcee was the heart of hip-hop culture in the Bronx. In African-American history talented orators have always been the vaunted figures and by 1978 the rapping DJs, as they became known (a hybrid connotation related to their association with turntable deejays and to comparisons between them and the entertaining speech style of radio DJs), had gone from entertaining crowds for deejays to commanding crowds with their skill of linking words and phrases. Consequently, fewer kids wanted to be deejays, opting to hone their rhyming skills (Hager 1984). The shift must have had an impact on the number of deejays that would become beat makers. The cultural hero of three years prior was supplanted. Due to the rise of the rapper and the shift in the hip-hop cultural hero, it is not a coincidence that the first commercial recordings from this culture were known as ‘rap records’ and the sound was not representative of the breakbeats created by deejays. Rapping was the impetus for the creation of the hip-hop recording and the driving force of the music’s early popularity; thus, very early in hip-hop production there was an implicit veil over the beats and the process of making beats.
The First Recordings: Hip-Hop on Wax Tape

We were selling cassettes of our mixes that were really our first albums. We had luxury cabs like OJ and Godfathers and Touch of Class that would buy our tapes.

– Afrika Bambaataa (quoted in George 1993, 51)

The end of Bambaataa’s quote is interesting because it speaks to the informal networks that circulated hip-hop recordings before 1979. Before recordings were in record stores, unauthorized cassette tapes were recorded at shows and parties and distributed locally by attendees and cab drivers. Flash explained how cab transmissions worked: “How it worked was people would call for a car, and if they had a dope Herc tape, or a dope Bam tape, or a dope Flash tape, that particular customer might stay in the cab all day long. So these cab drivers were making extra money and at the same time they were advertising us. Like Bam said, it was like cuttin’ an album, but it was on tape” (quoted in George 1993, 51). These cassette tapes also played on "ghetto blasters"—large but portable radios with cassette decks—in New York City neighborhoods and were circulated within nearby states and California, and to overseas army bases (Hager 1984).

Flash’s account of the informal broadcasting of amateur hip-hop recordings included references to tapes by all three vanguards of hip-hop deejaying. Herc, though, is the only one that did not make the transition to commercially recorded hip-hop, and his absence displays the impact that rappers had on the music of the culture. In the 2012 e-book edition of his hip-hop history book, *Hip Hop: The Illustrated History of Break Dancing, Rap Music, and Graffiti*, journalist Steven Hager included unpublished portions of his early 1980s interview with Herc. The following is an illuminating exchange:
Steven Hager: It seems only the young are into rap.

Kool Herc: Yes. Not even myself. I don’t like the rap scene. I was never too much of a rapper. I could pick up rapping but at my own pace. They know I’m into disco. When I play something I know is going to be a hit, I tell my crowd. When it gets on the radio, I stop playing it.

SH: So you don’t have any plans for an emcee group?

KH: I don’t know. Flash, Melle Mel, they came to me. When I’m playing, I’m running my business. But they claim that they came to me and I didn’t want to speak with them.

Herc’s absence from commercial hip-hop was due to him not aligning with rappers and making records. Hypotheticals are difficult to contemplate in considering what Herc could have brought to recorded hip-hop, but what is certain is that the lack of emphasis on what breakbeat deejays were doing and the focus on rapping had a major impact on the sound of the first commercial recordings of hip-hop.

In terms of the developing sound of hip-hop, informal recordings on cassette tapes were a direct feed of the record manipulations by deejays, without the filter of a recording studio or the influence that the stature of rap recordings would have on hip-hop music creators in the early 1980s. For some, especially the young devotees of the culture like producer Lee Stone, who lived in the suburbs of Queens at the time, these tapes gave them access to the clubs and parties happening in the Bronx. Used in this way, the cassettes were a means of grassroots distribution that displayed how a commodified version of hip-hop could flow and develop without intervention from the mass recording industry. For others, like the label heads at Sugar Hill Records in Englewood, New Jersey, the tapes were an insight into a prospective product.
The First Recordings: Hip-Hop on Wax

As a commercial recording, hip-hop’s music went from being an ephemeral performance art to an object entering the system of capitalist exchange, extending the music beyond the deejay-controlled atmospheres in the Bronx. In this moment of transition German philosopher and social critic Walter Benjamin might have concluded that hip-hop’s music was losing its “aura”—the unique attributes of a work of art that are distinct during its origin and eroded thereafter (Benjamin 2006). Bambaataa seems to have been in agreement with Benjamin: “It took the excitement away. We didn’t have the parties. Everyone would go out and buy the record” (George 1993, 54). Hip-hop’s music initially had an unsettling relationship with recordings. The origin stories of R&B, rock ‘n’ roll, soul, rock, funk, and disco usually begin with musicians revealing novel lyrical performances, instrumentation, arrangements, or any other combination of musical components in obscure places. Once discovered by some segment of the commercial music industry (independent or major), the novel performance style was captured on a recording and distributed within a relatively short span of time. In most cases the genre or style was presented with minor alterations in order to market innovation and energy. For hip-hop’s music, the six-year gap between the beginning of the music and its first recordings caused a disruption within hip-hop. In 1979, the first records were rolled out with a sound and feel that did not capture the entirety of what had happened or what was happening in the Bronx.

Officially, the first record with a rapping DJ on it was “King Tim III (Personality Jock)” by the Fatback Band, released by Spring Records in the summer of 1979. A few weeks later, at the end of the summer, Sugar Hill Records released “Rapper’s Delight.” Semantically, “Rapper’s Delight” is the first rap recording of hip-hop. “King Tim III (Personality Jock)” just featured a rapper, and not a particularly good one. Bill Curtis, the leader of the Fatback Band, had heard a cassette of rapping DJs through his friends and saw DJ Hollywood at the Apollo in
Harlem. While making a song titled “Catch the Beat” for their upcoming album, Curtis and his partner Gerry Thomas decided to get one of the rapping DJs on their record (Charnas 2010). Timothy Washington got the gig and his rap routine was featured for exactly three minutes of a 06:14 recording; the rest of the recording was the Fatback Band performing their disco composition “Catch the Beat” (Fatback Band 1979). “Rapper’s Delight,” though, highlighted rappers, although, they also rhymed over a disco instrumental.

As disco faded as a commercial hit maker and inspired vitriol from young, and predominantly white, Americans in the form of "Disco Sucks" chants (Charnas 2010), the disco break extended the genre’s relevancy before the rise of Chicago-based house music. Tom Moulton’s innovation became an exclusive strategy in the composition of the first hip-hop records. From the summer of 1979 to mid-1982, several rap releases from Spring, Enjoy, Sugar Hill, and Profile Records exploited the disco break—repetitions of energetic instrumental sections—as an accompaniment to rappers. In particular, the 1979 rap record rush saw “Seven Minutes of Funk” (1976) by Tyrone Thomas & The Whole Darn Family become “Superappin’” (Enjoy Records 1979) by Grandmaster Flash & The Furious Five, “Got to Be Real” (1978) by Cheryl Lynn become “Rappin’ and Rocking the House” (Enjoy Records 1979) by Funky 4+1, and, of course, “Good Times” (1979) by Chic become “Rapper’s Delight” (Sugar Hill Records 1979) by The Sugarhill Gang.

Considering the context of the musical and aesthetic development of hip-hop’s music from 1973 to 1979, these recordings chronicle how the first producers of hip-hop’s music conceived the new genre of music as a marketable product. “Rapper’s Delight,” as the first rap recording, has rightfully received a lot of attention because it was the model from which similar disco break hip-hop beats were made. The designation of ‘disco break hip-hop beats’ is
intentional because not every rap release during this early period employed that model, one that saw session musicians or a house band performing the best sounding sections of contemporaneously popular disco records. Looking at the recordings mentioned in the previous paragraph, it is apparent that the release year of an early rap record and its disco source material were never really separated by more than two years. In contrast, the source materials for sample-based beats of the late 1980s were available for, at least, twelve years. Thus, early recordings of hip-hop’s music, called rap in record stores, were generally covers of disco records, a circumstance motivated by rappers being more popular than breakbeats and the aesthetic choices of those with control over the means of record production. The two main aesthetic catalysts were the influence of superstar rapping DJs—DJ Hollywood and Eddie Cheeba—rhyming over disco and the early producers of hip-hop coming from the R&B industry. Sylvia Robinson, Sugar Hill Record’s lead executive and initiator of “Rapper’s Delight,” was bred in an era of recorded music where cover-based hits were an expected practice; she was not accustomed to the spaces of deejay breakbeats. As a recording artist in the 1950s, she advocated reworking a Bo Diddley tune with new lyrics for a Mickey & Sylvia 1956 single “Love is Strange,” which rose to number eleven on the Billboard pop charts (Charnas 2010). Bobby Robinson of Enjoy Records was also bred in the R&B recording industry.

Hip-hop’s connection to sampling—and, again, a general disparaging of disco—has led to a lack of understanding of these early beats on their own terms. DJ Kool Akiem, producer and one of Schloss’s consultants in Making Beats (2004), stated, “And if they [the Sugarhill Gang] had the sampler, I would like to think that they woulda sampled. That was before there were samplers, and … they couldn’t just play the record … ” (Schloss 2004, 51). Though very expensive, consumer samplers were available by January 1981 to musicians and producers with
those aesthetic leanings, and yet it still took several years before sampling became a compositional practice for hip-hop recordists. The first producers of commercial hip-hop understood music production from their perspective, which, for Sylvia, was the R&B house band format. She was not a deejay, but had a similar approach to her usage of Wood, Brass, and Steel, the Sugar Hill house band. Drummer Keith LeBlanc explained:

Sylvia would be at Harlem World or Disco Fever, and she’d watch who was mixing what four bars off of what record. She’d get that record, and then she’d play us those four bars and have us go in and cut it better. (quoted in Schloss 2004, 34)

LeBlanc, along with guitarists Bernard Alexander and Skip MacDonald, keyboardists Gary Henry, Duane Mitchell, Reggie Griffen, and Clifton “Jiggs” Chase, bassist Doug Winbish, percussionist Ed Fletcher, and a horn group named Chops (Toop 2000) played what deejays were mixing and cutting at clubs, resulting in an R&B production process that emulated a disco and hip-hop deejay practice. Unlike the creative processes of early hip-hop deejays, at Sugar Hill and Enjoy Records recordings were not considered material for creating a new composition, and thus covering the breaks from popular recordings became the method for creating an instrumental layer for rappers. The use of a live band, though, did not lead to the use of the standard verse-chorus form of popular music. All of the early records are basically recorded showcases of rapping DJ routines: solo rhyming, unison rhyming, call-response rhyming, and crowd engagement (“clap your hands everybody”). The rhyming on these records continued without much of an instrumental break. Many of these early rap records lacked definitive sections and were from seven minutes (“Rapper’s Delight”) to over twelve minutes (“Superappin’”), which
allowed the instrumental on the b-side of the first rap singles to be used for rap routines in clubs or by young rappers to practice their rhymes (Ice-T and Baybutt 2012).

Recordings are sometimes not representative of public performance styles.

–Tim Brooks (2004, 8)

The disco break, rapper-focused recordings of hip-hop’s music represented the rhythmically driven sound innovations that deejays had created becoming a lyrically driven product. This transition created a divide among people devoted to the culture and music at the time. Hip-hop production pioneer Marley Marl was blunt in his assessment of the early sound of recorded hip-hop: “Rap was wrong when it got to records, you know, it was bands playing covers. It was like karaoke before karaoke, it was terrible” (Weisfeld 2007, 05:25). Marley’s disparagement of early hip-hop records because they were covers of disco music is a sentiment shared by some beat makers. E.Z. Mike of the Dust Brothers, though, cited “Apache” and “Good Times” in the same sentence when mentioning breakbeats (Mike Simpson, pers. comm.), showing that at least for him the disco sound of “Good Times” was on the same level as the seminal breakbeat “Apache.”

The release of “King Tim III (Personality Jock)” and “Rapper’s Delight” led to emcees looking for record deals (Hager 1984). In the nascent stages of hip-hop there was a real fascination with the deejay and what he was doing to create the music that rappers eventually rapped over. It appears that the use of popular R&B/disco records put emcees in the forefront without the sounds that supported them in the Bronx. Once rappers were the celebrities and hip-hop became consumed through rap records, the profile of the hip-hop deejay began a gradual
The Mad Science of Hip-Hop: Chapter 1

decline, not to extinction but to a nadir in the U.S. in the late 1990s, when prominent hip-hop beat makers did not start their careers as deejays.

Style Wars

The first six years of the creation of hip-hop music as a distinct method of organizing sound featured two major aesthetic and poetic directions. The first was the breakbeat style produced by vinyl record manipulations that was started by Herc, honed by Flash, and diversified by Bambaataa. The second direction was the disco break style created with live musicians that was the sound of the first commercial recordings of hip-hop music. As recordings became a goal for deejays and rappers, each of these streams shaped how hip-hop recordists approached crafting the sound of hip-hop.

The style heard on the initial recordings of rap music was quickly expanded beyond the ad infinitum, four-bar disco groove. The first two recordings by the Funky 4+1 display a subtle advancement. Their 1979 recording “Rappin’ and Rocking the House” is built on an eight-bar loop rendition of Cheryl Lynn’s “Got to Be Real,” representing the standard at the time. After the group was sold to Sugar Hill Records, their next single, “That’s the Joint” (1980), added some original material to the Sylvia Robinson formula. “Rescue Me” by A Taste of Honey (1980) was the source material for the recording. Interestingly, "Rescue Me" has an eight-bar break section featuring a timbales solo from 02:10 – 02:28 that was not exploited to create “That’s the Joint.” Instead, the primary groove of “Rescue Me,” heard at 0:19, was performed and looped by Wood, Brass, and Steel. The advancement was the band appending an original break section to “That’s the Joint,” which occurs at 01:32. The break in “That’s the Joint” transitions the song from the spry, syncopated funk of the recreated “Rescue Me” to a sparse “on the one” bass thump. The
addition of the break section, though, does not lead to a verse-chorus form; the rap routine does not have any lyrical reprises.

Disco was not only covered for some of the first hip-hop beats. An original, disco-style composition supports Kurtis Blow’s lyrics for his first single “Christmas Rappin’” (1979). Robert “Rocky” Ford Jr. was a journalist at Billboard magazine and wrote one of the first articles written about hip-hop in 1978. He was shepherded around the 1970s hip-hop scene in Harlem and the Bronx by promoter and future hip-hop magnate Russell Simmons and became enthralled by the talent he saw from the rapping DJs. After the success of “Rapper’s Delight” in the summer of 1979, he decided to make a Christmas-themed rap record for the holiday season (Charnas 2010). He recruited Queens-based musician Larry Smith to compose the beat, the same Larry Smith who produced the first recordings by rap groups Run-D.M.C and Whodini. Smith assembled Orange Krush, a contemporary R&B band that transitioned to playing all the music heard on the first singles by rapper Kurtis Blow. Coming after the success of “Rapper’s Delight” and other disco break cover records, Smith’s style was a landmark for expanding how music was going to support rappers and thus hip-hop culture. Multi-instrumentalist Davey DMX, who worked with Smith, stated, "I’ll give credit to Larry Smith as well for laying down that groundwork of original Hip-Hop music and not sampling and taking other peoples—like doing “Good Times” like Sugarhill Gang did" (quoted in Chuck D 2011). Creating original melodies, harmonies, and overall grooves for hip-hop beats falls outside of the idea of the standard practice of making beats but was also a strategy for the R&B/funk-inspired “Funk You Up,” a hit single by The Sequence (1979), and has been used by some beat makers throughout the history of recorded hip-hop. Presaging later chapters, the practice of composing original musical
components for a beat picked up momentum as a response to sampling becoming an expensive compositional technique by the early 1990s.

From a technological standpoint, the greatest deviation from the early model of crafting hip-hop beats came two years after the first rap recordings. Musician and producer Joe Tucci (credited as Eric Matthew) from Profile Records created the beat for “Genius Rap” (1981) by Dr. Jeckyll & Mr. Hyde. Comparable to other disco break hip-hop beats of 1979, the beat for “Genius Rap” was a cover of a contemporaneous recording, “Genius Of Love” (1981) by Tom Tom Club. What is notable about this recording is that one recordist, Tucci, using an electric guitar, bass, synthesizer, and Linn drum machine (Roger Linn’s LM-1), created the beat (Charnas 2010). While the beats of the early hip-hop recordings have been disparaged because of their adherence to the sound of disco, Tucci’s work on “Genius Rap” foreshadowed the methods of hip-hop beat makers in the early-to-mid eighties.

**Conclusion: Last Night a Deejay Started a Culture and an Aesthetic**

See, the park playin’ is like playin’ for your people. You give them something free.

–Kool Herc (quoted in George 1993, 51)

The shifting of the cultural hero status to rappers did not lessen the impact of deejays and the sound aesthetic that they derived from the rhythmic breaks of 1960s and 1970s recordings. Deejays were still doing breathtaking feats with recordings and inspiring impressionable youths. Flash was a major cultural hero in the Bronx. He explained that with some of his early breakbeat sets the crowd refrained from dancing to watch him cut between breaks and mix records. Dance
parties became seminars for his style (Grandmaster Flash 2008). The techniques that Flash started and other deejays developed shaped the compositional process of beat makers as the resultant sounds heard in public spaces roused the imaginations of future beat makers. Veteran producer Lee Stone had a friend whose older brother went to shows at Harlem World and The Armory to see Flash around 1977. After every show the older brother returned to the Queens suburb where Stone lived with fresh tapes. With obvious excitement in his face, Stone explained his reaction to those tapes:

So, hearing it, I was hearing songs that I knew from people playing it regularly, but I’m hearing the deejays capture the certain break parts and doing these things to it and I’m like, “How? What are they doing? What is this they are doing to these…?” It was magical, because this was before people had a concept of—I mean, you know, coming from the suburbs of Queens we didn’t have a concept of what was going on in the Bronx, even South Jamaica Queens was like a different world from where I grew up and where my friend grew up. But to hear the stuff going on we didn’t even know how it was being done. (Lee Stone, interview with author, Long Island, New York, October 12, 2011)

Stone was around seven or eight years old when he first heard those tapes. After asking for and receiving turntables as a gift from his grandmother, he was figuring out how that sound was created and deejaying school parties in middle school.

Free outdoor music events featuring deejays cutting and mixing recordings in the moment spread the breakbeat aesthetic that was eschewed in the first studio recordings of hip-hop. As children, a particularly impressionable time in most people’s lives, Lee Stone, E.Z. Mike, and Sean C (Sean Cane) absorbed different ways to arrange and structure sounds as they watched and
listened to deejays. The sounds set a template for these future producers as they adopted turntables and then drum machines and samplers.

Bambaataa’s statement that rap recordings initially siphoned the excitement around the culture and the music is slightly overstated as parties motivated by the culture continued. The availability of hip-hop recordings, though, did alter the expectations and impact of a live exhibition of hip-hop. Parties and local gatherings in the park were the first places that hip-hop deejays and rappers unveiled what they were working on. As the 1980s progressed, the creation of hip-hop music occurred in a recording studio and was then exhibited to the public either as a recording or as a live performance to encourage the purchase of a recording. The sound of hip-hop’s music began on two turntables but was revealed outside of the Bronx on recordings crafted by studio producers with session musicians. The first retail recordings of hip-hop music introduced so many people to the culture and inaugurated hip-hop as a phenomenon but also degraded hip-hop’s intimate feedback loop between creators and enthusiasts, the enthusiasts that the cultural heroes of the Bronx had to please at local parks with a sound that they could not get anywhere else.
Chapter 2 – Shock of the “New”:
Hip-Hop Outside of New York, the Drum Machine, and the Hip-Hop Beat Maker

As time goes on there will be multiple written histories and reassessments of the twentieth century. Regardless of who tells a story or how a certain story is told, the creation and impact of computers will feature heavily in the narrative, and a sizable number of words will be written in regard to the computer’s impact on music. In considering the development of the studio production of hip-hop’s music, analog (capacitors and oscillators controlling electrical currents on a wire to create pitch and timbre) and digital computer technology (microprocessors sorting binary code that simulates pitch and timbre) will have to be placed at the forefront of any discussion. The introduction of new technology to popular music recordists has generally resulted in the fabrication of new sounds and inventive ways of organizing them. Consequently, the new sounds and composition procedures exhibit a fluid concept of what music is and/or its function (Théberge 1997). For many, encountering new creative works birthed from new technological instruments dislocates familiar, culturally understood vocabularies and makes those vocabularies feel only partially applicable to the new works that are presented. Robert Hughes (1991) references this sensation in the face of innovative creations as the “shock of the new.” After hip-hop established itself in the recorded medium, the remaining years of the 1980s presented several moments of dislocated familiarity for hip-hop enthusiasts as music technology moved from the research lab to the bedroom studios of hip-hop beat makers.

A ripe period for the impact of computer-based hardware instruments was the late 1970s/early 1980s, a span of time when composers, performers, and producers of almost every commercial popular music genre were utilizing the developing functions of synthesizers, drum machines, samplers, and vocal modulators. The general discourse around the hip-hop recordist of
this time period, particularly the beat maker and producer, frames this particular user as a disruptor to the developing practices on the new instruments. Beat makers have been described as having appropriated sampler technology (Schloss 2004, Chang 2005, Steward 2006), as if the use of the technology belonged to a particular group of music creators, or have been framed as making use of new technologies in ways that were not intended—relegating their practices to the periphery of a range of practices on technology that was less than a decade old. By the 1970s, the phonograph/turntable had an established function—with some alternative practices—by the 1970s, which made the innovations of Kool Herc and Grandmaster Flash disruptions to the use of that technology. The beat making and production practices of recorded hip-hop were novel and in many ways innovative, but the notion that these practices eschewed the intentions of new technologies is far fetched—particularly when the “intentions” of these machines were modified every couple of years—and ignores hip-hop’s parallel development, perhaps kinship, with music technology. Many of the innovative instruments had straightforward applications (drum machine) or specifically vague aims (samplers were created to offer more “natural” sounds) that received a musical application through the production practices of hip-hop beat makers.

The initial impact of developing technologies on hip-hop music occurred in the Northeast region of the United States, particularly the greater New York City area, where the practice of creating hip-hop music had been in development since 1975 among street deejays and since 1979 in recording studios. The popularity of “Rapper’s Delight,” though, was not solely contained in the Northeast. Discussed briefly in Chapter One, the circulation of informal recordings gave hip-hop rapping and deejaying from the Bronx a presence in other parts of the United States, and internationally as the tapes were exported by U.S. soldiers. With the sound of hip-hop trickling through society one amateur cassette at a time, the professionally released recording of
“Rapper’s Delight”—despite only representing one sound of hip-hop music—was primed to expand the sounds of hip-hop beyond the informal tape circuit. The greater Los Angeles area in southern California was one of the first areas to initiate hip-hop music outside of New York City and to reconfigure the established compositional practices and sound aesthetic to local preferences.

Phonograph Effect and California Hip-Hop

It is difficult to underestimate or devalue the significance of “Rapper’s Delight.” There were several recordings and production processes from the early era of recorded hip-hop (1979–1981) that were perhaps better or more representative of where hip-hop’s sound was headed, but no recording had the observable impact of “Rapper’s Delight.” Recordings store recorded sound. The act of storing recorded sound enlists the recording and the recording process as an intermediary, or medium, between performer and listener. The role of medium, though, as has been documented (McLuhan 1964, Théberge 1997, Meintjes 2003, Moorefield 2005, Veal 2007), is not the sole function of a recording process or the resultant recording. Musicologist Mark Katz coined the notion of the “phonograph effect” as an analytical tool for understanding how and why the act of recording and the recorded object influences users. According to him, a phonograph effect is “any change in musical behavior—whether listening, performing, or composing—that has arisen in response to sound-recording technology.” Furthermore, a phonograph effect is “[A]ny observable manifestation of recording’s influence” (Katz 2010, 2). In other words, phonograph effects are the observable actions following the shock of something new.
The consolidation of hip-hop culture around the deejay was an observable phonograph effect as the unique manipulations of duplicate recordings on two turntables created a unified understanding among the young people in the Bronx of a sound recording’s expanded purpose. In Capturing Sound: How Technology Has Changed Music (2010), Katz documents hip-hop’s origin as a phonograph effect, which was initiated from outside hip-hop in the form of James Brown and Mike Viner’s Incredible Bong Band breaks. As described in Chapter One, the informal recordings from parties can also be understood as catalyst for a phonograph effect. They impacted the compositional behavior of R&B producers at Spring and Sugar Hill Records, which further set a precedent for the sound of hip-hop heard on the first formal recordings, and impacted how pioneering deejays Grandmaster Flash and Afrika Bambaataa sounded on their first official recordings—“Superrappin’” and “Funky Sensation,” respectively. A significant, and perhaps defining, phonograph effect within hip-hop, though, was the observable manifestation of California hip-hop in reaction to “Rapper’s Delight,” a commercial studio recording of hip-hop music that gave the aesthetics of the developing genre a presence outside of the Bronx and the greater New York City area.

Informal distribution channels initiated by the mobility of cassette tapes and East Coast transplants were the primary lifeblood of California’s hip-hop scene. DJ Flash (Lee Johnson) (phone interview with author September, 13 2011) explained to me that when he was in college in the late 1970s, people from the East Coast brought over recordings and continued to do so once official recordings started being released. Mike “E.Z. Mike” Simpson of the Dust Brothers moved from the Lower East Side of New York City to Los Angeles as a fourteen-year-old in 1978, transporting his modest breakbeat-laden record collection and informal recordings of street deejays across the country (interview with author, Pasadena, CA, July 28, 2011). The tapes and
transplants were probably responsible for the onset of the Los Angeles mobile deejay scene in 1975 (Williams 2006). Four years later, in 1979, the California hip-hop scene was set on a course to becoming an industry with the importation of “Rapper’s Delight” by Sugar Hill Records sales representative Duffy Hooks III.

“Rapper’s Delight” is responsible for the creation of the hip-hop industry in southern California, but the recording and sound featured on it had to overcome the popularity of breakdancing. Rapper Ice-T explained that most people became fascinated with hip-hop when they saw breakdancing (Coleman 2005). Thus, initially in Los Angeles the cultural heroes of hip-hop were break dancers, not deejays or those that were creating music. The prioritizing of dancing has a history in Los Angeles that preceded hip-hop, and the history displays the obstacles that precluded the initiation of hip-hop music creation in the region. For the African-American population in Los Angeles, dancing had been a particular way of distinguishing themselves from other black cultural concentrations in the U.S. When jazz musicians from New Orleans and Chicago began moving to Los Angeles in the 1920s, they found that the “hot,” polyphonic and polyrhythmic improvised jazz style that they preferred was discouraged and a more European-influenced, sheet-music driven, dance band style prevailed (Bakan 1998). For the economically successful African-American that settled along Central Avenue in Los Angeles, the ability to do certain dance steps took precedence over “hot” instrumental expressions proliferating in other African-American areas in the country. Subsequently, in the late 1960s, Los Angeles native Don “Campbellock” Campbell and Chicago native Charles “Charles Robot” Washington invented the “locking” and “robot” dance moves, respectively, that combined to become “popping and locking,” the defining dance of black Los Angeles (González 2012). Facilitating the merger of each dance move was the 1968 move of Don Cornelius’ syndicated
dance television show *Soul Train* from Chicago to Los Angeles. As Ice-T stated: “They were locking in LA for a long time before they were rapping” (quoted in Coleman 2005, 149).

“Rapper’s Delight” was pivotal in transitioning hip-hop culture in southern California from solely breakdancing to rapping and record making.

The sales figures of “Rapper’s Delight” in the region proved to Duffy Hooks III that rap music was going to be big. Despite the entrenchment of the dance scene, he saw the potential for creating and selling hip-hop on the West Coast and enlisted his father, Jerry Hooks Sr., to join him in establishing the rap music industry in California. Throughout 1980, Duffy Hooks marketed releases from Sugar Hill Records and searched for local talent to establish his own rap music label. At a club he watched two rappers, Disco Daddy and Captain Rapp, battle and win against the local competition, including DJ Tracey (later known as Ice-T). Hooks approached them about making records and in 1981 the Rapper’s Rapp Disco Company, based in Hollywood, released “Gigolo Rapp” by Disco Daddy & Captain Rapp and “The Gigolo Groove” by Capt. Crunch and the Funky Bunch.

Duffy and his father are listed as the producers of “Gigolo Rapp.” As an employee of Sugar Hill Records, Duffy was aware of the recording process that Sylvia Robinson had established for hip-hop and ostensibly aspired to make Rapper’s Rapp a West Coast counterpart to Sugar Hill. “Gigolo Rapp” documents how Hooks transplanted the poetics of hip-hop record making from Sugar Hill Records and how the sound aesthetic of “Rapper’s Delight,” while influential, was localized to the aesthetic preferences of African-Americans in California.

As founder and owner of Rapper’s Rapp, Hooks structured a similar autocratic system of production instituted by Robinson at Sugar Hill. Rapper’s Rapp artist King MC (Robert Marshall) described the creative environment at the label to Sandro De Gaetani:
When we were with AVI (American Variety International) and Rapper’s Rapp we had no creative control over what we were doing. The way we rapped, the lyrics that we rapped, music that we rapped to was all controlled by Duffy Hooks.

(Marshall 2007, 19:11)

While DJ Flash explained to me that they had some agency in the studio, King MC is not far off in his assessment. Hooks edited lyrics and routines, and even though there were several mobile deejays to help craft the instrumentals, he decided to emulate the market-proven process used on Sugar Hill productions; he hired local session musicians to make instrumentals from contemporaneous hits.

Listening to “Gigolo Rapp” and other Rapper’s Rapp releases up until 1983 (the year the new sound of hip-hop in New York, electro, was embraced in California), it is apparent that Hooks also looked to R&B records that were popular locally instead of the type of records that Sugar Hill producers were covering in New York. Professionalized African-Americans with higher levels of financial means began moving to southern California from the southern areas of the U.S. in the 1910s (Bakan 1998). A second wave of African-American migrants—featuring people of various economic levels—occurred after World War II. This second wave featured people from the South and from poorer parts of the Midwest (Neal 1999) and was the beginning of a conduit that facilitated a cultural conversation between black music contingents in the Midwest and Southern California. One of the first examples of this regional interaction was jazz saxophonist Louis Jordan’s development of proto-rhythm and blues/rock ‘n’ roll in the mid-1940s. After establishing his jazz career in New York City, Chicago, and Iowa, Jordan relocated to Los Angeles in 1942. Furthermore, Kansas City’s blues-infused jazz became very popular in California as several of the city’s significant musicians moved to Los Angeles after the Second
World War (Collins 1998). Following the dance band jazz of the twenties, the popularity of Kansas City jazz grew in California to the extent that early rhythm and blues in Los Angeles, like Louis Jordan recordings, was a direct successor to the Kansas City style (Collins 1998). With the black music scene in Los Angeles in constant exchange with Midwestern cities, when the R&B/funk bands from the Midwest rose to prominence in the mid-to-late 1970s, that sound dominated Los Angeles. DJ Flash described the musical taste in Los Angeles at that time:

Yeah, that’s just what we were bumpin’ out here. We were bumpin’ Al Hudson and One Way, Parliament, Rick James, the Gap Band, and, you know, just bumpin’ all that stuff … the discos were big out here and that was dance music, that was party music and that’s what we were doing here. (phone interview with author, September 13, 2011)

Even when hip-hop records were available in the early 1980s the mobile deejays continued to play midwestern funk: “They were playing early hip-hop music, plus B.T. Express, a lot of Parliament, funk—‘Atomic Dog’ was one of the biggest records at that time. Roger Troutman,” explained Ice-T (quoted in Mlynar 2010, 66) as he listed the songs played by Uncle Jamm’s Army, the predominant mobile deejay outfit in Los Angeles from 1979 to the mid-1980s.

DJ Flash spoke about the popularity of James Brown records and disco among the black population of Los Angeles, but the polyrhythmic southern soul of Brown heard in Grandmaster Flash’s breakbeats or the disco-infused, “sophisticated” funk of Chic heard in “Rapper’s Delight” was practically nonexistent as source material for Los Angeles-based hip-hop until the Dust Brothers’ productions for the record label Delicious Vinyl. Understanding the initial sound of West Coast hip-hop entails understanding the R&B goldmine that was Ohio in the 1970s, specifically the city of Dayton. The city bred enough funk bands to fill an all-night deejay set:
Ohio Players, Roger Troutman and Zapp, Slave, and Lakeside originated there and have been covered, sampled, or reinterpreted by Los Angeles hip-hop producers since 1981. In general, the funk-style R&B from this region was less rhythmically dense than that heard on up-tempo James Brown records in the 1970s. To clarify and dissuade the reader from disparaging the Midwest, midwestern funk was rhythmically dense but not to the degree of the James Brown Orchestra or the J.B.’s—Brown’s bands from 1965–1970 and 1970 to the early-1980s, respectively. The lack of intensity resulted in a subtler, though still funky, groove that distinguished itself while still being popular during the prime years of James Brown. To illuminate the differences between these two styles and reveal a foundation of West Coast hip-hop’s sound, we can analyze the rhythmic foundations of two records: James Brown’s “Give It Up Or Turn It Loose” (1968), a breakbeat standard, and “More Bounce to the Ounce” (1980) by Zapp, a seminal Midwest–Los Angeles exchange recording.

Drum and bass components are vital to most black popular musics in the Americas, and examining these aspects of different genres reveals the distinct rhythmic qualities of genres and styles within this area of popular music (Johnson and Chernoff 1991). Interestingly, the difference in tempo between these recordings is slight (110 bpm for “Give It Up”, 105 bpm for “More Bounce”), but the difference in how the tempos are felt is more drastic due to the different rhythms and rhythmic textures employed by each band. In contrasting each style I found that analyzing the drums was a fruitless endeavor because the drum patterns in each recording are so disparate that conclusions drawn from them can be superficial: “these drums are more polyrhythmic than those.” The complexity of drumming on James Brown records has been heralded by many and analyzed by ethnomusicologist Alexander Stewart, who has explained that the style was inherited from the New Orleans way of layering straight eighth-note and swinging
or shuffling eighth-note rhythms into a composite groove (Stewart 2000). The drumming on Zapp’s record is a standard “2/4” (two-four) backbeat pattern (two snare hits every four beats: kick - snare - kick - snare) that began in early r&b/rock ‘n’ roll (“Hound Dog” (1952) by Big Mama Thornton) and was institutionalized at Motown (“Baby Love” (1964) by The Supremes; “Signed, Sealed, Delivered I’m Yours” (1970) by Stevie Wonder) (Fink 2011). 17

Differences in the bass ostinatos from each record and how each ostinato interplays with its respective drum pattern display the onset of regional sounds in hip-hop. Figure 2-1 is a descriptive transcription of "Sweet" Charles Sherrell’s bass ostinato from “Give It Up Or Turn It Loose.” Listening to the bass groove makes it clearer, but even looking at the syncopation in the transcription shows the offbeat coordination and unanticipated rhythms that enlivened the records of James Brown:

**Fig. 2-1: Initial bass ostinato from “Give It Up or Turn It Loose” (1968) by James Brown**

An example of these aesthetic effects from James Brown’s band can be seen and felt when the double thirty-second note anacrusis is followed by an empty beat, which exhibits Brown’s aesthetic proclamation that all music components of his style are in service to “the one” (the first beat of each measure) (Vincent 1996). As a dancer to R&B music, I have physically felt the movement possibilities that arise from the beginning of the first beat of a measure being left open (the second half of the beat has the swell of an open hi-hat). This type of rhythmic configuration allows dancers to slip their hip or drop their shoulder on beat one as an anticipatory step towards,
perhaps, a complex dance step or flourish once the rhythmic attacks enter. With the addition of
the drum pattern—which features a syncopated snare pattern that surveys the off- and off-off-
beats and a stabilizing straight eighth-note hi-hat pattern—the syncopated polyrhythms from up-
tempo James Brown records keep one’s body constantly reassessing the groove as the
combination of the drums and bass offers several places to attack the groove and still be on beat.
Accordingly, it is not surprising that break dancers gravitated towards James Brown breaks. In
“More Bounce to the Ounce” the straightforward “2/4” drum pattern leaves less equivocation
about where a dancer can attack the groove. The bass ostinato rhythm (fig. 2-2) reinforces the
stable “2/4” pattern and gives the record a distinct groove that dancers responded to with dance
steps that elaborated on the physical motion of bouncing down and rebounding up on alternate
beats of a four-beat measure.

Fig. 2-2: Bass ostinato from Zapp, “More Bounce to the Ounce” (1980)

The one-measure ostinato can be analyzed as a reduced antecedent-consequent rhythmic phrase
with either half containing a four-quaver structure that can be embellished with some sixteenth
notes, and the other half featuring long note values with rhythmic silence: a musical rest that is as
valuable as attacks in establishing the groove. As figure 2-2 shows, the bass ostinato in “More
Bounce to the Ounce” has the four-eighth-note structure in the second half of the bar. Model
recordings for West Coast hip-hop—“Funky Worm” (1972) by the Ohio Players, “(Not Just)
Knee Deep” (1979) by Funkadelic, and “Doo Wa Ditty (Blow That Thing)” (1982) by Zapp—feature slight variations of this bass ostinato in sync with a “2/4” backbeat drum pattern.

Returning to the first Rapper’s Rapp recording, “Gigolo Rapp” (1981) is an instrumental cover version of “Give It to Me Baby” (1981) by Rick James. While funk luminary Rick James began his career in Buffalo, New York, his solo career flourished while he was living in Detroit and then in Los Angeles. Figure 2-3 is the bass ostinato for “Give It To Me Baby”:

Fig. 2-3: Bass ostinato from Rick James, ”Give It To Me Baby” (1981)

With a tempo of 120 bpm, Rick James’ recording was recognizably faster than that of Zapp; regardless, the song featured a similarly styled bass ostinato, except for the reversal of the antecedent-consequent content: the four-quaver structure is mostly in the first half of the bar.

While Hooks paid for session musicians to recreate Rick James’ recording (at a semitone higher, from C-sharp minor to D minor), he did not splurge to recreate every aspect. The bass line, drums (“2/4” pattern), synthesizer, and guitar parts remain practically unchanged, but the horn fanfares played during the introductory and chorus sections of “Give It to Me Baby” are absent from “Gigolo Rapp.” After a four-bar introduction, Disco Daddy and Capt. Rapp rap for roughly 148 bars, not including the two eight-bar break sections (02:13 and 03:47) that are pulled directly from the break section of “Give It to My Baby” (“Give me that stuff, that funk, that sweet, that funky stuff”). “Gigolo Rapp” does not have an easily understood structure; like many hip-hop
recordings based off of rap routines, it has varying section lengths (20 bars, 28 bars, 12 bars, 44 bars). The lack of a consistent section length indicates that the music, while ostensibly important to establishing a local sound, was less effective in organizing a rapper’s lyrics.

After the release of “Gigolo Rapp,” Hooks held auditions to fill out the label’s roster. DJ Flash was signed during this period and became a member of the Rappers Rapp Group, a six-member rap group (DJ Flash, King MC, Lovin’ MC, Mr. Ice, MC Fosty, and Mack-A-Moe). Their first release was “Rappin’ Partee Groove” in 1982. Many of Hooks’ compositional and production decisions were impacted by his tight budget. At the time, Rapper’s Rapp was recording using a twenty-four-track mixer onto two-inch, reel-to-reel tapes. To save money, Hooks reused parts of master recordings to make other records. In the case of “Rappin’ Partee Groove,” the drums are duplicate drum tracks from “Gigolo Rapp” played back at a slower tempo. In “Rappin’ Partee Groove” the drum arrangement, including a fill at the end of the introduction and the two eight-bar breaks that “Gigolo Rapp” covered from “Give It To Me Baby,” is aligned with “Gigolo Rapp,” though the transfer of the break section drums to “Rappin’ Partee Groove” (at 02:34 and 04:20) is awkward because the corresponding bass line is absent. From the outside, Hook’s method of reusing parts of hip-hop beats in newer compositions may appear dubious.18 Ironically, even hip-hop enthusiasts that support sampling are weary of beat makers reusing parts of other hip-hop beats for their compositions. However, it is a practice that hip-hop producers Marley Marl, Timbaland, and Kanye West have either admitted to or not denied.19 In addition, the practice of reusing parts of recordings is familiar to creators and enthusiasts of Jamaican popular musics dub (Veal 2007) and dancehall reggae (Manuel and Marshall 2006).
The origin and growth of hip-hop culture and music in New York City before official recordings were released served as a support for the genre’s transition to the popular music market. If the first records had failed in New York City, there still would have been a large amount of support from the informal markets that hip-hop had sustained itself on in the mid-to-late 1970s. Young people in Los Angeles had not watched and participated in the growth of hip-hop. As a consequence, commercial recordings of hip-hop from New York initially dominated as the authentic and only sound of local hip-hop. Considering the popular music scene that the Rapper’s Rapp recordings entered into—a scene dominated by midwestern funk and early hip-hop recordings from New York—the first official releases had to sound like what was in demand or face the market challenge of going against popular sentiment. Hooks, as a former Sugar Hill employee, was not going to exacerbate the risk inherent with starting a record label by making potentially unpopular records, and the performers at Rapper’s Rapp wanted to get their records played at clubs. DJ Flash explained the practical reasons for the sound aesthetics of the first two years of Rapper’s Rapp recordings:

[W]e had to survive from record to record. So the best way to get club play—since they were playing like Michael Jackson and Rick James and all that in the clubs—we would use those beats and then deejays would say, “oh, I could mix that with the Prince record,” like with “Erotic City Rapp” (1984). They’d say, “I can mix that in with Prince’s ‘Erotic City’ (1984),” and that’s how they would do it. So that’s how we would get play in the clubs. (phone interview with author, September 13, 2011)

Following “Rappin’ Partee Groove,” the Rapper’s Rapp Group changed its name to Dark Star. In addition, DJ Flash recruited Black Diamond, a band from his hometown, Bakersfield,
California, to be the official house band at Rapper’s Rapp. During my conversation with DJ Flash, I inquired about the compositional practices during Rapper’s Rapp studio sessions with Black Diamond and referred to the major components of their beats as “loops.” He quickly corrected me, “Actually they weren’t really playing loops. They would play a full song” (phone interview with author, September 13, 2011). In the mid-1980s, DJ Flash created hip-hop beats on hardware machines and later in our conversation he referenced the components of those beats as “loops.” He engaged in each type of production process in the early years of hip-hop record making, thus his correction of my word use in regard to the live band production process speaks to his separate perception of the practice of making beats in the manner that established hip-hop record making and the current common practice of using hardware and/or software as the primary instrument for composing.

I believe that DJ Flash saw the two production practices as disparate, and I agree with that perception; however, in considering his distinction it becomes even more fascinating how he described his interactions and negotiations with Black Diamond: “[W]e would just tell them how many bars we were going to rap and then we would need a break and then, the next rapper, how many bars [he’d] rap. So, they actually played—they would play a full song, a live song” (phone interview with author, September 13, 2011). The necessary features of what constitutes a ‘song’ will vary according to the cultural aesthetics and, perhaps, the agenda of the beholder of an arrangement of sound sections. In the context of most popular music, an instrumental’s song structure is defined by the arrangement of repeated and contrasting sections, which tend to have distinguishing harmonic progressions and are analyzed using letters of the alphabet (e.g. 32-bar AABA song form). Generally, the production of early hip-hop with a live band entailed extracting a section from an existing hit to cover, creating a repetitive groove, and arranging the
groove to fit a rapper’s routine. Therefore, in the context of composing hip-hop with a live band during this time, playing ostinatos under a rapper who distinguished the sections through lyrical content could be considered playing a song. But in the case of Black Diamond it appears that this distinction, using the term “song,” was the result of their being a live band. When the extraction, creating a groove, and arranging for a rapper production model moved to hardware in the form of programmed drum machines, synthesizers, samplers, and sound modules, “looping” became a commonly accepted and utilized term. DJ Flash detailed the sudden transition to commercially available music composition technology:

We did a song called “Sexy Baby” (1982). We would tell them [Black Diamond] we wanted—like the Bar-Kays had a song called “Freaky Behavior” (1981) at the time and we would say we want to do a track like “Freaky Behavior.” So they would change it just a little bit, they would record it, and we would put the vocals down. So, yeah, they were just doing R&B songs from R&B tracks. That was before the drum machines and all that came in; that was about ‘82 and ‘83 when Black Diamond was doing it with us. Then the drum machine came and everything changed, so we quit using Black Diamond and we started going with the drum machines and the programming and stuff. (phone interview with author, September 13, 2011)

Duffy Hooks and the deejays and rappers at Rapper’s Rapp Disco Company understood that using the instrumentals from popular records ensured spins in the club by the local deejays. Consequently, the foundation of Los Angeles hip-hop was the funk records from the Midwest, whereas hip-hop music in New York was initially a balance between the dense rhythmic loops of breakbeats and borrowed grooves from disco records. While the source materials for each
regional style of hip-hop music did not become less significant as the genre developed beyond its preordained fad stage, the introduction of cutting-edge commercial music technology altered and augmented the compositional instruments, process, and sound of hip-hop.

**Transitioning From the House Band**

Technologies become imbedded in cultural systems and social institutions, which, in turn, are reconfigured by those same technologies.

–René T. A. Lysloff and Leslie C. Gay (2003, 8)

The development of hip-hop’s music and the development of commercial music technology are historically joined at the hip. As deejaying technology, particularly advances in mixer function, became more sophisticated, deejays expanded their craft. By 1982, synthesizers and drum machines radically changed the sound of hip-hop that was heard on the first recordings in 1979 and the process of creating hip-hop recordings. From a techno-historical standpoint the house band production process that was predominant in the initial recordings of hip-hop was a dalliance that arose from producers who saw promise in the energy of a new musical style but were not responsive to the prospects of a new production craft based on turntables and contemporary technology. Producer Joe Tucci’s utilization of the Linn LM-1 drum machine and a synthesizer to rerecord Tom Tom Club’s “Genius of Love” (1981) for “Genius Rap” (1981) was an example of how the sound of hip-hop was becoming reconfigured by the latest technology after previous technological instruments (turntables) were already embedded in hip-hop’s compositional practice. It is unclear, though, how inspirational his use of drum machines was outside of Profile Records, especially considering that the disco cover style of beat was
outdated a year later. Rather, it was the oncoming impact of “Planet Rock” (1982) that inaugurated drum machines and synthesizers as popular tools for creating hip-hop music.

The reciprocal interdependence of musical cultures and technology is now an understood paradigm that is further elucidated through evaluations of musical cultures that adopted and then adapted to available technologies. In “Ethnomusicology in the Twenty-First Century,” the introductory essay to the edited volume *Music and Technoculture* (2003), René T. A. Lysloff and Leslie C. Gay establish a dialogue to come to a sort of theory or belief for this area of ethnomusicological research. Throughout the essay they describe how contributors to the volume have approached the interdependency of music and technology in certain temporal and social positions, and the impact of technology on music cultures. Lysloff and Gay conclude with the idea that technologies are not neutral but are tied up in social and political struggles to control and expand human potential and agency. In regard to ethnomusicological inquiry, the social and political struggle is over cultural ownership, musical authenticity, and intellectual authority.

The abrupt transition away from house band recorded hip-hop was a cultural ownership maneuver in which one of hip-hop’s pioneering deejays, Afrika Bambaataa, reasserted hip-hop’s music as a radical sound facilitated by the latest technology. While “Rapper’s Delight,” “That’s the Joint,” and even the offerings from Rapper’s Rapp in Los Angeles were popular and displayed the affinity early hip-hop enthusiasts had for disco, there was a degree of criticism leveled from vanguards of hip-hop production Marley Marl, Rick Rubin, and Ced-G about those records as not being authentic presentations of hip-hop from the Bronx. Though they were initially used in a conventional professional studio following the abandonment of the house band, the technologies that the hip-hop beat maker used gradually decentralized the recording studio as a gateway to making a record and provided beat makers with intellectual authority over the
sound of hip-hop’s music. The tradeoff for having more, not total, cultural ownership, though, was the move away from the public visibility and experience of sound from turntable manipulation to the private, in-studio use of synthesizers, drums machines, and eventually sampling technologies. The drum machine did not directly serve the public as the turntables had, but hip-hop’s music started developing a sound beyond disco.

**Establishing the Instruments of the Hip-Hop Beat Maker**

Interestingly, the sound beyond disco was one from Germany, in the form of the pioneering computer music ensemble Kraftwerk. The group of four began recording in 1970 and by 1977 had produced a seminal electronic music record using custom made, computer-based instruments, “Trans-Europe Express.” On stage the group was seen standing still and manipulating a palette of computers, but behind the scenes they utilized an array of analog and digital instruments to create rhythms and melodies that were exclusively played electronically. Figure 2-4 is a screenshot from a 1975 BBC documentary about the ensemble:

**Fig. 2-4: Screenshot of Kraftwerk electric drum machine from 1975 BBC documentary**
The image shows an electronic drum set fashioned with metal pads that triggered the drum sounds (kick drum, snare drum, hi-hat, etc.) heard on their records. Inspired by the group’s style of composition, Afrika Bambaataa and producer/engineer Arthur Baker applied the sound of electronic music to hip-hop to create what is recognized as the electro sound of hip-hop.

A house band could not recreate the sound of Kraftwerk. Computer instruments in the 1970s output algorithmic rhythms with a robotic precision unlike the tight but untethered-to-a-static-pulse rhythms that most drummers generally produced (Keil 1994). Deejays in New York City were able to produce the sounds created on Kraftwerk records because of the succession of synthesizers and drum machines that were available as consumer products. The defining sounds of “Planet Rock” came from a Fairlight CMI, a digital synthesizer that featured sampled sounds, and a Roland TR-808, the transistor rhythm machine that laid down the drum track.

Robert Moog’s 1964 analog, voltage-controlled, keyboard synthesizer was introduced on the cusp of experimental music technology transitioning to commercial products, which began dictating the sound of popular music in the mid-to-late 1970s. The cost of designing and producing complex analog components to play sound with the aid of electricity was, in the 1950s and 1960s, relegated to national industrial design houses, university research centers, and a handful of entrepreneurial inventors who went through high-risk, monetary mazes in an attempt to manufacture their designs (Théberge 1997). In this environment, “computer music” was initially associated with experimental music done in laboratories and at universities. In fact, the compositions that arose from early synthesizers were referred to as “experimental music.” During the experimental stage of music technology, the aim of many researchers was to translate the conventional Western score and notes into workable software with hardware interfaces (Lyon
By the mid-1970s, the use of computer music instruments transitioned from predominantly experimental music that was created and consumed by insular communities at research facilities to what computer music researcher Eric Lyon referred to as normative music. The “normative” type of computer music was music based on accepted stylistic norms that used technology once developed for experimental uses: technologies like sequencers, reverberators, and synthesizers. Thus, according to Lyon, computer music technology experiments result in normative uses at a later time. By normative music Lyon is referring to music for entertainment purposes, and normative uses of music technology led to a new wave of tools and techniques for popular music production.

Normative uses of music technology were spurred by the introduction of microprocessors or integrated circuit boards that lowered the cost of music technology development and allowed more entrepreneurs not associated with research centers to start companies. Initially, microprocessors were built into synthesizers to stabilize the analog components; capacitors and transistors could be unruly if the design they were housed in did not properly account for or control the dynamic nature of electrical currents. Then microprocessors were used to manage the functions of the different analog components, making polyphonic (multiple tones played simultaneously) synthesizers possible. Finally, integrated circuitry became the sole component of synthesizer technology (Théberge 1997). The last stage of hardware instrument evolution occurred in the 1980s, and at each stage the cost of manufacturing computer instruments decreased, which was vital to the parallel development of hip-hop’s sound. In order to review the development of these instruments it is necessary to understand that microprocessors used in synthesizers were not developed by music technology research centers and companies. They were developed by companies in the future Silicon Valley to increase the ability of general
computer hardware to create and utilize more sophisticated software programs. Proceeding along the tenet of Moore’s Law that computer technology will continue to double in capacity every eighteen months, microprocessors were, and still are, a transectorial innovation that began in a specific industrial sector that focused on capacity development but found application in another industrial sector, commercial music hardware (ibid.). In the 1970s, E-mu Systems, Sequential Circuits, Fairlight, Oberheim Electronics, and the Roland Corporation took advantage of the decreasing cost of manufacturing hardware instruments and each company created products that were utilized by hip-hop beat makers in the 1980s.

The Fairlight CMI (Computer Musical Instrument) is famous for being the first polyphonic keyboard-based digital sampler heard in commercial popular music—Stevie Wonder used it while on tour in 1980 and Peter Gabriel’s eponymous 1982 album features the instrument—and infamous for its initial cost, from $25,000 to $36,000 (Vail 2000). The development of this instrument’s sampling capabilities will be highlighted in the subsequent chapter. It is relevant to the content of this chapter because the first instrumental attack heard on “Planet Rock,” the ORCH5 open fifth orchestral hit after Afrika Bambaataa’s a cappella introduction, is from the microprocessor-reliant machine (Fink 2005). Robert Moog’s cost-effectively designed, lower-priced Micromoog from 1974 and the Prophet 5 synthesizer from Sequential Circuits from 1978 provided the other non-percussion sounds (fig. 2-5) (Buskin 2008). The Prophet 5 was probably the most used synthesizer in 1980s popular music, only competing with the Yamaha DX7. Bambaataa and producer/engineer Arthur Baker’s use of the Micromoog in the creation of “Planet Rock” is interesting because that synthesizer was also favored by Kraftwerk.
Anyway, since we were basically trying to emulate the Kraftwerk sound, when we went into the studio we decided we needed a drum machine. What’s more, after hearing an 808, we knew that was what we wanted.

—Arthur Baker (quoted in Buskin 2008)

Presumably, the first hip-hop record to feature drum rhythms from a drum machine was “Genius Rap” (1981), which features Roger Linn’s LM-1 drum machine. The year that record was released the most renowned and utilized drum machine of the first stage of electronically created hip-hop, the Roland TR-808, was released. The following year, 1982, “Planet Rock” made the TR-808 a must have for anyone aspiring to make hip-hop beats. While the TR-808 can appropriately be credited with ushering hip-hop production out of the house band production style, the synthesized sound and mechanical rhythms produced by the TR-808 could only attempt to emulate the polyrhythmic breaks that Flash made popular before the disco-infused rap records of 1979-1982. In addition, the LM-1 contained sampled drum sounds—albeit of 8-bit resolution—and a “shuffle” feature that gave programmed rhythms a loose, swing feel that was
impossible on the TR-808. Considering what the TR-808 offered in regard to its technical specifications, the phonograph effect of Kraftwerk’s records serving as an aural model to create a hip-hop sound separate from Sugar Hill Records is hard to underestimate.

The closeness of TR-808’s sonic output to Kraftwerk made it popular with Bambaataa and Baker as they attempted to create a new sound for hip-hop. “Planet Rock” made that drum machine popular, but on a more practical level, since competitor drum machines were more than double the price of the TR-808, which came to market in 1981 at $1,195. In comparison, Roger Linn’s LM-1 came to market in 1980 at a price of $4,995; the successor, the LinnDrum (LM-2) was introduced in 1982 at a list price of $2,995; and in 1981, Oberheim Electronics retailed the Oberheim DMX for $2,895 (Vail 2000). Getting the drum machine priced down to a consumer level and to be acknowledged as a functional instrument for creators of hip-hop music, and popular music in general, was not a developmental flashpoint that occurred in the late 1970s.

What became the drum machine was originally referred to as a rhythm machine and was predominantly utilized by composers and performers of Western classical music. In 1930, Leon Termen, the inventor of the etherophone or “Theremin” (Théberge 1997), released what is recognized as the first rhythm machine, the Rhythmicon. Termen’s motivation for creating the rhythm machine arose from a request: American composer Henry Cowell wanted a device to play uncommon time signatures to assist him while composing (Linn 2012). For more than thirty-five years drum machines were manually operated (hand cranked like a pianola) and used for accompaniment. In 1964, Ikutaro Kakehashi designed the Rhythm Ace R-1 for the Japan-based company Ace Electronics Industries (Ace Tone), a company he founded and reorganized into the Roland Corporation in 1972. The Rhythm Ace was a hand-operated machine that attached to an organ to help organists keep time. In 1967, Ace released the Rhythm Ace FR-1
with analog parts to automate the playing of rhythms; it was the first automatic rhythm machine (Vail 2000).

After Kakehashi founded Roland, the company released several models of rhythm machines for six years that were automated but did not allow users to edit preprogrammed rhythms or create new ones. The Roland Rhythm 33 (TR-33) was one of the first machines released by Roland in 1972:

**Fig. 2-6: Roland Rhythm 33 (TR-33) (rel. 1972)**

The TR-33 had analog sounds and about twenty preset rhythms (waltz, slow rock, “2 beat,” swing (1 and 2), beguine, samba, etc.) that could be varied through tempo and volume. The preset rhythms on the TR-33, and the generic groove produced from it, are examples of the survival paradigm concept within the music technology industry. A survival paradigm is a design or piece of technology that, even after decades, is still the foundation for current technology
Preset rhythms became a staple of electronic keyboards in the 1980s and can still be found on common consumer electronic keyboards. The TR-33, even in 1972, was designed for a consumer electric organ; the elevated front panel allowed the rear section of the machine to rest under an organ.

Keyboard synthesizers with microprocessors started appearing in the mid-to-late 1970s and gave those instruments polyphonic capabilities. Kakehashi realized that a CPU could be beneficial to his rhythm machine, and in 1978 the Roland CR-78 (Computer Rhythm) became the first rhythm machine with a microprocessor:

**Fig. 2-7: Roland Computer Rhythm 78 (CR-78) (rel. 1978)**

(Cropped image from http://www.vintagesynth.com)

The microprocessor made the CR-78 programmable: users could input their own rhythms to go along with preset rhythms that were still included in the machine. The setbacks were that the CR-78 could only program two-bar patterns and a user could only program one voice at a time. Additionally, though the machine had ten percussion sounds, each two-bar pattern could only contain four of those sounds (Vail 2000). A significant feature of the CR-78 was its ability to be synced to an outboard sequencer. The feature, in combination with user programming, was a
signal from Kakehashi and Roland that their rhythm machine was for more than organist accompaniment. Sequencers store the information of a performance gesture from an electronic instrument (Théberge 1997). The sound from that gesture becomes arbitrary, changing with each electronic instrument. Initially, a sequencer was an individual machine that was an organization hub for performance data from multiple synthesizer keyboards. Though the first sequencers were essential to organizing multiple synthesizers, they were monophonic and could only store a limited amount of note data. The drum machine joined the hub in order to be synced up properly with synthesizers. One of the first polyphonic sequencers was the Roland MC-8 (MicroComposer) from 1977 (ibid.). The MC-8 sequencer must have impacted the conceptual design of the purpose of Roland’s next rhythm machine (CR-78). The recording studio-focused capabilities of the MC-8, in particular the multichannel inputs, appear to have ensured that Roland’s next drum machine was going to be a device for the recording studio instead of the home organ player.

Roland, and other electronic instrument companies in the 1970s and 1980s, introduced new instruments on an annual or even bi-annual schedule. By creating “families” of instruments (TR-___, CR-___, MC-___) where each individual device presented a minimum expansion of functionality, Roland and other companies were able to cover the technical and financial investments into proprietary designs with annual consumer products that sold between fifty- and seventy-thousand units (Théberge 1997). From a design perspective, the annual product model allowed survival paradigms to thrive in the early years of electronic instruments. The Roland MC-8 contained a step editor in its sequencer for programming rhythms, and the CR-78 allowed the user to accent drum sounds: “I built many rhythm machines previously but none of them had accents. Rhythm with no accents? Unbelievable!” exclaimed Kakehashi (quoted in Vail 2000,
The ability to accent percussion attacks is the first jump into making programmed rhythms sound more like the rhythmic discrepancies of human drumming. Accent and step editing functions were incorporated into the TR-808, a device that was ostensibly intended for studio production.

**Fig. 2-8: Roland Transistor Rhythm 808 (TR-808) (rel. 1981)**

From a manufacturing standpoint, the TR-808 (fig. 2-8) was cheaper than the Linn LM-1 and the Oberheim DMX because, while the latter two machines featured more expensive hardware in order to have digitally sampled sounds, Roland continued using analog components and synthesized sounds. And though it may appear counterintuitive in light of the overwhelmingly digital nature of current hip-hop production, the sounds from the TR-808 have endured longer than any other aspect of the machine. The standard low, mid, and high tom tom drums, congas, rim shot, claves, handclap, maracas, and cymbal crash were in the machine but were and are not as celebrated as the “famous five,” as they were coined by music technology journalist and researcher Mark Vail. Here are Vail’s befitting descriptions of the most utilized TR-808 sounds: “ticky” snare, “tishy” hi-hats (open and closed), and “spacey” cowbell. The pièce de résistance of the percussion sounds was the “hum” kick, a synthesized simulacrum of a
standard trap drum set kick drum that featured more low-end bass presence than percussive attack and has enthralled beat makers since 1982:

Arthur Baker took the acetate [of “Planet Rock”] into the Music Factory record shop in Brooklyn and quite literally blew up the speakers there, due to excessive low-end.

–Richard Buskin (2008) on “Planet Rock”

I used the [Roland TR-] 808 drum machine a lot back then because I loved the bass that it gave.

–Mantronix (quoted in Coleman 2005, 141)

The 808 is great because you can detune it and get this low-frequency hum. It’s a car speaker destroyer. That’s what we try to do as rap producers—break car speakers and house speakers and boom boxes. And the 808 does it.

–Kurtis Blow (quoted in Rose 1994, 75)

He (producer Marley Marl) always put the 808 to it and gave it a heavy bottom and warm feel.

–Big Daddy Kane (quoted in Coleman 2005, 163)

And in Reason I got a custom 808 patch that just kills everything man. I use this; whenever I need an 808 I go to this patch that I made.

–Rick Hertz (interview with author, New York City, August 27, 2012)

An important feature that assisted in transitioning hip-hop production away from the house band was the design of the front panel step editor to facilitate programming. The 808 was
Roland’s second programmable rhythm machine and, unlike the CR-78, it gave a lot of space to the step editor, especially for displaying metric divisions:

**Fig. 2-9: Roland TR-808 Step Editor**

![Roland TR-808 Step Editor](image)

(Extracted from user’s manual)

The four lines above the editor’s actual buttons show a user simple (2/4, 4/4, 3/4) and compound (6/8, 12/8) meters that can be programmed. Discussing the development of the step editor and the changing usage of rhythm/drum machines Kakehashi explained:

> The step-writing interface wasn’t new but it was the first time that we paid more attention to the people who program in real time. It used to be that our customer was the home organ player. Then people in the music industry started to pay attention to our rhythm machines. Such a musician was agreeable to programming by himself. That’s why we developed the step-writing system, so that you could slow the tempo down, enter your rhythm events, and then speed it up and hear the realistic rhythm pattern that you had just created. (quoted in Vail 2000, 282–83)

“Real time” programming is when a user adds to a sequenced arrangement while the arrangement is playing. In contrast, on previous rhythm machines (e.g., the CR-78) individual percussion sounds were programmed and then played back to hear how the sound synced with
the other layers. Real time programming allowed composers to immediately reflect on the effectiveness of an addition and adjust it appropriately, a benefit that conventional composers did not have until staff notation software became more common and efficient. Even with real-time programming, though, the TR-808 could only program one sound at a time.

Interestingly, while the step editor was created with a new kind of composer in mind—a composer that was not going to translate rhythmic ideas through staff notation when working in a recording studio and, perhaps, utilized a synthesizer—Roland made the effort in their manual for the TR-808 to communicate directly to the staff notation composer. They wanted to show composers how they could write onto computer memory instead of manuscript paper. As a music researcher I expected to have the task of visually translating the step editor in order to display how it correlates with a musical staff, but alas:

Fig. 2-10a: Roland TR-808 Instructional Manual, Composer Conversion (1981, 15)

Fig. 2-10b: Roland TR-808 Instructional Manual, Staff to Step Program (1981, 13)
Paul Théberge (1997) makes the point that the only electronic musical instruments that went from a one-off invention to an innovation that permeated the music industry were the instruments that could most resemble the established conventions of musical performance and composition. The importance of a technological advancement’s ability to translate to established demographics is why keyboard synthesizers are still utilized but Theremins are not and why Roland decided to communicate directly to conventional music composers how their established way of processing music translated to this new device. However, highlighting the step editor as a way to translate a notated score (fig. 2-10b) downplayed the rhythmic abilities of the TR-808 drum machine and resulted in the machine being predominantly used to make rigid, mechanical rhythms. Programmable drum machines had an internal sequencer. Every sequencer has a clock resolution that is measured in pulses per quarter note (ppq). Before MIDI (musical instrument digital interface), the common clock resolutions were 24, 48, or 96 ppq (Vail 2000). The CR-78 had a 12 ppq (Reid 2004). Therefore, while the step editor limited users to 8 ppq (32nd notes) to place a rhythmic attack, if users utilized the tap programming method they could program a rhythm in a 24 ppq environment and create a less rigid rhythm. The “tap” button on the TR-808 was yellow, located to the right of the step “16” button, and let users freely input rhythmic attacks when the sequencer was recording input data. The reason this feature was not prominent was because, as the manual infers, attacks programmed outside of the step editor’s clock resolution could not be synced to create a cohesive rhythm with other devices. The second edition of Roger Linn’s LM-1 featured the first rhythm quantizing function—in order to create a swinging rhythm that could be synced—but was not priced for popular adoption as hip-hop production moved away from the house band.
When hip-hop music composition moved from live musicians to the synthesizer and drum machine, it transitioned from a music that was performed to a music that was predominantly programmed, which transformed the notion of performance and music making within the genre. Using machines, initially the drum machine, sounds were activated by a beat maker with the simple gesture of tapping on a plastic button and programmed in a space of time to be played back immediately and reconfigured if necessary. In practice, beat makers that used drum machines, unlike the live bands that preceded them, were making (composing) and recording simultaneously (Zak 2001); as a drumbeat was being programmed it was, in essence, also being recorded into its machine. The impact of compressing the steps of the record making process was not immediately felt, but once the logic of a drum machine was combined with digital sampling there was an unavoidable adjustment in the role the commercial recording studio had in creating hip-hop’s music. In the early stage of programming drumbeats, the programming of multiple sounds was organized into sequences that served as drum accompaniment for a rapper. These sequences were typically conceived as sections of a verse-chorus form and were then arranged into a song format. “Planet Rock” is the first major hip-hop recording where the beat was imagined completely through machines.

“Planet Rock” and Electro Hip-Hop

Well if you’re looking for the perfect beat, people
Well here’s a perfect beat for ya


“The first time I heard Kraftwerk, Bam (Afrika Bambaataa) brought it to the house in 1977” (McCord 2007, 61). Soul Sonic Force emcee Mr. Biggs recounted his first hearing of
Kraftwerk to journalist Mark McCord; he was also recounting the beginning of “Planet Rock” and the electro hip-hop sound. In December of 1981, at Intergalactic Studios in Manhattan, Afrika Bambaataa, producer/engineer Arthur Baker, keyboardist John Robie, and a $30/hour drum machine programmer merged the latest electronic music instruments for popular music composition with the established practice and aesthetic of making hip-hop instrumentals.

The use of electronic instruments at different stages and in different genres of popular music is typically viewed as forward thinking and innovative. With hip-hop’s music the notion of forward thinking is appropriately attached to the use of turntables, drum machines, and samplers, but what motivated the usage of new instruments and the sounds that they produced was an inspired aesthetic that peered into past music aesthetics while accommodating new technologies. This motivation aligns with the concept of Afrofuturism as established by Mark Dery in his 1994 essay “Black to the Future.” Afrofuturism, according to Dery, relates to African-American cultural practices and products that “appropriate images of technology and a prosthetically enhanced future” (Dery 1994, 180) in the wake of a disconcerted past and the prospects of a liberated future. It is important to keep in mind that beat makers and producers generally repurposed any sound that they liked; also, beat makers in the early-to-mid 1980s created largely for black audiences whose ears and bodies were conditioned to previous black musical expressions.20 It is unclear if the utilization of new technologies while negotiating black musical heritage—a related concept of Afrofuturism—was an explicit goal for the majority of hip-hop recordists. As Bambaataa established the beat making practice for electro hip-hop, though, he and the Soulsonic Force also visually embraced Afrofuturism in their wardrobe and recording cover art that featured images of outer space and spaceships:
Imagery and the use of technology placed “Planet Rock” on an Afrofuturist aesthetic continuum that started in the 1960s and was prevalent in the work of jazz (Herbie Hancock, Miles Davis, Sun Ra), rock (Jimi Hendrix), and funk (Parliament, Earth Wind & Fire) musicians (Veal 2007). “Planet Rock,” as a recording, chronicles German electronic music’s conversion into hip-hop music intended for the black population in and outside New York City.21

Unlike the production protocol at Sugar Hill Records, Tom Silverman, the founder and head of Tommy Boy Records at the time, gave Afrika Bambaataa and producer Arthur Baker more space to be creative (Toop 2000, Charnas 2010). Silverman himself is on record stating that he saw hip-hop in the same light as other recently emerged genres of music at the time like punk and new wave (Charnas 2010). Silverman was a dance music enthusiast and founded Tommy Boy Records in 1981, releasing “Jazzy Sensation” by Afrika Bambaataa & The Jazzy 5 the same year. The production on “Jazzy Sensation” replicates that of Sugar Hill releases, with “Funky Sensation” (1981) by Gwen McCrae serving as source material. “Jazzy Sensation” sold upwards
of 40,000 records (Charnas 2010) and Bambaataa went back into the studio to work on the next record. “You know, someone was going to make the first record that heavily used machines, and it just happened to be us by virtue of the sound and the drum machine,” asserted Baker (Buskin 2008). He was very satisfied with the Queens musicians that played on “Jazzy Sensation” but understood that they could not replicate the sound of Kraftwerk that Bambaataa aspired to emulate, particularly the uncompromising rigidity of the drum rhythms.

At the time I told people that this is not a machine intended to replace drummers, it’s just another tool with the drum set … these machines can never listen to the music and respond to the dynamics and to the rubato timing and to thinking of ideas … . And candidly, I didn’t think that it would be used so much for recordings, I thought it would be mostly used for an inspirational song-writing tool.

– Linn LM-1 designer Roger Linn (Linn 2012, 08:35)

When we used them (drum machines), we didn’t try to make them sound like real instruments.

– Arthur Baker (quoted in Buskin 2008)

The intention of a creator of technology does not dictate the use of that technology, particularly since a technology can have varying spatial and temporal uses, it can be transported to unintended environments or retro-fitted for future compatibility. From Linn’s perspective, he did not envision the use of the drum machine for composition because he thought the participatory discrepancies that attract listeners to live drummers would always be more desirable to the creator and the consumer. Kraftwerk initially showed the viability of non-human
drumming and then Peter Gabriel, Prince, Phil Collins, Giorgio Moroder, Stevie Wonder, and other popular music creators exhibited the utility of programmable drum machines in creating hit records. Despite hip-hop being a late adopter of the drum machine, the genre gets much of the recognition for popularizing the technology because it seems to have been the first genre to take up the instrument as a primary, and sole, compositional tool. To reiterate, hip-hop did not radicalize the intended use of the drum machine. After other genres opened up the expectation of the sound of drum accompaniment, hip-hop embraced and expanded on the usage of the drum machine sound.

Intergalactic Studios had a Neve mixing console and a Studer 24-track tape machine to record and mix the tracks from a recording session. The studio also had a Lexicon PCM41 digital delay machine that was used to create the vocoder effect on Bambaataa’s voice at the start of the recording, and a Sony reverb or echo machine, which was used to recreate the airy quality of Kraftwerk’s records (Buskin 2008). When “Planet Rock” was recorded, the Roland TR-808 was less than a year old and the studio had yet to invest in one, “[S]o I looked in the Village Voice and saw an ad stating, ‘Man with drum machine, $30 a session.’ His name was Joe and he had an 808, so we paid him to come in and do the beats,” recalled Baker (ibid.). With the 808 and someone who knew how to operate it in tow, Bambaataa directed the production of the instrumental more than he actually performed or programmed. Bambaataa was a deejay but the track did not use turntables, therefore, it was his knowledge of records and what he knew was popular that was channeled into the creation of the beat. Bambaataa and Baker had Joe program two patterns into the TR-808 that communicated the nexus between German electronic music and hip-hop in the Bronx.
Soul Sonic Force member DJ Jazzy Jay disclosed that “Planet Rock” was based on a rap routine that they did to “Trans-Europe Express” (1977), “Numbers” (1981), and “Super Sporm.” The first two records are by Kraftwerk, while the latter was a 1978 R&B/funk record by Captain Sky that featured a break used by Bambaataa when deejaying. Outside of his embracing of Afrofuturism, from accounts of the recording sessions it appears that Bambaataa wanted to recreate “Trans-Europe Express” because its tempo, 108 bpm, was more in line with rap records at the time. Baker lived in Brooklyn at the time and, when he heard Kraftwerk’s “Numbers” playing at Music Factory, a record store on Fulton Street, he wanted to use its drum pattern at its tempo, 128 bpm (ibid.); the tempo of “Planet Rock” is 127 bpm. Figure 2-12 is the main drum pattern from “Numbers,” heard at the 02:21 mark.

![Fig. 2-12: Main drum pattern from Kraftwerk’s “Numbers” (1981) with accompanying waveform labeling](image)

Baker played “Numbers” for session drum programmer Joe and requested that he recreate the beat in the TR-808. Figure 2-13 is the initial drum pattern for “Planet Rock,” as heard at 01:16. Interestingly, and fortunately for the producers of “Planet Rock,” the main drum pattern from “Numbers” was only two-bars long, a perfect length for the memory limitations of the TR-808.
Fig. 2-13: Initial (A) drum pattern from “Planet Rock” (1982) with accompanying waveform labeling

From a programming perspective, Joe was able to use the 16-steps to program both bars of the kick and snare loops from “Numbers,” but only one bar of the hi-hat loop, with its many 16th notes, could fit into the 16-steps. Figure 2-14 visualizes the asymmetry of the different loops, as a one-bar hi-hat pattern was looped against the two-bar kick and snare patterns. In a sequencer it is not necessary for layered loops to be of the same duration, and many times auxiliary parts (e.g., hi-hat, tambourine, shaker) are looped in shorter durations than a kick or bass line.

Fig. 2-14: Drum programming arrangement of “Planet Rock” (1982)
The recreation of the electronic drum pattern from “Numbers” is more recognizable to people that know “Planet Rock,” but the other drum pattern in the record (first heard at 02:51) is compelling because it was a recreation of a live drummer’s drum break. Bambaataa requested that Joe recreate the drum break to “Super Sporm,” which is first heard at 04:56 of the almost twelve-minute recording and closes out the record. In figure 2-15 I have displayed the two-bar rhythm of the drum break, heard at 05:00.

Fig. 2-15: Drum break from “Super Sporm” (1978) at 05:00 with beat annotations and accompanying waveform labeling

In the wavelength representation of the rhythm I have overlaid lines at sixteenth note pulses where there is a primary rhythmic attack from the kick or the snare. There is no label for hi-hat attacks because the waveform for the hi-hat is not unlike that for the hand clap, which is somewhat improvised throughout the length of the break; in addition, the kick and the snare give the rhythm most of its character and groove. As this is an analysis—positivist to some degree—of a recorded human performance, I have made the assumption that the kick the drummer plays at the beginning of the two-bar ostinato is intended to fall perfectly on the first beat. Therefore, the attacks that occur after the start of the ostinato are in relation to the first downbeat. Looking at the sixteenth notes near the important percussive attacks, it is apparent that Captain Sky’s
drummer played slightly behind the beat in the first bar and then on top of the beat by the second bar (keep in mind this is only one performance of the ostinato). In his research on the presence and pertinence of groove, ethnomusicologist Charles Keil (1994) accurately stated that the sort of “out of timeness” performed in “Super Sporm” is what gives music like funk-style R&B its “vital drive” and invites participation, which, for this song, would probably be dancing. But what happens when machines eliminate the rhythmic discrepancies that create the vital drive? Figure 2-16 is Joe’s programming of the “Super Sporm” drum break for “Planet Rock.”

**Fig. 2-16: Second (B) drum pattern from “Planet Rock” with beat annotations and accompanying waveform labeling**

The step editor on the TR-808 was designed for rhythmic precision, and the sixteenth-note attacks are impeccable. There are also two extra kicks added at the tail end of the second bar, giving the programmed groove a bounce that later became the foundation for Miami bass music. The drums on “Planet Rock” were rigid but syncopated—the kick sparingly hit a downbeat in either of the two patterns. In addition, they were more rhythmically austere than the previous rhythms heard in hip-hop’s music, mostly breakbeats and live drumming. Regardless, the overall impression of rigidity and robotic-ness was hugely popular. A testament to the inconsequential removal of rhythmic discrepancy was that breakdancers responded to “Planet Rock” with more
deliberate body movements that synced up with the precision of electro rhythms, including the incorporation of “popping” and “locking” techniques from Los Angeles.

John Robie, who was recruited to contribute to the record after Bambaataa discovered it was he playing synthesizer on a record that he liked, provided the synthesizer sounds heard on “Planet Rock.” The Fairlight CMI, a very expensive sample-based synthesizer that expanded the sonic palette of hip-hop to include extra-musical sounds, provided all of the sound effects (the famous configuration of the ORCH5 sound [Fink 2007], orchestra hits, explosions, and laser-like sounds). This was a practice that was soon adopted for the creation of Grandmaster Flash and the Furious Five’s “The Message.” Bambaataa and Baker had access to the $25,000 machine because the studio had invested in one. Robie brought his personal Micromoog and Prophet 5 for the session. The Micromoog provided the bass, which is a bass thump on the note ‘B’ that rhythmically aligns with the kick drum pattern. The Prophet 5 is heard prominently at 01:43 when the exact synthesizer phrase from “Trans-Europe Express” (audible at 01:33) follows the first lyrical verse.

Robie’s synthesizer parts were not sequenced; what is heard on “Planet Rock” is his live synthesizer playing through the console onto the 24-track Studer recorder. Unlike the TR-808, though, Robie’s playing was ahead of the desired tempo. To get the parts to sync up they slowed down the tape recording of the synthesizer lines (Buskin 2008). While hip-hop production generally continued as a machine-based practice, the interaction between live performance and mechanical programming was/is prominent and in this period has to be acknowledged because it reveals interesting ways that hip-hop recordists used technology to facilitate the sound products from each process. While not confirmed by anyone present during the recording of “Planet Rock,” but relevant considering the need to slow down the synthesizer parts, it is thus not a
coincidence that “Planet Rock” (in B minor) is a semi-tone lower than its instrumental inspiration “Trans-Europe Express” (in C minor).

In *How Musical is Man?* (1973), anthropologist John Blacking pushed for understanding a musical system through the context of user creation. In particularly, he deemed it useful to understand how the structure and capabilities of an instrument influence creation. Blacking presented the fact that French romantic composer Hector Berlioz worked out harmonic progressions on a guitar as a means for approaching an analysis of the structural parts of the composer’s works (1973, 21). With regard to this stage of hip-hop production, specifically the drum parts in “Planet Rock,” the user controls and memory limitations of the TR-808 impacted the composition of the record: the song is structured by limitations in the use of TR-808 drum patterns. The machine could only switch between two programmed beats and offered the user a toggle switch to go from pattern “A” to pattern “B.” During the recording of the instrumental, the first physical switch to the “B” drum pattern occurs at 02:49 and lasts for thirty bars before returning to the “A” pattern. The “B” pattern finishes up the song. Interestingly, though perhaps unrelated, when the song first moves to pattern “B” the synthesizer parts also move up a fourth.

“Planet Rock” was released in the spring of 1982. Some believed that the song was so disparate from previous rap records that “it was hard to believe anybody would buy it” (Toop 2000, 131). The record was certified gold (500,000 sold copies) by September 1982 (Charnas 2010). People did buy it, and the electronic sound created by Kraftwerk and fused with hip-hop using the TR-808 soon became integrated with the sound of dance music all over the country (Cooper in Bogdanov 2003). Breakbeats, disco break instrumentals, and the electro sound were all dominant sounds within hip-hop in the span of roughly six years; the ephemeral nature of hip-hop meant that electro did not have much longevity and only produced a few artists and hits in
New York City, the center of the hip-hop world at the time. Grandmaster Flash and The Furious Five had electro success later in 1982 with “The Message,” an instrumental crafted by Wood, Brass, and Steel percussionist Ed Fletcher and keyboardist Reggie Griffin using an Oberheim DMX drum machine and Prophet 5 synthesizer, respectively (Charnas 2010). “The Message” kept the rigid rhythm aesthetic from “Planet Rock,” but at a much slower tempo (100 bpm), and more emphasis was given to Melle Mel’s renowned lyrics about life in the ghettos of New York City.

Many electro hip-hop records featured the rigid, sequenced drum rhythms heard on “Planet Rock.” “Jam On Revenge” (1983) by Brooklyn-based group Newcleus, was an exception. Cozmo D (Ben Cenal), founder of Newcleus and the DJ crew Jam-On Production, began experimenting with a cheap synthesizer and drum machine in 1980. In 1982, he began collaborating with Chilly B (Bob Crafton) and they created a funky electro hit with even more of a dance groove than “Planet Rock” (Windmill 2008). The tempo of “Jam On Revenge” is 110 bpm, which was slower than most dance-based electro records. But once the slap bass starts to thump around the robotic pulse of the drum machine one’s body cannot help but lock into the groove. Additionally, the one-bar, programmed kick pattern (fig. 2-17) has a lot of rhythmic drive, with five consecutive sixteenth-note attacks at the end of the bar after a more reserved kick placement in the first half; a building of rhythmic tension at the end of the bar that is subsequently released as the loop begins again. “Jam On Revenge” was a Top 40 hit on the Billboard R&B charts (ibid.); this was a feat that was not accomplished by “Planet Rock” and qualified the record’s dance credentials among black consumers.
To Los Angeles, With Computer Love

Comparable to “Rapper’s Delight,” “Planet Rock” commanded the hip-hop world. Dance floors and radio stations in New York City kept the record in constant rotation and with an expanding hip-hop market due to the success of Sugar Hill Records, Los Angeles, Miami, and many places in between also frequently played the record (Charnas 2010). Unlike “Rapper’s Delight,” though, as “Planet Rock” spread around the country it was associated with a dance familiar to those in the Bronx, break dancing. The more popular the song became, the more there were kids around the country spinning on different parts of their bodies (McCord 2007). As Ice-T referenced earlier, initially break dancing was more popular than rapping. “Planet Rock” fed the thirst for break dancing in Los Angeles but it also impacted the sound of hip-hop records after the first wave of Rapper’s Rapp recordings.
So about ‘83, ‘84, ‘85 the West Coast started like an electro beat, kind of based off of “Planet Rock” and—who are those cats out of Germany (thinking), Kraftwerk. So the West Coast got known for its early electro sound and, you know, it was Unknown DJ and the World Class Wreckin’ Cru, Egyptian Lover, people like that.

–DJ Flash (phone interview with author, September 13, 2011)

As a creator of drum machines Roger Linn did not expect electronic rhythms to replace actual drummers, but that is precisely what occurred at Rapper’s Rapp. Black Diamond, the house band at Rapper’s Rapp, was initially replaced by producer Rich Cason and then the in-house deejays, like DJ Flash, started learning how to use drum machines to program beats. Cason used the Roland TR-808 and a Yamaha DX7 to produce the 1984 parade of electro records released by Rapper’s Rapp: “Planet Earth” by Dark Star; “Radio Activity Rapp” by MC Fosty and Lovin’ C; and “We Are the Future” by Future MCs. As DJ Flash revealed in the above quote, though, electro started in California in 1983. Egyptian Lover (Greg J. Broussard) was a deejay in the mobile deejay group Uncle Jamm’s Army and was the first deejay/performance artist from the group to pursue a solo recording career. In 1983, he released “Egypt Egypt,” which was the record that changed the sonic trajectory of hip-hop in the region. The co-founder of Uncle Jamm’s Army, Mr. Prinze (Roger Clayton), explained that in 1982 Egyptian Lover started programming drumbeats for the group’s live performances (Clayton 2006). That acquired skill made it easier for him to transition to making records, and for his first single he used many of the components from “Planet Rock.” When “Egypt Egypt” begins the ear is drawn to the vocoder sound of Egyptian Lover’s voice and the layered sound of his heavy, sensual breathing, but beneath the vocal lines is the exact “A” drum pattern from “Planet Rock” (fig. 2-13), which
came from Kraftwerk’s “Numbers.” Very quickly, at 0:27, a slight variation of the “B” pattern from “Planet Rock” enters for four bars. The variation—the third kick in the first bar moves from the second half of beat two to the down beat of beat three—makes it seem as if Egyptian Lover made a mistake when trying to program the “Planet Rock” beat. Regardless, the use of those drum patterns, particularly the “A” pattern, solidified the status of that rhythm as a hip-hop and electronic dance music staple from coast to coast. Outside of “The Message” (1982), most hip-hop recordings were made for club dancing. While the Detroit techno and Chicago house scenes institutionalized the ‘four on the floor’ kick pattern with a persistent off-beat open hi-hat (the “ump-tsk-ump-tsk” club thump), the drum pattern from “Numbers” is the ubiquitous sound of electronically programmed dance music, particularly among black communities in the southern region of the U.S.

The use of drum patterns from “Planet Rock” shows the impact of that song as a model for Egyptian Lover, but the main synthesizer statement in “Egypt Egypt” provides even more evidence. Figure 2-18 (top) is the synthesizer statement that “Planet Rock” appropriated from “Trans-Europe Express.” Figure 2-18 (bottom) is the transformation of that statement in “Egypt Egypt.” The first bar of each statement has the same rhythm and melodic topography and each melodic segment ends with a long held note on the tonic. The apparent difference is that the “Egypt Egypt” statement is double the “Planet Rock” statement, which is appropriate considering the statement is heard for the majority of the record, while the four-bar statement from “Planet Rock” has a more secondary status.
Electro hip-hop had a longer run of significance in California (approx. 1983-1988) than its East Coast counterpart. There were even records released in California with deejays cutting and scratching over electro beats; “Surgery” (1984) by the World Class Wreckin’ Cru featured future hip-hop production luminary Dr. Dre scratching over a very “Planet Rock”-esque beat. In New York City, though, there was still a contingent that believed that what excited Bronx crowds in the 1970s had yet to be matched on commercial hip-hop recordings.

**Drums, No Chaser**

Drum machines and synthesizers clearly reordered the understanding of recorded hip-hop. In the recording studio, producers of electro hip-hop used electronic instruments to flex their creative autonomy beyond the hierarchical constraints of Sugar Hill Records, Enjoy Records, Spring Records, and Rapper’s Rapp Disco Company. Deejays continued to develop the craft of turntablism, but between 1979 and 1984 their position in the record studio was less prominent. Scratching and cutting were featured on some electro hip-hop records but the actual
sound of the beats was not indicative of what deejays were doing at dance clubs. In fact, having the name “Grandmaster Flash and the Furious Five” attached to recordings like “The Message,” “New York, New York” (1983), and “White Lines” (1983) is deceptive because Grandmaster Flash was removed from the production process once the group was purchased from Enjoy Records by Sugar Hill Records in 1980 (Grandmaster Flash 2008, Charnas 2010). In his book on the history of the hip-hop recording industry, *The Big Payback: The History of the Business of Hip-Hop* (2010), journalist and former record executive Dan Charnas paraphrased early 1980s hip-hop promoter and manager Russell Simmons’ contemporaneous response to the first four years of recorded hip-hop: “Rap shouldn’t sound like disco. And it shouldn’t sound like new-wave synth pop, either. Rap should sound like itself” (89).

The labeling “real hip-hop” is an exercise that has been a component of hip-hop culture since the genre became a recorded commodity with varying market value, and especially when it started being recorded outside of New York City and embraced by major recording labels. With several prominent personalities and agendas—many that have been as ephemeral as the sound of the music—engaging in the qualitative assessment of the different sounds of hip-hop, the notion of what “real hip-hop” is has been fluid, adjusting to generational and regional interests. In considering the many references to “real hip-hop” from my friends, colleagues, consultants, and in my research, I’ve concluded that “real hip-hop” is related to the ability of a certain sound of hip-hop to appeal to a black, urban, lower-to-working-class demographic, i.e. the ‘hood, or a hip-hop enthusiast that has engaged the history and practice of hip-hop culture with integrity. What some insist is “real hip-hop”—made for and by the ‘hood—though, is never static or homogeneous and is, to those from the ‘hood that qualify the judgmental label, also related to whether a certain sound appeals to casual hip-hop consumers or people not bred in the ‘hood.
Thus, the socio-cultural value of the label “real hip-hop” increased when the popularity and commercial viability of the genre truly began to overwhelm and distort much of the discussion about aesthetic authenticity. To reprise earlier ideas in relation to Simmons’ statement above, there were deejays and rappers who were full supporters of disco music and electronic music from Kraftwerk. Disco and synth pop, while not suggestive of the principal sound of breakbeats, were legitimate expressions of the hodgepodge of hip-hop’s aesthetic absorptions.

In lieu of Simmons’ statement, which expressed a sentiment shared by Rick Rubin (Adler 2010a), Marley Marl (Weisfeld 2007), and Bob Power (pers. comm.), it is appropriate to re-quote a statement made by Grandmaster Flash: “Drums. A little bass. That’s it. That’s the break. Fuck the melody, forget the chorus, and leave the verses alone; we’re talking about the pure rhythmic groove” (emphasis in original; Grandmaster Flash 2008, 47). Subsequent to electro hip-hop’s popularity both Simmons and Rick Rubin, an NYU student/independent label owner by 1982, employed the drum machine towards a minimalist sound more attuned to urban streets than discotheques or Afrofuturistic imagery.

In 1983, Simmons enlisted Larry Smith, the bassist and leader of Orange Krush, the house band heard on “Christmas Rappin’,” to co-produce records for his younger brother and his friend. That year the first two-sided single from Run-D.M.C., “It’s Like That” backed with (b/w) “Sucker MCs,” was released. While electro beats surrounded the fundamental drum machine parts with various electronic auxiliary parts, Run-D.M.C.’s beats privileged percussion and established an aesthetic of hip-hop production that is still aspired to today, a hard beat—an aspect of a beat composition qualified by the visceral impact of the drum programming in regard to sound engineering and rhythm. After spending time in studios and attending beat battles, I have recognized that a hard beat is a prerequisite for a hip-hop beat to be really popular. If the
kick and snare parts do not have a sonic, gut-shifting punch, whatever else is happening in the beat cannot redeem the beat in the eyes of other beat makers. Hard beats are an aesthetic goal for hip-hop producers that results from chosen drum sounds and how those sounds are altered during the mixing process: their spacial position in the mix, how they are equalized, and their predominance within a frequency range. Each side of Run-D.M.C.’s first single featured the digital drum sounds from the Oberheim DMX (fig. 2-19). “It’s Like That,” though, with sparse synthesizer stabs from a Prophet 5, resembled the sound of “The Message.” “Sucker MCs” was more of a novel sound for a hip-hop record in 1984, with a hard beat unimpeded by any other sound.

Fig. 2-19: Oberheim DMX Drum Machine (rel. 1980)

(Cropped images from http://switchedonaustin.com/products/oberheim-dmx)

The drums in “Sucker MCs” are in the center of the sound field of the recording. By 1983, stereo recording had been around for more than twenty years and many producers and engineers had resorted to placing the drum track in either the left field or the right field of the stereo sound image. While hip-hop recordings were in stereo, the drum track occupied the center of the stereo field. I have been around producers that place their kick and snare sounds on individual mono tracks to ensure that the sonic force of those drum sounds is unconditionally directed at the
listener. An additional equalizing technique is to ensure that the kick and snare solely respond at their respective frequencies and do not have to compete with other sounds. Figure 2-20 is a parametric equalizer representation of the first kick sound from “Sucker MCs”:

Fig. 2-20: Parametric equalizer representation of kick from “Sucker MCs” (1983)

The core frequencies of low frequency sounds (kick drums and basses) typically respond at a frequency between 60hz and 100hz. In “Sucker MCs” the highest amplitude the Oberheim DMX kick responds at is 80hz and it automatically or, if done by the mix or mastering engineer, manually has a shelf around 140hz. Without a bass line in the song, the kick frequencies are unimpeded. The other frequency responses seen in figure 2-20 are the crash cymbal, the middle range frequencies from the kick, and the decay from the snare hits that introduce the song. In figure 2-21 we can see that the snare is also predominant within its range simply because of how acute the visualized curve is. If there were other sounds in that range the curve would have been wider. This technical discussion is meant to support an understanding that there were frequency considerations made when Russell Simmons demanded a sonic reordering for the sound of hip-hop.
With respect to the production of Run-D.M.C.’s first recordings, bassist and producer Larry Smith stated, “But if I had had the budget, I would have hired live performers on the whole first Run-D.M.C. album” (quoted in Coleman 2006, 24). The inclusion of a bass or guitar part would have had an impact on the sonic presence of the kick and snare parts. Without extra parts the hard beat and the rappers were highlighted.

The minimalist, drum-focused aesthetic, and even the drum rhythm, of “Sucker MCs” and other tracks off of Run-D.M.C.’s eponymous debut album from 1984 have been attributed to rock, particularly punk rock, records from the early 1980s. “Back in Black” by AC/DC and “The Big Beat” (1982) by Billy Squier are cited as precursors to Run-D.M.C.’s sound (George 1998; Toop 2000). “The Big Beat” featured a drum break that Bambaataa was known to play while deejaying (Toop 2000). Before producing Run-D.M.C., Simmons and Smith were involved with several R&B artists and Kurtis Blow. Hip-hop in the clubs and block parties in the Bronx was raw energy inspired by the raw rhythms from breakbeats. Thus, it is appropriate that Simmons and Rick Rubin, a member of the early 1980s punk rock band Hose, looked to punk rock as a template to unleash hip-hop from the grasp of disco and electronic music. The drum rhythm from “Sucker MCs,” a seminal one in hip-hop production history, though, cannot be attributed to “The Big Beat” despite their similarity in feel and groove. As a member of Orange Krush, Smith
played on and produced “Action” (1982), the only recording released by the studio band. When
Smith started work on the beats for Run-D.M.C. he ostensibly recreated the drums from
“Action” on the Oberheim DMX to make “Sucker MCs”; figure 2-20 visualizes the beginning of
each recording:

Fig. 2-22: Introductory drum patterns from “Action” (1982) (top) and “Sucker MCs”
(1983) (bottom)

The first set of brackets displays the one-bar introduction from each recording; the increasing
volume in “Action” (top line) is a result of the crescendo played by a human drummer through
the eight hi-hat attacks. In contrast, eight identical, electronic snare hits introduce “Sucker MCs”
(bottom line). The second set of brackets displays the main rhythm of the song, which was made
denser in “Sucker MCs” with the inclusion of hand claps. The final set of brackets shows the
drum cadence that is heard at the end of each four-bar ostinato. The four-bar ostinato was also a
first for hip-hop as most electro drum patterns were two bars long. “Sucker MCs” is another
example of the conversion of a live drum part into an electronic one, a compositional aesthetic
that was popular in hip-hop until samplers had the memory capability to capture an entire drum
performance. What is special in this case is that the beat maker converting the live drum, Larry
Smith, was involved in the recording of each drum part and, along with Simmons, made an effort
to make the electronic version more reminiscent of the sonic energy emitted from deejay breakbeats. Their experimentation with the sound of hip-hop was successful, at least to the ears of Rick Rubin: “They’d (the first hip-hop recordings) be good dance records—a band making music and guys rapping—but they wouldn’t be good hip-hop records. Where was the DJ—the thing that makes it special?! The first good hip-hop recording I heard was “Sucker M.C.’s” by Run-D.M.C. and that was late” (emphasis in original: quoted in Adler 2010a, 26).

**Rocking Without a Band**

“It was incredible. Larry Smith gave them that little rock edge that kind of made them a little different than anybody else at that time. But we always had classic rock records in hip-hop and they were one of the first to have it produced by Larry Smith,” affirmed Smith collaborator Davey DMX (quoted in Chuck D 2011). “Sucker MCs” (1983) inaugurated a new sound of recorded hip-hop that was reinforced in 1984 with the release of *Run-D.M.C.*—the first full-length hip-hop recording of rappers—and the first recordings from Rick Rubin’s independent label Def Jam Recordings. Rock music had featured in the sound of hip-hop’s music since Bambaataa used the breaks from “Mellow Yellow” (1966) by Donovan and “Mary, Mary” (1968) by the Monkees. The drums in “Sucker MCs” suggest a connection to rock music, but it was Run-D.M.C.’s third single, “Rock Box,” that made rock an explicit component of recorded hip-hop.

Simmons and Smith made those first Run-D.M.C. recordings on a low budget (Coleman 2006), which made it difficult for Smith to assemble a live ensemble. Nevertheless, after they heard Riot, a contemporaneous rock band, recording loudly with distorted guitars in an adjacent studio at Greene Street Studios, Smith enlisted his friend Eddie Martinez to record some
distorted guitar over a programmed drum beat to get the loud sound associated with 1980s rock (Adler 2002). The electric guitar was the predominant icon for rock music in the 1980s (Walser 1993) and “Rock Box” was the first attempt to integrate the distorted sound aesthetic into hip-hop. Additionally, the beat for “Rock Box” followed the path that began with “Sucker MCs” and tempered the syncopated kick drum rhythm that was heard in several electro hip-hop records. The kick pattern imitated the bass drum of many rock drummers: the first and third beats are played strongly with the third beat including a pair of straight eighth notes, resulting in a hard, direct drum beat. In “Planet Rock,” the syncopation is continuous in the kick drum rhythm as offbeats are attacked more than strong beats. In “Rock Box,” syncopation is scarce, and the scarcity of the syncopation is more prominent because of the slower tempo, 100 bpm, down from 127 bpm in “Planet Rock.” With these changes to the rhythm and the tempo, hip-hop music was no longer solely dance music. While dancing is not restricted to faster tempos syncopated rhythms, the sounds that Smith and Simmons constructed for “Rock Box” and other Run-D.M.C. records were predominantly platforms for Run (Joseph Simmons) and D.M.C.’s (Daryl McDaniels) lyrical abilities.

The use of rock music’s sound and iconicity by the producers of Run-D.M.C. does not appear to have been done with hip-hop’s marketability in mind. Everyone involved wanted to pare down the sound of electro and be as sonically intimidating as the loudest rock recording. But while their goals for the use of rock were more focused on their sound, using rock meant that what they created could prospectively attract the ears of people not familiar or enamored with hip-hop music. DJ Flash shared with me that he and King MC used the rock recording “State of Shock” (1984) by the Jacksons featuring Michael Jackson and Mick Jagger to create one of their records for extra-musical reasons:
He (King MC) wanted to do ‘State of Shock’ with Michael Jackson and I think it was—I’m not sure if it was Mick Jagger . . . So we said alright, we would try that; we were actually trying to get more of a white audience to follow rap, so he wanted to do the “State of Shock Rapp” (1984). (phone interview with author, September 13, 2011)

King MC and DJ Flash were on the right path, but it was Run-D.M.C. that truly succeeded with that idea when Rick Rubin became the lead producer on their third album, *Raising Hell* (1986), and got them in the studio with Aerosmith to recreate “Walk This Way.”

**Turntables in the Studio**

Taking a record that’s already made
With the help of a mix board, using the crossfade
—T La Rock, “It’s Yours” (1984)

While the drum machine became the prominent instrument in the creation of recorded hip-hop, turntables were not to be left out of the hip-hop mechanical band. The third member of Run-D.M.C. was Jam Master Jay (Jason Mizell), who was heard briefly on “Sucker MCs” and “Rock Box.” In “Sucker MCs” Jam Master Jay was heard scratching for two bars at 0:54, in the middle of Run’s verse, and during the first four bars of D.M.C.’s verse at 02:15. In “Rock Box,” Run and D.M.C. introduced Jam Master Jay, “Our deejay’s better than all these bands,” and at 03:01 he scratched over the beat for four bars. On the full-length album *Run-D.M.C.* (1984) Jay received two tracks, “Jam-Master Jay” and “Jay’s Game,” to display his turntable skills; however, these tracks did not have the profile of the popular singles. Accordingly, when
Simmons stated, “Rap should sound like rap,” he was literally and actually not heralding the deejay.

In the early 1980s, Rick Rubin chose to study at NYU instead of the University of Chicago because of his preference for the music scene in New York City (Adler 2010a). Punk rock was one attractive facet of the city and hip-hop was the other. One of Rubin’s favorite deejays was Jazzy Jay (John M. Byas)—a disciple of Bambaataa who was a member of the Jazzy Five—and when he needed a deejay to feature on the first single for his independent hip-hop company, he had Jazzy Jay lay down some scratches. Rubin had a Roland TR-808 in his NYU dorm room/record company office/music production space. He programmed beats that ended up on records by LL Cool J, the Beastie Boys, and other rappers on Def Jam. After recruiting rapper T La Rock (Clarence Keaton) when he could not get well-known rapper Kool Moe Dee from the Treacherous Three, Rubin opened up his dorm room to T La Rock and allowed the rapper to start working on his demo (ibid.). The result was “It’s Yours,” the 1984 single that featured the TR-808 but also the full integration of deejay techniques.

The record began with Jazzy Jay scratching an instrumental break from “I Like Funky Music,” a 1979 disco record by Uncle Louie. The instrumental break (fig. 2-23) occurs at 02:26 and features five horn hits. “It’s Yours,” similar to “Sucker MCs,” had a hard beat with prominent kick and snare parts. But unlike “Sucker MCs,” “It’s Yours” had non-percussion components that were supplied by the horn hits from “I Like Funky Music” (large brackets in fig. 2-23):
At the beginning of the track Jazzy Jay played the entire instrumental break, but throughout the song he mostly exploited the first horn hit (small brackets in fig. 2-23), which allowed him the flexibility to use the rest of the break when necessary. Remember, he did this with his hands and quickly getting back to the beginning of a short segment of a recording was a dexterous task. With the horn hit completely under his control on the turntable, Jazzy Jay rhythmically scratched the horn hit in sync with the other components of the composition. Jazzy Jay is highlighted throughout the song—more than Jam Master Jay was in the early Run-D.M.C. singles. Figure 2-24 shows how Jazzy Jay “performed” the horn hit and how Rick Rubin arranged the transition from T La Rock rapping over the drum beat to Jazzy Jay’s solo scratching. The section displayed in figure 2-24 is a noteworthy moment in the song because the end of Jazzy Jay’s two-bar scratching solo sets up T La Rock to say the tagline of the record, “It’s yours.”
Fig. 2-24: Beat annotations and accompanying waveform labeling of “It’s Yours” (1984) by T La Rock audible at 01:00

Additionally, in figure 2-24, particularly bars two and three where Jazzy Jay is heard solo, we can see that while Jazzy Jay is using the horn hit from “I Like Funky Music” to play a syncopated groove against the established pulse, he inserts rhythmic scratches at the end of bar two and in the second half of bar three to ornament the horn hit. The rhythmic scratches are too short to make out any semblance of the recording being used on the turntable but are excellent as a percussive attack. Looking closer at the highlighted waveforms in figure 2-24 we can see that there are two peaks. Each peak represents the sound from the forward and back motion of moving the record while the needle is touching and shows the rhythmic placement of the scratches Jazzy Jay performed. “It’s Yours” is well known for the inspirational and multi-syllabic words rhymed by T La Rock, but it should also be acknowledged as having truly put the deejay on equal footing in the recording studio with the rapper.

Besides Run-D.M.C. and T La Rock, Simmons, Smith, and Rubin’s hard beat/distorted guitar/deejay scratch sound was heard on the recordings of other Def Jam artists during this period. In 1985 and 1986, Rubin produced the debut albums of LL Cool J (Radio) and the Beastie Boys (License to Ill), respectively. Both albums, and the singles released from each,
extended the sound established on the recordings by Run-D.M.C. and T La Rock before the wave of sampler-created hip-hop beats modified the sound of hip-hop and the process of making hip-hop beats. The hard beats of Run-D.M.C. and the rhythms they produced were products of available drum machines and the progressive preferences in every hip-hop recording studio where what was contemporary was aging. In this setting, where auxiliary sounds were less valued, the deejay assumed a prominent role in the recording studio after having been supplanted by the rapper in 1979.

**Conclusion: The Beat Maker as Digital Musician**

From the first field holler in a southern field to the unorthodox saxophone honking in rhythm and blues, popular music expressions by poor and working class black people in the U.S. were looked upon as primordial or uncultivated and vulgar. The variety of black music practices was seen as not reflecting aspects of contemporary times and in need of refinement, even by some affluent black people who expressed an understanding of how to make black popular culture equal to the culture of refined Euro-Americans (Locke 1968). Hip-hop’s music could not be criticized for not being contemporary because its creators utilized the latest technologies (turntable mixer, synthesizer, drum machine). Therefore, most of the early discourse about hip-hop’s music—shaped by skeptical musicians from previous popular music genres like rock and R&B and intransigent music critics and scholars—constructed it as not music, in the sense that it lacked any recognizable musicality in the areas of composition and performance.
A digital musician is one who has embraced the possibilities opened up by new technologies, in particular the potential of the computer for exploring, storing, manipulating and processing sound, and the development of numerous other digital tools and devices which enable musical invention and discovery.

–Andrew Hugill (2008, 4)

By 1984 the composition of hip-hop beats privileged electronic instruments whose usage was not modeled after acoustic predecessors, i.e. the electric guitar or keyboard synthesizer. Thus, the hip-hop beat maker and producer was slowly forming into a digital musician with a different set of musical priorities. While many popular music composers and musicians utilized technology and digital tools, according to Hugill (2008), that did not necessarily make them “digital musicians.” To be classified as digital musicians composers or musicians needed to completely conceive of their craft through the capabilities (and limitations) of technology and digital tools. With the drum machine and turntables as the predominant tools for creation, hip-hop beat makers and producers took a total creative plunge into the space of technological composition that was more frequented by experimental composers. Sequencers and drum machines proposed programming and automation as substitutes for the typical acts of composition and performance, and consequently called into question the musical aptitude of those who used them directly for creating and not simply as an aid for creation. The skepticism about musicality was especially potent when it could be assumed that the makers of hip-hop’s music were young and black—despite the reality of the diverse personnel in recording studios. Programming sounds and automation, though, were the means to achieving sound and groove
aesthetics evocative of German electronic music, and in the promotion of hard beats that happened to be facilitated through a drum machine.

Kool Herc and Flash’s manipulation of two turntables established vinyl recordings as more than just an end product and made sections of recordings into independent musical entities. Beat makers’ use of drum machines set two precedents for the sound of hip-hop. First, though many beat makers started making hip-hop music as deejays, a person interested in making beats did not have to be a deejay to start making hip-hop music on a drum machine—Larry Smith was not a deejay nor was Mantronix. Second, because a drum machine could play an abundance of attacks with multiple layers at a perpetually fast tempo, listeners had to quickly suspend their disbelief in reference to the actual physical abilities of a human drummer. The second precedent became more important once drum loop samples and drum programming were layered on a beat.

The shock of a new sound in recorded hip-hop should have lost some force by the mid-1980s as the multiple sounds that grew from the practice of record exploration and manipulation began to grow in number. The introduction of new technology for sound sampling and the adoption of sampling as a beat making practice, though, ensured the continuation of the creative development of hip-hop’s music.
Chapter 3 – The Past’s Presence is the Future:
The Sampler and the Common Practice of Hip-Hop Beat Making

[F]or the first time in world history, mechanical reproduction emancipates the work of art from its parasitical dependence on ritual. To an even greater degree the work of art reproduced becomes the work of art designed for reproducibility.

–Walter Benjamin (2006, 23)

Benjamin’s 1936 essay “The Work of Art in the Age of Mechanical Reproduction” was keen in its assessment of what the Industrial Revolution sowed for artistic endeavors and how the subsequent products of and societal behaviors prompted by mechanically reproduced art would dissolve certain structures of capitalism. He focused his examination on the visual arts (painting, photography, film) and his argument was initially influential amongst cultural studies scholars and media theorists. The wave of electronic instruments and processes in popular music genres in the late-twentieth century, though, resulted in music scholars relating and extending Benjamin’s arguments to the mechanical reproduction of music (phonographs and radios), with an additional focus on the mechanical production of music (synthesizers and mixing boards) (Théberge 1997, Taylor 2001, Meintjes 2003, Veal 2007, Katz 2010). Despite the continued relevance of Benjamin’s ideas, it is proper to assume that Benjamin never envisioned Grandmaster Flash’s techniques on turntables.

In the quote above, Benjamin argues that the art that becomes reproduced will eventually become designed for reproducibility. Those in attendance at a local party could only experience what deejays in the Bronx were creating with duplicate copies of a vinyl recording, turntables, and a mixer. What Benjamin designates as the “aura” of those deejay sets remained undisturbed as the space (community center, park, dance club) and the participants (particularly break
dancers) combined and contributed to what hip-hop music was at that particular time. Amateur cassette recordings initially disrupted the original or authentic presence of deejays’ creations, spreading the sounds and spaces of hip-hop music to other boroughs and a few domestic and international areas. Despite the transport of amateur cassettes, there were still a negligible number of people who actually experienced what street deejays were doing—even as those cassettes led to new, local deejays throwing parties and aligning their sound with local spaces and hip-hop practitioners. The first commercial recordings of hip-hop’s music, as discussed in Chapter Two, were not reproductions of the more profound deejay creations in the 1970s Bronx; however, the related practice of rapping enabled those recordings to be associated with the term hip-hop. Once commercial hip-hop recordings began transmitting original performances of deejays—albeit from a recording studio—and a deejay’s technical creation was made available through mass produced recordings of Run-D.M.C and LL Cool J, what the deejay did on a turntable became a reproduced art. As such, the techniques of the deejay were susceptible to redesign in order to become more easily reproduced within the musical culture. Coincidentally, advances in micro processing technology and the expanding sound aesthetics of aspirational computer engineers and innovators resulted in the sampler. Regardless of how many people got a set of turntables and a mixer during the blackout of 1977, the adroit physical techniques of the best deejays could not be duplicated by everyone, but the physical act of chopping and arranging an audio sample of music to get the sonic results a deejay produced with turntables conceivably could be, and was done by any person who could gain access to a sampler.23

In the subsequent line following the quote that begins this chapter, Benjamin continues to explain that once art is reproduced and is free from its ritual function it becomes a function of politics—generally speaking, a series of diverse conflicts over a configuration of power. When
hip-hop’s music became reproduced through recordings the political contests were in relation to cultural ownership, specifically the control over the sound aesthetic of hip-hop in the recording studio—the mediated space, dominated by a producer, between the hip-hop deejay or rapper and the ear of the music consumer (Hennion 1989). As hip-hop recordists began to use drum machines in the recording studio, they assumed more of the cultural ownership of hip-hop and divested the early creators of disco-based hip-hop of aesthetic primacy. The sampler extended their cultural ownership as some producers, most of whom were deejays, did not need other instrumentalists (keyboard player, guitarist, bassist) or the requisite skills on a conventional instrument because the sampler could (re)produce many sounds. With the sampler, hip-hop beat makers fortified cultural ownership over the sound of hip-hop. Consequently, the common practice of beat making was established through the practice of sampling older recordings and the reputed era of the “golden age” of hip-hop recordings was inaugurated.

So I think there is a difference in kind between the kind of composition I do and the kind a classical composer does. This is evidenced by the fact that I can neither read nor write music, and I can’t play any instruments really well, either. You can’t imagine a situation prior to this where anyone like me could have been a composer.

—Brian Eno (2004, 129-130)

Brian Eno, in his assessment of the impact of the studio becoming a compositional tool in the mid-1970s, explained how the development of music technology offered him access and an opportunity to become a composer, musician, and producer in the music industry without
acquiring the competencies of traditional musicianship. With the sampler joining the drum machine and turntables, the cultural ownership of hip-hop’s sound aesthetic was democratized—conditionally offered to anyone who approached the genre with integrity, regardless if they made beats in a New York City Housing Authority apartment or in the suburbs of Long Island. The opportunity to steer the sound aesthetic of a commercial popular music was a socio-political victory for a marginalized group of predominantly black youth who gained access to the means of expression and creation within the larger commercial market (Lipsitz 1994, Meintjes 2003).

As the creative tools to make hip-hop became more approachable in scale (from live musicians to a sampler) and price (discussed below), the expansion of the cultural ownership of hip-hop also expanded the sonic and cultural expressions of the genre, as different personalities from different locales combined hard beats with an arrangement of sampled sounds.

In general, to sample is to use excerpted sections of pre-existing recordings as materials for a new musical arrangement and recording. The act and results of sampling have typically been analyzed from socio-cultural perspectives to make statements about what sample arrangements explicitly and implicitly communicate about black urban life (Krims 2000, Keyes 2002), associations with black music history (Rose 1994, Bartlett 1994, Neal 2002), or “affect and social meaning” (Walser 1995, 200). Recently, there has been writing on the theoretical underpinnings of sampling that posits the creative integrity of the practice through the semiotic negotiations that result from extracting and utilizing audio from disparate sources (Chang 2009). Earlier writings on sampling by academics discussed the social power of a hip-hop beat by using the lyrical content that corresponded to the beat as a primary reference; a valuable approach, especially when analyses of the overt political lyrics and rhetoric of some hip-hop artists were buttressed by ethnographic research (Rose 1994, Keyes 2002). Analyzing sample-based hip-hop
beats through this manner lacked a context for what came before sample-based beats of the mid-to-late 1980s, the diversity of sample usage, and the process and decisions of the people actually doing the sampling. Public Enemy’s sample-filled recordings from the late 1980s/early 1990s received a lot of attention from academics—fittingly considering the ingenuity of their craft—but it seems that only beats featuring rappers that made unequivocal social statements or make overt intellectual claims about their craft have received scholarly attention. Other recordings that feature sampling ingenuity but are more flippant in their socio-political content are less acknowledged or written about. Recent writings on sample-based beats have retreated from analyzing their social meanings sample-based beats and have given more attention to the practice of sampling. Deemphasizing various social aspects of sampling practice, though, has not filled in important gaps that remain in the scholarly writing about beats: the tools and how they are used (Schloss 2004, Chang 2009, Williams 2013); the historical context of sampling in hip-hop (Harkins 2010, D’Errico 2011); and critical examination of sampling within the overall practice of beat making that includes other methods of making beats.

As the previous paragraph reveals, sampling has become essential to any examination of hip-hop’s music because of how it communicates the extra-musical status and value of hip-hop’s music and hip-hop culture. Recapitulating the statements above, the social, cultural, and political aspects of sampling in hip-hop can be evaluated through the frame of a predominantly marginalized group within the commercial music space—hip-hop enthusiasts in the 1980s—acquiring access to technology that facilitated comprehensive expressions on their terms. In privileging this evaluative position, I believe that technology and how and where certain technologies are used become a primary perspective for analysis. Furthermore, in discussions about the use of older recordings of black music as sources for sample-based beats, the
superficial understanding of black music history being recontextualized within an intertextual fabric of a beat (Rose 1994; Bartlett 1994) becomes less—but continues to be—important, and the sonic power of those, and other, recordings that inspired the imaginations of beat makers that use samplers becomes, in my opinion, more valuable. In a sense, the history of black music—and recorded popular music in general—is germane because of how beat makers listen to older recordings, what they hear while listening, and how they excise parts and compose.

Sampling in hip-hop beat making is generally done without any socio-political aim in mind. Schloss (2004) and Hawkins (2010) have each pointed out the academic excess of analyzing samples for their social meaning. In our conversation about his process of making beats and hip-hop records in the late 1980s/early 1990s, Harlem-based rapper/producer/break dancer Qiniso Mdladla was candid about sampling from older records that are widely acknowledged to have a political, even radical, sound agenda:

Patrick Rivers: Any favorites? Which jazz records were you looking at?

Qiniso Mdladla: Well there were people that I enjoyed sampling, especially during ’90/’91. I definitely enjoyed using Sun Ra.

PR: Any reason why? Why did Sun Ra catch your ear?

QM: He just had some fly shit. I liked using him, Mingus, Eric Dolphy, Art Ensemble of Chicago; I just like a lot of the hardcore. I did use a lot of hard stuff, but I liked a lot of stuff. I wasn’t just—I think, as far as jazz, I probably messed with stuff more so that was ‘50s, ‘60s, ‘70s, if I did mess with early stuff it was some bop stuff that I used. I definitely used swing, and I thought Louie Armstrong had some interesting samples.
PR: At the time, when you guys had an Afrocentric angle in your group, did you use those samples to connect to the concept of what you guys rhymed about?
QM: No.
PR: So they just sounded good?
QM: Yeah, we just used what we liked and that was that (interview with author, New York City, July 17, 2011).

Beat makers sample audio that they interact with, that sounds good to them, and that they can predict will work well as a component in a beat. Beat makers that use sampling as a compositional technique are digital musicians who foreground the exploration, manipulation, and processing of sound. That does not mean that they are less appreciative of conventional performance; on the contrary, many beat makers have a deep knowledge of all the recordists involved in a recording. Esteemed producer Pete Rock explained his attentiveness to names in the liner notes of recordings that caught his ear: “It’s real important that I study the player, you know what I’m saying, the orchestrators. There were a lot of dope ones, you know what I’m saying, a lot of dope orchestrators out there that did great, great, great shit like dope shit” (emphasis in original; Weisfeld 2007, 30:53). Some of the beat makers that I have been around also have a heightened admiration for the skill and talent of the people featured on a recording that they sample. Lee Stone communicated this to me:

[B]ut on the real Patrick. For me, what happens is—and this is what I hear from most people that play stuff (beat makers that don’t sample)—when sampling you are taking from a record by guys who probably grew up from five years old playing whatever they were playing, some were child prodigies. Sly Stone and these dudes were prodigies. And then if
they got a band they’ve been playing five ten years with this band; and you find, out of all of their work, a couple of seconds worth that you think you want to rock with. I don’t care how many keyboards you buy, if you just bought your keyboard last year, you’re not playing anything like what is on those records. (interview with author, Long Island, New York City, October 12, 2011)

Stone’s rationale about capturing a fragment of a remarkable performance from the past is a common agenda for beat makers as they search for samples, but is also a central criticism about sampling as a practice. As rock producer and musician Steve Albini stated in the documentary Copyright Criminals (2010):

As a creative tool, for someone to use a sample of an existing piece of music for their music, I think it’s an extraordinarily lazy artistic choice. It’s much easier to take something that is already awesome and play it again with your name on it.

(Franzen and McLeod 2010, 05:08)

Samples are used by many beat makers as a surrogate for musical skills that they did not acquire themselves; and if a beat maker’s goal is to have the drumming skills of Clyde Stubblefield or the guitar talent of Sly Stone then, perhaps, deciding to sample is the creative choice of less resistance. But hip-hop music’s aesthetic and the poetic process of sampling have a precedent in turntable manipulation. Furthermore, sampling as a practice is not simple to master—the creative use of samples is not afforded to everyone that wants to sample and beat makers go through much trial and error and many mediocre beats before finding good sample combinations and defining their sound. MacNair “Aa-Ron Jaqueson” Odoi started making beats in 2003, putting
samples into the software program Fruity Loops. He appended the sentiment expressed by Lee Stone:

Patrick Rivers: You said you started [making beats] using samples but over time you’ve grown to not use them. Why sample at all?

Aa-Ron Jaqueson: Why sample at all? That’s a good question. Certain sounds you can’t recreate. If you’re not a true musician, if you don’t know how to read music, if you don’t know how to write it, certain sounds you could never emulate. I don’t care what you do … so certain sounds I cannot make, I’ve accepted that about myself. I’d rather sample them and if by accident I end up playing certain sounds from scratch and they sound like those sounds, I’m grateful for it. So I always sample, I would never stop sampling. But the only reason I stopped sampling was sometimes it took days and days trying to find records to listen to and find a sound; and I was like, “screw it.” That’s how I started making beats from scratch. Once I got comfortable with that, I think it gave me time away from samples to come back with a fresh ear. So once I went back [to sampling] it was easy to find samples that I wanted to use because I knew from making beats from scratch that I had a certain sound. So once I went to look for samples I didn’t go for like “ok, I’m going to go and try to find an Isaac Hayes sample.” I went for sounds that sounded close to the beats that I made from scratch. (interview with author, New York City, June 3, 2012)

When beat makers get in front of their technology to create they will have a rudimentary, if not a fully fleshed out, mental conception of what they want to make. Composers of many musical genres probably face the obstacle of bringing their imaginations to fruition. For the beat maker
this obstacle can be prolonged if an appropriate sample has not been discovered, an issue that AJ struggled with and attempted to alleviate by making his beats from “scratch”—composing all the melodic, harmonic, and cacophonic components of his loops using synthesizers or traditional instruments. For him, translating his musical thoughts through a synthesizer helped him to be more incisive when searching for samples. In the end, having access to sampling technology allowed him and other beat makers access to sounds that they could not recreate individually or without hiring a musical ensemble.

The choice to use older recorded sounds is also a decision that is deliberated because hip-hop music, as a commercial popular music, has to respond to popular sentiment and expectation. While early sample-based beats sounded good and were successors to deejay breakbeats, once samples began to be used in hip-hop, the sample sources were older than the disco cover sources of the first hip-hop recordings by Sugar Hill Records and Enjoy Records. As a result, samples were anachronistic to the contemporaneous sound of commercial popular music in the mid-1980s. To ensure that samples from ten-year-old records would be acceptable to hip-hop enthusiasts, beat makers used records they knew were popular as breakbeats in the clubs and received feedback from their peers and colleagues. More details on the peer review process of hip-hop beats will be discussed later, but one of the ways that beat makers choose samples—including myself—is by sitting in a room with friends and colleagues, playing a recording they want to sample from, and getting quick feedback from the room. Sean C described how he and his beat making collaborators worked together in the early 1990s:

Just going through records. I would go to Knowbody’s (co-producer with Sean C of Jay-Z’s “Can’t Knock the Hustle”) crib with records. He would play me certain [records]—I would be like, ‘yo, you got this record. Check the sample out.’ And
at the time it was crazy because I used to do a lot of super fast beats. My beats used to be one hundred bpm (beats per minute) and he would always do beats at like eighty [bpm], you know, he was always doing like slow stuff and I was always doing fast stuff—and then we would add to each others’ tracks. (interview with author, New York City, October 11, 2012)

For Sean C, the tempo of his sample arrangements also became a point of deliberation as he searched for the best samples for constructing his beats.

Giving older recordings a contemporaneous presence through sampling involved negotiating the valuable parts of older music; this negotiation, though, was different every few years as certain samples and certain ways of processing and using those samples came to epitomize the sound of hip-hop’s music. In 2005, using the extensive database at www.the-breaks.com that cites the sample sources from many official hip-hop recordings, Pacey Foster or DJ Pace presented a graph showing that a large number of samples for hip-hop beats were sourced from recordings released during the first half of the 1970s, especially 1973 (Foster 2005). Thus, the performances of certain musicians—the instrumentalists heard on James Brown, Parliament, and Al Green records, for example—and the aural ambience of the recording equipment used in the early 1970s have been a feature of many sample-based beats. Samples from early 1970s recordings, though, have been used differently or not used at all during certain moments of the first thirty years of sampling in hip-hop. Observing the recurring presence of certain past recordings in beats and how beat makers used samples on their equipment creates prospective delineations between eras of hip-hop beat-making history.

Hip-hop beats are patchworks of reference (Chang 2009) that chronicle the labor of beat makers as socially embedded cultural producers (Mahon 2000). Kevin Holm-Hudson’s concept
of sonic historiography (2001) is a useful method to analyze sampling history through recordings and technology without making grand statements about the “meaning” of the use of certain samples. Sonic historiography “combines postmodernism’s lessening of stylistic distinctions and spirit of play with the self-consciously aware historicity of modernism” (emphasis in original; 248). Writing about post-1960s rock, Holm-Hudson asserts that the importation of musical codes—textures, compositional techniques, recording ambience—from historical moments in rock is beyond mere quotation and is fundamental to the style and sound of subsequent bands and recordings. While not promoting the novelty of postmodernism in the musical practice of hip-hop, there is relevance to the idea of sonic historiography in the use of samples: accounting for which older recordings were used, and how the chosen samples were processed by a sampler and arranged by a beat maker enables evaluative qualifications of style for hip-hop beats. For example, as will be further detailed in the chapter, a one-bar loop from the 1986 rerelease of James Brown’s “Funky Drummer” filtered through the sampler of an E-mu System’s SP-1200 is indicative of New York City-based beat production from the late 1980s/early 1990s. The three variables in the previous equation are 1) the type of sample used, 2) the contemporaneous popular sample source(s) or the recording(s) where the sample came from, and 3) the type of technology. Once one of the variables is altered and widely adopted there is a sense of a change in the sound of hip-hop’s music.

**Sampling as a Hip-Hop Musical Practice**

If the drum machine allowed hip-hop pioneers cultural ownership over the sound of hip-hop, the sampler reinforced that cultural ownership and expanded the sound palette and malleability of the practice, as any and every recording was a prospective layer in a beat maker’s
sonic tapestry. Sampling, as a compositional technique using recorded media, existed before hip-hop music and has been succinctly and verbosely defined by many scholars of the craft (Rose 1994, Walser 1995, Théberge 1997, Katz 2010). The practice is a technological extension of musical borrowing practices that have existed in musical cultures since coherent arrangements of sounds were memorized (Attali 1985, Williams 2013). Sampling has become professedly the common practice of hip-hop beat making. While beat makers have used and continue to use other methods to make beats, within the culture of hip-hop and among beat makers, sampling is still seen as a primary feature of what makes a musical arrangement representative of hip-hop.

Discussions of hip-hop sampling, particularly Schloss’ Making Beats (2004), have acknowledged the beat-maker ritual of “digging in the crates”—a cultural exercise where beat makers search for rare recordings to sample and interact with other beat makers. While this practice is vital to the discussion of hip-hop’s sound, further understanding hip-hop’s music is contingent upon further understanding how beat makers perceive the music they are sampling and how they use their instruments to create the sample arrangements heard on recordings.

For hip-hop beat makers the act of sampling can be a prolonged process. A beat maker searches for and amasses recordings—digging in the crates or scouring a CD or digital music collection—locates the serviceable sections of those records (which could be seconds out of a forty-five minute album), extracts the sections using technology that has to be learned, and, perhaps, truncates the samples into smaller segments for a variety of uses. The detailed process of sampling from a recording is undertaken before the process of programming sampled parts into a sequencer.

The sampling techniques and arrangements heard on hip-hop recordings originated from the ways deejays manipulated two recordings in real time. “As long as it was two bars it was just
enough for a deejay to catch it,” proclaimed Hank Shocklee (quoted in Frazen and McLeod 2010, 12:48) when discussing the process of making a break beat. Most of the first beat makers of sample-based hip-hop beats, like Marley Marl (Marlon Williams), were deejays. As a child on the Lower East Side of Manhattan, Mike “E.Z. Mike” Simpson of the Dust Brothers watched deejays at park jams before moving to California in 1978. He began deejaying—scratching and cutting records at parties—in the greater Los Angeles area before the practice was well-known in the region, and in 1983 was making hip-hop beats for a recording label (pers. comm.). DJ Evil Dee of the production duo Da Beatminerz made a direct link between deejaying and making beats: “Once you deejay, you know what I’m saying, it’s like you automatically become a producer. When you take a record and you’re cutting it up or when you blend it, that’s your interpretation of that record. You produced that interpretation of that record” (emphasis in original; Weisfeld 2004, 02:52). The techniques deejays used to extend sections of a recording or cut between sections of separate recordings were simplified once audio could be imported into a sampler, triggered or activated through simple gestures, and programmed into a sequencer. Sampling, in a sense, began on turntables; however, despite the semantic argument of DJ Evil Dee, when the price of samplers reached a consumer reality, the capabilities of samplers in the mid-to-late-1980s—especially the E-mu SP-1200 and MPC 60—fortified the transition to identifying the beat maker as separate from the deejay, a process that began with the drum machine.

The role of beat maker was initially dominated by deejays but entailed separate, though related, musical practices. The beat maker, as a specific hip-hop recordist, became a separate role once sampling technology evolved and allowed for an expansion of arrangement techniques. Some of the new techniques offered by better sampling machines were practically impossible for
deejays to imitate as the arrangements of previously recorded music became more complex. The following example will detail how a beat maker can conceive of a sample arrangement through a sampler and the difficulty a deejay would have trying to emulate such an arrangement, which necessitates the separation of the two types of hip-hop recordists.

**Hip-Hop Sampling Craft: A Common Practice of Beat Making**

Technologies are not mere exterior aids but also interior transformations of consciousness …

—Walter Ong (1982, 81)

There is a contained, repeatable craft to making beats from samples of older recordings, colloquially referred to as ‘flipping’ samples. In “From ‘Craft’ to ‘Art’: Formal Structure in the Music of the Beatles,” music theorist John Covach (2006) argues that an analysis of the four-year development (1964-1968) of songwriters John Lennon and Paul McCartney reveals a transition from a craftsperson model to an artist model of songwriting. According to Covach, a craftsperson approach emphasizes repeatable structures that are commonly used; the Beatles displayed a craftsperson approach in their early songs that utilized the well-known, Brill Building song writing structures. The artist approach privileges new methods that are not easily repeatable, if repeatable at all. Covach details how The Beatles gradually broke from the Brill Building craft of songwriting and developed composite forms within album-length themes that did not lend themselves to repeatability. For his analysis Covach limits himself to formal design and admits that his dichotomy of ‘craftsperson’ and ‘artist’ is general. The craftsperson model, though, is intriguing when considering the common practice of sampling in hip-hop. The notion of what
makes a creation “art” or a practice “artistic” is contestable and is beyond the goal of this section; however, hip-hop beat making, as a creative practice, has had creators and creations that have extended themselves beyond the common practice described below.

The use of previously recorded material for the creation of hip-hop beats demands an analysis of the craft of beat making through an understanding of the musical cognition of beat makers, particularly how a beat maker listens to a recording, finds useful samples, and starts arranging spurts of sound through technology. The analysis of a musical practice within a culture should not simply state how the practice is enacted within its cultural context but use “an analytical device describing its structure as an expression of cultural patterns” (Blacking 1973, 30) and social order. Hip-hop began and continues as a protean culture, exhibited by the versatility with which its many practices respond to the material environment they inhabit. Graffiti writing, break dancing, fashion, rapping, and deejaying were and are cultural practices in which hip-hop practitioners absorbed and appropriated a variety of stimuli and practices from other cultures and configured them to a familiar environment and aesthetic. The beat makers’ practice of composing from sampled sounds was an extension of other hip-hop practices of extraction and reconfiguration that many beat makers participated in or were socialized around. DJ Rob Swift (Robert Aguilar) revealed his introduction to hip-hop before deejaying and making beats from samples:

I was a little kid with an older brother that just exposed me to all these different facets of hip-hop and the culture. I’d see people break dance, you know, teenagers and I was just a little kid and I just absorbed the art form and fell in love with it.

(interview with author, New York City, July 23, 2011)
Rapper and producer Donwill (William Donald Freeman Jr.) from the hip-hop group Tanya Morgan qualified the music that he creates though its relationship with his early delving into other hip-hop cultural practices:

You know like my shit was, I was a graffiti artist earlier on—I tried everything. I used to break dance, do graffiti; I have a pretty deep history and a pretty deep understanding of why good music is good and what kind of music I do. (interview with author, New York City, July 23, 2011)

Making beats from samples is a craft that extended from the aesthetics of other types of cultural creation within hip-hop culture. While many of the younger consultants that I discussed beat making with did not initially participate in hip-hop through break dancing or graffiti writing, their craft has been informed by beats from beat makers like Sean C or Lee Stone who came of age when all of the extraction and reconfiguration practices of hip-hop culture were as popular as the music.

Making a sample-based beat begins with listening. Blacking advanced his conviction that listening is not valued enough in Western society despite it being as important as performing for the comprehension and relevance of any musical practice. He stated, “[creative listening] is as fundamental to music as it is to language” (1973, 10). The ability to hear words and pronunciation in a language and begin to conceive of interesting combinations is a basic process in the expansion and development of a language. In music, the same process has occurred with sounds and pitches. Listening is where all beat makers begin their creative craft. “[B]ut if I was to use a sample I’ll say I’ll start off just listening to the music, seeing what grooves or what areas that I would personally use to sample and what gives me the best emotion,” stated Queens-based producer Rick Hertz (Ricky Jason) (interview with author, New York City, August 27, 2012).
For some beat makers listening can be a meticulous practice in which, after they dig for and discover records, they spend countless hours listening to every second of several recordings, maybe even the same recording:

I break it down to two parts. I have one part where I hear the sample, let’s say a George Duke record, it's called “After Dinner Drink,” where I heard the sample and it was so groovy—it had a West Coast feel to it but it was very slow, the bpm was probably about sixty-five, or probably lower than that because it was a jazz record. So like the first moment I heard it, I listened to the whole record, after the first five seconds I couldn’t put the record down. I played it over and over again; because I was at school, I was working on a final where I had to go to the Department of Buildings to get a floor plan for a project I was working on. So I had the song on loop for like two hours. [I] listened to it, and listened to it. Once I had the idea for it—when I came back home around 11 o’clock that night—I was like, “I know what I want to do with it.” I put it in the EXS24 [the plug-in sampler for digital audio workstation Logic]. (interview with author, New York City, June 3, 2012)

In the above quote Aa-Ron Jaqueson (MacNair Odoi) described the dedicated amount of listening time he gave to a record before finding the pertinent samples for a beat. Other beat makers take a casual approach in their process of scouring recordings for sounds to sample; here is Sean C detailing how he found some of his samples:

While I was getting dressed in the morning I would have records playing and I may be, you know, in the bedroom and I can hear it and I’d run to where my MP
[Akai MPC 2000XL] is at and say [to myself], “I want to sample that part, bring that back.” (interview with author, New York City, October 11, 2012)

Most, if not all, beat makers casually listen to music the way most people do; but while listening to music in the morning is recreational for most music consumers, beat makers are also curating those recordings for useful samples to immediately put into their creative tools. There is also a middle ground or hybrid of meticulous and casual listening practices: sort of a flippant thoroughness that is practiced by beat makers, including acclaimed producer Kanye West. Here is an exchange that West had with journalist Dante Carfagna where he discusses the long but casual sessions he spends auditioning recordings:

Dante Carfagna: How much time do you spend listening to records?
Kanye West: Like I’ll play video games, watch TV, do some other shit, look through magazines. Listen for like three hours before we start a session.
DC: Listen to whole albums or just scan them?
KW: “Take the remote control like this [makes flipping motion], tap the button, fast forward to the middle of the song. I would never just sit back and let the record play. If I like the basic instruments of the song, or if I like the basic melody, I’ll let the whole song play. (Carfagna 2004, 74)

During a listening session a beat maker can extract an interesting sample, save it, and continue listening to the recording or listen to other recordings in order to compile samples. A beat maker, though, may elect to take the sample or group of samples and begin crafting, or flipping them into, a sample arrangement. I will now illustrate some options from the craft of making a hip-hop sample arrangement using an arrangement that I constructed from flipping
“More Love,” a 1967 recording by Smokey Robinson & the Miracles. In order to show a basic sampling process the following sample arrangement is a generalization of how beat makers program samples. Technology, copyright law, and aesthetic shifts in the crafting of hip-hop’s music have impacted the number of sample sources used in some individual compositions and also how samples are layered. As the historical survey continues I will detail some of the major shifts in sample practice, but in this instance I will only exhibit the possibilities when using a single sample source.

Figure 3-1 is the waveform representation of the first eight bars of “More Love.” In the brackets is the section that I chose to use after listening to the recording on my iPod.\(^{26}\)

**Fig. 3-1: First eight bars of “More Love” (1967) by Smokey Robinson and the Miracles**

Figure 3-2 displays a waveform of the bracketed section from figure 3-1 along with a Western staff notation transcription of the piano and drum parts heard during the two bars. As a representational tool that has been utilized by every discipline of music scholarship, Western staff notation remains valuable in communicating results of musical analyses without necessarily distorting the actual performance under examination, especially analyses of samples of African-American R&B performances.
Beat makers think of samples as sound fragments to be used as they imagine, and some beat makers consider the actual rhythmic, harmonic, and melodic relations within an individual sound fragment. Thus, the figures below are descriptive acoustic notations that display a sample arrangement as the effect of a beat maker’s action (Ellingson 1992)—in this case, the triggering gestures of the samples programmed into the sequencer of my Akai MPC 2000XL. In using staff notation and waveforms I want to show the musical intent of a beat maker’s use of sound fragments but also acknowledge how musical elements interact as sample arrangements are crafted in order to communicate what is special and particular about creating and arranging samples. Staff notation can be simply prescriptive—functioning as a blueprint of how music components interact with each other and abstracting how a performance could sound—but when transcribing a recorded R&B performance into staff notation the iconicity of pitch level and the representation of attack duration relays a basic, and many times accurate, description of how
different musical components are interacting. Waveforms are more descriptive—exhibiting the aural and temporal presence of layers of musical sound events—but may not, if applicable to the music being analyzed, relay information about harmonic and melodic relationships (ibid.). I feel secure stating that most sample-based beat makers, even from prior eras of beat making, privilege rhythm—even in their approach to melodic and harmonic fragments—when making beats; but sample-based beats and beats that use samples in support of composed harmonic and melodic parts reveal that many beat makers contemplate points of cadence or resolution through the sounds that they choose to utilize. The combination of a waveform with a transcribed staff notation into a descriptive acoustic notation for analysis provides several pertinent perspectives on how to look at sampling as a compositional craft.

Sampling has a variety of options predicated on the size of audio that is wanted and subsequently used. The largest type of sample that a beat maker will utilize is a loop. The loop is the most common way people think of sampling. A loop is at least one bar of music—typically never more than four bars—from a recording that is repeated, also referred to as being looped. Thus, the term is used as a noun and verb. Figure 3-3 shows a sample arrangement of the first two bars of “More Love” as a loop:
Once the sample was in my MPC I did not alter the tempo of the excerpted recording and set my sequencer to 104 bpm to match the playing of Smokey Robinson’s backing band. The performances in the sample approximated 104 bpm. It is precisely the composite sound of the loose tempo in a sample and the consistent timing of a sequencer that makes the combination of sample arrangements and drum programming so engaging, if programmed properly by the beat maker.

The next type of sample, in order of size, is the chop, which also has multiple grammatical uses among beat makers. As a verb, beat makers use the word ‘chop’ to refer to the act of extracting audio from a recording. As a sample type, a “chop” is excerpted audio shorter than a loop, usually less than one bar. Figure 3-4 displays the chops that I made from the two-bar sample from “More Love”:
After listening to the two-bar piano and drum loop, which is free of vocals, this is how I—and, probably, several other sample based producers—began to perceive this section of the song: as five separate chops, with each chop assigned to one of the sixteen drums pads of the MPC 2000XL. As figure 3-4 displays, the chops correlate with the harmonic rhythm of the piano introduction. In terms of sample arrangement, chops can be used like loops, triggered indefinitely in a sequencer (fig. 3-5); this method can obviously become monotonous if used by itself, but usually a sample arrangement of this kind would be used in an auxiliary role with other parts of the beat prominently arranged.
Fig. 3-5: Chop sample arrangements from the first two bars of “More Love” (1967) by Smokey Robinson and the Miracles, indefinite triggering of a chop

Chops are usually discontinuously reconfigured into a new loop (fig. 3-6) or interjected, perhaps, at the end of four repetitions of a loop to serve as a cadence point.

Fig. 3-6: Chop sample arrangements from the first two bars of “More Love” (1967) by Smokey Robinson and the Miracles, reconfigured chops
In some cases chops comprised of drum audio, particularly drum fills from a recording, have served the purpose of supplying the cadence point for a sample arrangement. The sample arrangement in figure 3-6 exhibits a result that is possible and generally acceptable to beat makers once a sound segment is programmed to a pad and controlled by a user. Samples “4” and “3” from “More Love” have a defined rhythmic duration—each is a beat and a half—and the MPC provided me the ability to suspend the second attack of sample “4” a half beat early and initiate sample “3” in order to fit how I imagined a quadruple meter sample arrangement of those chops to sound. Interestingly, and efficient for a beat maker, the drums that go along with the harmonic rhythm of the piano did not sound awkward after shortening the release of the second attack of sample “4.” The interaction between the different musical components of a sample is a variable that beat makers have to negotiate during the editing and programming process. This is where the variety of style can be heard, as different beat makers can make different decisions about what to filter out of the same sample to mitigate a musical component that, for aesthetic reasons, is not wanted.

The last type of sample I will discuss, in terms of size, is the stab. Stabs are short spurts of sound that have a distinguishing sonic quality because they are the exploited minutiae of a previous recording given prominence within a new arrangement. As the shortest sample length, a stab typically has a percussive function though its content could be melodic, harmonic, or cacophonous. Early samplers used by hip-hop beat makers had limited memory capacity, placing a technical restriction on sample times. While there were workarounds to create longer samples of audio, the stab was a pervasive technique used by beat makers—in several instances in the late 1980s/early 1990s stabs were provided by an actual deejay scratching, as previously discussed with T La Rock’s “It’s Yours” from 1984. In regard to my sample arrangement, I excised the
individual horn hits at the end of the first eight bars of “More Love” (fig. 3-7, top), placed them on individual pads in my Akai MPC 2000XL, and used them as stabs—layering the stabs with the chop arrangement that I previously looped:

**Fig. 3-7: Stabs from the first eight bars of “More Love” (1967) by Smokey Robinson and the Miracles (top) and sample arrangement with stabs (bottom)**

The act of flipping sample chops into a new arrangement typically results in a chop arrangement of at least two bars with the ideal being two or four bars. Loops that are not divisible by four or are eight or more bars have existed but have never been a common practice, even as current digital sampling technologies allow for unlimited loop lengths. I infer that this is the case because hip-hop beats are usually in service to rappers that have typically constructed their rhymes in sets of eight or sixteen bars. Thus, in sample arrangements that are continuous, stabs are utilized to introduce contrast, perhaps from one section to another.
The craft of making a beat from samples opens up many possibilities for beat makers. To create the last example above (fig. 3-7, bottom) I used seven of the sixteen available pads on one “pad bank” of my Akai MPC 2000XL. While users of the Akai MPC 2000XL only have sixteen physical pads to trigger sounds, they can access four pad banks or sound compilations of sixteen sounds (sixty-four sounds in total), through simple button prompts (fig. 3-8).

**Fig. 3-8: The author’s personal Akai MPC 2000XL.**

The other nine pads were filled with drum and percussion sounds that I programmed into a hard beat to accompany the sample arrangement. The drum pattern that I decided to use accented the sample arrangement; I programmed the kick drum to attack when each sample was triggered. Using a different kick pattern or complementary snare or hi-hat pattern would give the sample arrangement a different presence as different aspects of the sample would be emphasized or overshadowed by the drums. The range of expressive possibilities in crafting a beat is truly opened up, though, by the usage of different sample sources for each sample type. A loop extracted from one recording, layered with chops from another recording, and complemented
with stabs from yet another recording is how the craft of making a sample-based beat was established in the late 1980s, and is how most beat makers hone their creative skills as they experiment with combining textures, timbres, and rhythms. As such, from an analytical perspective, evaluating the musicality of sample-based beats entails interpreting how the simultaneous occurrence of samples is being used by a beat maker to “heighten tension,” “animate a performance,” “add to the texture,” or “provide signals” within a composition (Blum 1991, 25–26).

Since the three sample types discussed above can be varied and sonically edited in dozens of ways before being combined, the creative possibilities offered to sampling beat makers are only limited by the extent of their access to sample sources (recordings), their ambition for experimentation, and the options and limitations of the technology they use to compose. The third limitation oscillates between being the most and least important. Aesthetic ambitions and technological processes negotiate a compositional logic for making beats that is usually determined by technology until human ingenuity expands creative possibilities. Some examples in this chapter will exhibit the creative and adroit combinations that beat makers made with the equipment available to them at different stages in the development of sampling technology.

You take two pieces of vinyl and you cuttin’ it up. All the sampling does is take those two, that section that you’re cutting up and loops it. So it’s the same principle. You sit there and construct a blend, you know what I’m saying, with a sampler you can construct a blend, construct a mix. To me it’s like the same thing except one you’re cutting up the records, the other one you’re doing it by chopping sound, you know. It’s the same principal to me.

–DJ Evil Dee (Weisfeld 2004, 03:39)
The argument that a sampler is no different from any other instrument is absurd.

–Steve Albini (Franzen and McLeod 2010, 06:26)

Albini disparages the notion that sampling is a practice or craft of musical composition. His pronouncement, though, highlights a distinction that is necessary for those that support the notion of sampling as a compositional craft. The musicianship needed for using a sampler cannot be understood through another instrument, regardless of how redeeming the comparison may appear to be for the sampler and those that use sampling for composing. And, though the hip-hop aesthetic principle of manipulating excerpts of existing sound recordings is central to the practices of deejaying and making beats, the practices are separate undertakings that now have to be acknowledged independently. As the technologies for beat making and the uses of those technologies developed, the logic that guided the process of making a beat from samples became separate from the logic of scratching and mixing recordings on a turntable; e.g. the chop manipulation explained above could not be accomplished on two turntables. DJ Evil Dee has been a successful deejay and beat maker since the late 1980s and straddled the line between each practice, but as the years progressed and the cultural hero status of the rapper and the rap record exceeded the popularity of the deejay, young hip-hop music creators bypassed the years of deejay training and went directly into making beats from samples (including myself). The limited memory capabilities of early samplers—stab samples were similar to a deejay’s scratches—and the preeminence of deejays in the creation of hip-hop’s music made it unnecessary to separate deejaying from beat making in the early years of hip-hop recordings. The increase in full-length rap albums after 1985, along with the release of E-mu Systems’ SP series, though, established
hip-hop musical practices that descended from the turntable but were fortified by the capabilities of samplers.  

**Sample Beginnings**

In May 1980, the Audio Engineering Society (AES) held its 66th convention in Los Angeles. According to Fairlight co-founder Kim Ryrie, the professional audio industry—a burgeoning group of developers, technicians, distributors, vendors, and media engaged with professional-grade technologies for sound design and production in recording studios—was barely in its nascent stage in the early 1980s (Vail 2000). The development of synthesizers and other analog and digital electronic musical instruments had typically been a research endeavor for a university. The decade of the 1970s, though, was a time of transition as independent companies were founded to satisfy the demand for synthesizers in the commercial popular music industry that was steadfastly adopting them (see the landmark recordings from Miles Davis, Parliament, Steely Dan, and Stevie Wonder). For many in the industry the decade had a “folksy” vibe to it that became more professional in the 1980s (Keeble 2002). If we consider the 1970s as an exciting but unsettled period in the history of electronic instruments, in hindsight we can appreciate the 1980 AES convention in Los Angeles as a moment of convergence for electronic instrument development and as a ‘big bang’ moment in the development of hip-hop production tools. The 66th AES convention was the site for the unofficial unveiling of the present and future of digital synthesis and sampling as a means for creating sounds. Fairlight’s CMI (Computer Music Instrument), the first keyboard-based digital sampler, and Roger Linn’s LM-1 Drum Computer were displayed publicly for the first time. In addition, Eµ (E-mu) Systems was present
to unveil its new analog synthesizer and absorb ideas from Fairlight and Linn in order to create some of the most used hardware by hip-hop beat makers and producers.

Interestingly, the realization that digitally sampled sounds were a possibility beyond synthesized sounds came while trying to overcome a technical obstacle: figuring out a more efficient way of creating digitally synthesized sounds in order to transition from the burdensome hardware of analog instruments to microprocessor-based instruments. The Fairlight CMI was conceived of as a hybrid analog/digital synthesizer; it ended up being a “device that allowed you to digitally record any acoustic sound, store it on disk, tweak its harmonic content using a light-pen on a video monitor, and play it and seven other independent sounds back from an 88-note keyboard” (Vail 2000, 214). Australian engineers Kim Ryrie and Peter Vogel founded Fairlight in late 1975 and soon after began work on what would become the CMI. The motivation for creating the instrument came initially from Ryrie: “My frustration set in because of the inability to produce more natural sounds” (ibid.). The ‘build-it-yourself’ synthesizer they created that could not sustain stable pitches that resonated produced the frustration-inducing sounds he referenced. Thus, their first idea was to create a synthesizer based on a microprocessor, specifically the 8-bit Motorola 6800 processor—they wanted to use the microprocessor to control analog oscillators in order to sustain a stable, synthesized pitch.

Tony Furse, an independent engineer at the time, was also working on a digital synthesizer called the Qasar M8 (multimode eight). Ryrie and Vogel entered into a licensing agreement with Furse to continue working with the foundation of the M8 while acknowledging his design, specifically the twenty 8” x 8” circuit boards that were at the heart of creating digital sounds. Furse’s machine contained eight channels of sound production, thus, eight of the twenty boards were used to play an individual sound, and those sounds could be played polyphonically.
(a user, though, had to load the same sound into multiple channels to get something like a piano chord). Working from Furse’s digital synthesizer design, Ryrie and Vogel decided to utilize the other twelve 8” x 8” circuit boards in the machine to map analog signal processing functions for the sound output of the eight sound channels. The twelve functions correlated to those of analog synthesizers: functions like pitch generating, sine wave shaping or timbre, pitch bending and the ASDR quartet better known as attack, sustain, decay, and release were each given an individual circuit board. With the hardware organized as such, in order to get the eight sounds in the synthesizer to have the same processed sound—the same sustain perhaps—the circuit board with the sustain function had to repeat its function eight times, once for each sound channel. From a research prospective the twenty-board structure was acceptable but presented a problematic situation for manufacturing and supporting a consumer product; Ryrie explained that building twelve distinct boards for each consumer version of the machine was tedious, particularly because Ryrie and Vogel had to build every board themselves, and maintaining the synthesizers for overseas customers was very complicated.

Fig. 3-9: Fairlight Computer Music Instrument (CMI) (rel. 1980)
To make their product feasible in the professional audio market Ryrie and Vogel decided to restructure the design by placing every signal processing function on the circuit board of each of the eight audio channels. In addition, to facilitate the simpler processing paths they decided to put a lot of memory in the machine. They chose the recently released 16-kilobyte DRAMs, placing one DRAM on each of the eight audio channel circuit boards. Surprisingly, they realized that the amount of memory in the machine and the speed in which the memory worked allowed them to record and store actual acoustic sounds. Ryrie explained that, in the mid-to-late-1970s, the word sampling was not used in reference to digital recording (Vail 2000), but that was exactly what the memory allowed. To reiterate, Ryrie was aesthetically driven to create a synthesizer with more natural sounds. With the 128kb of DRAM and an 8-bit analog-to-digital converter designed by Vogel, Ryrie’s sound quality goal for synthesizers had reached a milestone. The creation of the sampler as we still think of it today came about from a desire for more natural sounds and a technical component decision for streamlining sound processing in a digital synthesizer. Comparably, it is understood that hip-hop sort of stumbled into sampling as well, especially after sampling technology became financially accessible.

**From Invention to Innovation**

As discussed in Chapter Two, there were plenty of electronic music inventions dating back to the experiments of Leon Termen and Ondes Martenot, but only a few transitioned from invention to innovation, a status accrued once an invention has become widely adopted for performance purposes (Théberge 1997). Unlike the unfamiliar gestures needed to produce sound for Termen’s theremin, the Fairlight CMI’s sampled sounds were activated through a piano
keyboard. The only drawbacks were the CRT monitor and light pen used to interface with the signal processing functions, and perhaps the standard QWERTY keyboard interface to work in the operating system of the sampler (fig. 3-9). What kept the CMI from becoming an innovation and truly shifting musical performance and composition practices was its exorbitant price—initially $25,000 to $36,000, dependent on the amount of available audio channels. The U.K., Germany, and later Japan were the biggest markets for the three versions of the Fairlight CMI—Series II (1982), Series IIX (1984), and Series III (1985)—hence its popular use by musicians Peter Gabriel, Jan Hammer, and Thomas Dolby (Vail 2000). In the U.S., one high profile musician to adopt the CMI was Stevie Wonder. Overall, sales of the CMI in the U.S. were paltry, which was probably a major reason for the downfall of the company in 1988. In his interview with journalist Mark Vail, Fairlight’s co-founder Kim Ryrie cited the lack of a professional audio consumer market for the downfall. At the time, most of the publicity for the CMI came at insider trade shows created by AES and the National Association of Music Merchants (NAMM). While the lack of an organized professional audio market was an obstacle, in order to achieve consumer saturation the price of an item cannot be a consumer deterrent and the CMI was consistently in the five-figure range. Getting below that $10,000 price point for sampling technology became a goal for Dave Rossum at E-mu Systems.

We knew that all of these products were fairly hot and within an area of interest to many musicians, and—being the sort of people who didn’t mind borrowing other people’s ideas—we said, “It sounds like this digital sampling idea is ripe. Someone should come in and do it right.”

–Dave Rossum (Vail 2000, 222)
The goals that propelled the development of the Emulator included making the sampling process more technically efficient and making an affordable sampler. E-mu had already learned a difficult lesson with Audity, the first digital synthesizer workstation they developed in 1979. While Audity was ahead of its time and was an impressive machine when compared to the strong digital synthesizer competition from Japanese companies, once E-mu calculated that the retail price was going to be $69,200 per unit they ended the project. After realizing the potential of sampling at the 1980 AES show, E-mu’s co-founder and lead engineer Dave Rossum spent the autumn of 1980 figuring out how to reduce the amount of memory needed for each sampled sound, which would reduce the price of manufacture. The Fairlight CMI had a large and complex memory subsystem for each sound (the circuit board for each channel in addition to the boards for each type of signal processing). Rossum started from Ryrie and Vogel’s Fairlight design and constructed a memory system with five Direct Memory Access (DMA) chips, which was able to trigger eight sounds at once with other sound functions; “[T]hat’s the fundamental basis of all samplers these days, memory sharing,” shared Rossum (Vail 2000, 223). The E-mu Emulator was introduced in 1981 for $9995 with seventeen-seconds of sample time and the ability to store eight separate “voices” or sounds. The first shipment went to Stevie Wonder (Keeble 2002).

Despite the low price in relation to other available samplers, the Emulator did not sell well until a redesign. The Mark 2 Emulator, released in 1982, allowed users to stop a sample by releasing a key—previously samples played all the way through once triggered. It included an internal sequencer, and came packaged with a one-hundred 5¼” floppy disk sound library (ibid.). In addition, the redesign was priced at $7995. Sales increased but E-mu had not yet hit critical mass with their professional audio products; however, they had made the sampler more common. The use of DMA chips and a less expensive common memory architecture to trigger sounds
allowed the sampler to become an innovation and an instrument, though E-mu did not reap the full fruits of their creation until they released the Drumulator in 1983 and the Emulator II in 1984, priced at $995 and $7995, respectively.

The Emulator’s lower price point made it a piece of equipment in several music studios in the early 1980s, including Unique Recording Studios, located in Times Square. Bobby Nathan, the co-founder of Unique Studios with his wife Joanne, was an early advocate of sampling technology and was excited by the CMI, but became an advocate of E-mu’s products because of their lower price: “Then we all got to check out the Fairlight sampler. This $35k machine was all I had to see. But, we couldn’t afford it! So we bought the Emulator. I was hooked” (Nathan n.d.). Arthur Baker produced and engineered “Planet Rock” at Intergalactic Studios but also worked for Nathan at Unique Studios, where he had an intern name Marlon Williams, who was known as Marley Marl when he was deejaying in Queens (Gonzales 1999). During his first interactions with the Emulator Marley unintentionally initiated the sampling process associated with hip-hop beat making:

> Now I didn’t invent the sampler but I invented bringing samples to hip-hop. I had made a mistake and put the snare of John Davis and the Monster Orchestra, the snare from “I Can’t Stop,” that’s what it was. I actually—it went in by mistake and I had another beat playing and I started playing that snare along with the track. “Oh shit, I could put my own—I could make my own beats out of people’s drum sounds off of a record. That’s phenomenal.” (Weisfeld 2007, 8:30)\textsuperscript{32}

In 1984, while working on a mix of a recording by electro rapper Captain Rock (Charmain Mao 1998) at Unique Studios, Marley uncovered a possibility for the sampler at a time when the technology had yet to find a standard use and was more often being used for sound effects,
sounds from films, or converting acoustic sounds into digital ones (like the ORCH5 Fairlight CMI sample heard in “Planet Rock”).\textsuperscript{33} Sampled drum sounds had already entered the field of music production with Roger Linn’s Linn LM-1 (1980) and E-mu’s Drumulator (1983), which featured acoustic drum hits that were converted into digital samples. Marley Marl’s drum sampling was different in that he sourced his drum sounds from recordings. Following his first grab of a drum sound from a previous recording, Marley Marl started collecting his favorite drum sounds onto a reel-to-reel tape to source from when making his beats (Marley Marl 2013a).\textsuperscript{34} Amassing a collection of treasured drum sounds was just the beginning for Marley, as he soon purchased an inexpensive sampler and began crafting sample arrangements from chops of R&B recordings using his personal studio set up. His beats from 1983 to 1987—which will be discussed shortly—are credited with transitioning hip-hop’s music from its drum machine and/or synthesizer composition process to the common practice of arranging samples. Marley’s opportunity to innovate the sound of hip-hop’s music, though, has to be prefaced with the fact that sampling technology trickled down from an accidental discovery in 1979 to an approachable consumer product by 1981.

**Sampling and the Studio Deejay**

Sampling technology was a boon for the recording studio creation of hip-hop’s music. The dynamics of the early 1980s hip-hop recording studio—R&B and rock-based producers and the combination of the drum machine and synthesizer—was the first move away from the deejay as the proprietor of the sound of hip-hop’s music, particularly street deejays that predominantly performed for people at parties and in clubs. Grandmaster Flash was the prime example of how the street deejay was being left behind by the early recording practices of hip-hop (Kool DJ
Here, it seems through interviews, was not interested in recorded hip-hop). “Grandmaster Flash & The Furious Five” was on the front of the group’s Sugar Hill Records releases, however, Sylvia Robinson slowly eroded Flash’s power in the group and decreased his contributions in the recording studio. She preferred rapper Melle Mel and encouraged the cultural shift away from the deejay and to the rapper (Grandmaster Flash 2008, Charnas 2010).

Deejaying and the prestige of the practice did not fade, and the rise of the rapper did not eliminate the deejay from recordings of hip-hop’s music. Despite being less important in the studio during the early 1980s, the deejay was still present in the studio and, at times, was given a prominent position on a recording:

After months of asking, the Good Queen [Sylvia Robinson] finally let me do my thing. After months of standing around the studio, letting live musicians play what I could be mixing on two turntables, and showing the engineers how to mix everybody’s voice so the record sounds right, I finally got my own record. Finally got to punch-phase, cut, cue, spin back, rub, and zuka-zuka on wax. (Grandmaster Flash 2008, 150)

*The Adventures of Grandmaster Flash on the Wheels of Steel*, a 12” single released in 1981 by Sugar Hill Records, was the first official recording of a deejay "getting busy" in the way Bronx residents observed in the late 1970s. The A-side of the single features 07:12 of Flash quick-cutting between breaks (Chic’s “Good Times” [1979] and “Apache” [1973]) and records popular in New York City clubs at the time (Queen’s “Another One Bites the Dust” [1980], Blondie’s “Rapture” [1981], and Sugarhill Gang’s “8th Wonder” [1980]). Flash’s single stands out because there was a gap before another deejay was given similar space on a hip-hop recording. In 1983, jazz pianist Herbie Hancock collaborated with deejay Grand Mixer D.ST (now DXT) on “Rockit,”
but it was not until 1984 that another deejay was featured on a hip-hop recording—Jam Master Jay’s 04:25 exhibition on “Jay’s Game” from the album Run-D.M.C. As table 3-1 shows, throughout the 1980s deejays were given some space on hip-hop albums to display their skills (“Solo DJ” row) and were featured in songs in which a rapper acknowledged their skills (“Mostly rapping/Some DJ” row), an appropriate situation considering deejays were instrumental in rappers becoming the cultural heroes of hip-hop music once it became commercially recorded.

Table 3-1: Official Album Tracks Referencing Deejays in the Title, 1981-1989

<table>
<thead>
<tr>
<th>Solo DJ</th>
<th>Mostly DJ/Some rapping</th>
<th>Mostly rapping/Some DJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;The Adventures of Grandmaster Flash on The Wheels of Steel&quot;</td>
<td>&quot;Jay's Game&quot;</td>
<td>&quot;Chill Will Cuttin' It Up&quot;</td>
</tr>
<tr>
<td>&quot;Marley Mari Scratch&quot;</td>
<td>&quot;Jam Master Jammin&quot;</td>
<td>&quot;Leave It Up To The Cut Professor&quot;</td>
</tr>
</tbody>
</table>

As the 1980s progressed there were increasingly more hip-hop albums released; correlating with that increase was the continued growth of album tracks that directly referenced deejays associated with popular rappers (e.g. “Jazzy’s in the House” (1988) by DJ Jazzy Jeff and The Fresh Prince) and featured the scratching skills of a deejay. By all accounts and documents most deejays had two routines, one for the studio and one for live shows, and in order to hear the
most inventive work of a deejay, enthusiasts were better off seeing their favorite deejay perform live. As the 1990s progressed there was a substantial decrease in album tracks that referenced a deejay or featured the scratching of a deejay. One of the reasons for the decline was that deejays broke away from rappers and began to put out records that solely featured turntablism. Here is DJ Rob Swift discussing when he and the deejay collective the X-ecutioners entered the studio in the mid-1990s to work on *X-Pressions* (1997), a turntable recording:

> Now production wise and how deejaying transferred over to the studio environment, I think that was more of a fun, interesting adventure that we were on; “wow, how can we now transfer what we do on stage into the studio, in a recording environment.” We had engineers that would help navigate through the session. We were working on two-inch reel tape instead of a little four-track cassette tape that we were using at home …. So the cool thing was that I was able to experience the whole concept of having an engineer help develop the sound that you hear in your head or the direction that you want to go in with a particular song, the engineer is there to help bring that into fruition. (interview with author, New York City, July 23, 2011)

For Rob Swift, getting the opportunity to record an official release that solely featured the art of a deejay was an opportunity to contain the experience of a live deejay show in a recording, which is also what Flash aspired to in 1981. At variance, though, was the process of creating hip-hop music in the studio. Listening to many hip-hop recordings from the 1980s into the 1990s, it is apparent that in the studio the creative process and products specific to the turntable were seen as auxiliary to rappers’ lyrics and *could* be removed without rendering a hip-hop recording
unrecognizable within the genre. In the case of Run-D.M.C., by the third of their seven albums there were no longer tracks that highlighted their deejay, Jam Master Jay (Jason Mizell).

The increased access to sampling technology in the early 1980s can be seen as the result of the art of deejaying being adapted for easier reproducibility, at least in the context of creating hip-hop’s music. Interestingly, while the two succeeding decades display the gradual eroding of the distinct art and sound of the turntable on hip-hop recordings, the transition to sampling made the deejay more valuable to the creation of hip-hop’s music. The use of sampling in hip-hop was established as a means to use the preferred aspects of previous recordings to craft new grooves or beats, as they soon were called. Deejays had two advantages in the studio under the new sampling model for hip-hop music: they had access to a lot of older recordings and, because the ability to deejay necessitated finding the best parts of hundreds of recordings, they had an ear for the craft. During our conversation Rob Swift explained his transition:

I started experimenting with sampling beats [in 1994], kind of taking my skills as a deejay and applying them to the production world and it helped me a lot. I think that production is a natural progression from deejaying and it doesn’t shock me when I hear deejays that are now famous producers because it’s a natural progression. From day one when you start deejaying, whether you realize it or not, you’re training your ear to become a producer, you know. And I still to this day produce. (interview with author, New York City, July 23, 2011)

RZA (Robert Diggs), the well-known producer for Wu-Tang Clan and the Gravediggaz, entered hip-hop culture as a deejay and further validated Swift’s sentiment:
It’s really hard to trace the exact beginning because I was a deejay at one point. I got my first turntables at eleven or twelve. And being a deejay I used to always just listen to cats’ different breaks and cutting different breaks, you know what I mean; and I think that really led to my ear [for] producing. (Steward 2006, 12:55)

Unlike DJ Evil Dee, who perceived deejaying and producing as the same, Swift and RZA saw the practices as separate but related, the skills from one practice partially transferring to the other. It is important to mention that, though deejaying made for an easy transition to making beats, many deejays were fine with being turntablists and touring with rappers. For example, Mister Cee was the deejay for Big Daddy Kane but does not have a production credit on any Big Daddy Kane recording. Sampling as a hip-hop musical practice descended from deejay techniques but was quickly in service to rappers.

PSA Beats

By the end of 1982, with several commercial samples on the market, sampling was established as a process for creating a sound palette for use in creating musical arrangements. Concurrently, recorded hip-hop music, called rap music when sold in stores, was in the midst of the drum machine and synthesizer sound of Afrika Bambaataa and Arthur Baker and soon transitioned to hard beat and deejay scratch sound that defined the Larry Smith/Rick Rubin beats of Run-D.M.C. and T La Rock. Sampled-based beats on a hip-hop recording were not heard until 1986; however, sample and sample-like beats were heard in the years leading up to 1986 but as experimental music not released commercially or as background music for promotional spots on radio stations and at festivals. Double Dee and Steinski’s Lessons series from the 1980s is representative of the experimental-type. The beats made for radio stations and festivals were
created by deejays using their knowledge of recordings and their record collections to construct instrumentals for rappers.

Mike “E.Z. Mike” Simpson was one of the transplants from New York City responsible for spreading the sound and practices of hip-hop to California. In 1981, as a student at Pomona College—one of the Claremont Colleges located about thirty-five miles east of Los Angeles—Simpson introduced deejaying and hip-hop music to his dormitory when he set up his Technics 1200 turntables and started mixing in his room. In 1982, after deejaying a party, someone at the college radio station recruited him to do a radio show featuring his sound because, as the recruiter said, “I’ve never heard anything like this.” He was given the early Thursday morning, midnight to 3AM, slot at KSPC to play breakbeats and the latest rap records—a time slot that made him particularly popular with a college fraternity that threw parties at that time and became unsuspecting listeners of hip-hop music.

The radio station gave him public service announcements that he had to play every fifteen or twenty minutes. The PSAs were “about neutering your dog or something like that and they were all created by technicians at the radio station and they all had these horrible music backing tracks that had nothing to do with my show,” explained Simpson (interview with author, Pasadena, CA, July 28, 2011). Therefore, he decided to customize the PSAs to fit with his show. The station did not have advanced equipment for 1983 but it did have a reel-to-reel recorder that Simpson could use to make some beats. “I was using very primitive technology; I was basically making pause tapes on a reel-to-reel and then a buddy lent me his four-track [recorder] and I got a little more sophisticated” (ibid.). Many beat makers’ introduction to beat making was through pause tapes. Using the ‘pause’ button on a recording device—for Simpson it was a reel-to-reel, others use a dual-deck cassette player—a user can record a segment of audio, hit the “pause”
button, return to the start of the audio segment to play it again, release the “pause” button, and record another copy of the audio segment behind the first copy.\textsuperscript{36} In essence, the user samples an audio segment onto tape by recording it and creates consecutive instances of that segment by rerecording it at the precise moment it ends, creating a loop. Editing a pause tape is a tedious task that can yield results comparable to that on two turntables or a sampler if a user dedicates the time to editing.\textsuperscript{37} Simpson created sample-like arrangements of segments of funk-style R&B records for the PSAs that played during his radio show.

Simpson’s pause tape arrangements were afterthoughts in relation to the content of his radio show. Besides playing the latest rap records, he invited local emcees to come on his show and display their skills. One emcee that came down to his show around 1985/1986 was Tone Lōc:

So Tone Lōc came down to the station and we were talking and I put in one of my public service announcements and he said, “yo, who made that beat, that beat’s hot.” I said, “oh, I made that,” and he said, “really, do you have more,” and I said, “yeah, I got some more stuff;” and he said, “I’m making a record, we gotta hook up.” The next day I get a call from his manager and he said, “hey, can you play some of that stuff over the phone that you played yesterday.” So I played it over the phone and when I got back on the phone there was a different guy on and he said, “oh man, what was that, that was incredible. We’re starting this record label, you got to come down to Hollywood and meet us.” So those were the guys that started Delicious Vinyl (ibid.).

The sound of Los Angeles hip-hop in the mid-1980s was still defined by the electro style that was transmitted from “Planet Rock” and incorporated into the recordings of Egyptian Lover and
the World Class Wreckin’ Cru (see the latter’s 1986 recording “World Class Freak”). By the end of the decade, Delicious Vinyl and Ruthless Records, with the group N.W.A. (Niggaz Wit Attitudes) and producer Dr. Dre, had transitioned Los Angeles hip-hop to the mid-tempo, Midwest funk sample sound that defined gangsta rap in the early 1990s. The beats from Simpson’s PSAs presented a sound that was not coming from local producers at the time but foreshadowed where Los Angeles hip-hop was going. In 1984, though, the sound of arranged funk samples was being developed in the greater New York City area.

The Deejay as Manual Sampler

As long as it was two bars it was just enough for a deejay to catch it

--Hank Shocklee (Franzen and McLeod 2010, 12:48)

Deejays were the core of hip-hop culture in the 1970s when the culture was developing on the streets of New York City. When the musical practices were transferred to recordings, hip-hop deejays and emcees were supported by radio disc jockeys that ensured the latest sounds of hip-hop could be accessed on local airwaves. Throughout the 1980s, in New York City, hip-hop enthusiasts could tune in to WBLS to hear Mr. Magic’s (John Rivas) Rap Attack or to WKRS (Kiss FM) to hear Kool DJ Red Alert as he debuted recordings by future hip-hop icons. Starting in 1982, east of the city, devotees of hip-hop music on Long Island were able to hear the latest local hip-hop talent on WBAU, Adelphi University’s radio station, particularly on the Super Spectrum City Mix Show featuring the mobile deejay crew Spectrum City, the future core of Public Enemy.
On the WBAU show Chuck D (Carlton Ridenhour) and Hank Shocklee (Hank Boxley) began the creative process that developed into the Bomb Squad production style heard on Public Enemy records in the late 1980s. Hank Shocklee founded the mobile deejay crew Spectrum City in 1975 and his brother Keith joined in 1978. Chuck D enrolled at Adelphi University in 1979 and joined Spectrum City; three years later, following a request from WBAU program director Bill Stepney, the crew was given a radio show (Coleman 2005). The *Super Spectrum City Mix Show* was one of the most popular shows in the area, giving the crew access to the ears of the hip-hop scene in Long Island and some parts of Queens. With a dedicated audience but lacking hip-hop records to play, Hank and Chuck started making pre-show tapes of local rap groups rhyming over their beats (Rivers and Fulton 2013). They recorded their tapes at 510 South Franklin Street in Hempstead, where they met Eric Sadler, the future guitarist of the Bomb Squad production team (Coleman 2005).

Making beats and producing recordings were not the initial goals of Chuck D and Shocklee. The following is Chuck D explaining the state of their craft in the early 1980s:

“We was [sic] only interested in being radio jocks back then, we even tried to get a syndicated radio deal back in the day. Records just didn’t hold much interest for us. I had interviewed so many nightmares in the record business by doing the radio show that I just wasn’t interested in being involved with that” (quoted in Coleman 2005, 170). But similar to Simpson out in Los Angeles, Spectrum City’s radio platform served as a weekly demo tape for record labels; as Chuck D started rhyming over the beats and they improved at making recordings, the music industry took notice. In 1984, they recorded a single for the Vanguard Recording Society, Inc. The A-side of the single was called “Lies” but it was its B-side, “Check Out the Radio,” that
became popular, an unexpected outcome considering that they included “Check Out the Radio” on the B-side to promote their radio show.

In regard to sound, “Check Out the Radio” was similar to other hip-hop recordings that were released in 1984: it featured a drum machine beat from the Roland CR-8000, a bass line from a synthesizer (a Roland TB-303 (Transistor Bass)), and deejay scratches (Rivers and Fulton 2013). The track is significant because, in addition to rhythmic deejay scratches, the turntables provided a chop of a horn riff from a recording precisely placed in the beat arrangement as an instrument. The horn riff was sourced from “Catch a Groove,” a 1976 disco recording by the band Juice—once again showing the presence of disco in the developing sound of hip-hop. Figure 3-10 shows the moment in the recording from which Shocklee sourced the horn riff; the bracketed areas are the specific moments that were exploited.

**Fig. 3-10: Waveform of “Catch a Groove” (1976) by Juice, audible from 01:53–01:57**

In T La Rock’s “It’s Yours” (1984)—a hip-hop recording from same year discussed in Chapter Two—Jazzy Jay used “I Like Funky Music” to rhythmically scratch in short spurts of a horn sound from the record and allowed the whole bar to play as a cadence point leading into the next verse by T La Rock. In contrast, Shocklee used a turntable to convert a section of a recording into an instrumental layer. His reasoning for using the turntable in this manner was
“since we didn’t have keyboards, and couldn’t play keyboards, we would take the turntable—the turntable would be the chorus. We would scratch in parts for the chorus” (Shocklee quoted in Rivers and Fulton 2013). Shocklee and Chuck D did not have access to samplers but they imitated the musical functionality of a sampler with the use of a turntable. Figure 3-11 shows three of the four layers of sound in “Check out the Radio”39:

Fig. 3-11: Waveform and Staff Notation of “Check Out the Radio” (1984) by Spectrum City, audible from 01:18–01:23

While the patterns of the three parts are slightly varied throughout the recording with cadence points and drum fills, the two bars that are displayed are a sufficient representation of the building blocks of the recording. During the beat making process the CR-8000 and TB-303 parts were synced together and sequenced through the CR-8000’s sequencer, giving the beat a
persistent swing. The instrumental part provided by the “Turntable Chops” displays some of the interesting results from the interaction between sequenced and ‘sampled’ parts. First, there is the rhythm of Shocklee as he scratches in the horn riff and, second, there is the rhythm of the whole horn riff. Throughout the song, and in the two bars that are analyzed, Shocklee varies the entrance of the second and fourth horn hit, each of which is placed around the offbeat of beat two. In addition, the end of the second bar has a sixteenth-note snare flare and horn riff that is not totally compatible with the sequenced time structure and is heard on the fourth beat while the other parts are silent. Shocklee used his hands and the turntable to trigger a chop from “Catch a Groove,” backspinning the recording to repeat the end of the horn riff. The results of using the turntable as a manual sample were basic—especially with the hindsight of what Shocklee and the Bomb Squad eventually accomplished with samplers—but all composers have to crawl before they walk. Comparable to other deejays that became beat makers, the cognitive imperatives around sound that were established with the turntable were suitable to the expansive possibilities of sampling.

**Establishing Sample-Based Beats**

We was the first group to do sampling. Marley Marl was the first person to use one, with “The Bridge” …

—Moe Luv from Ultramagnetic MCs (Coleman 2005, 118)

Being a deejay and knowing that ‘Impeach the President’ always got the crowd rocking. So what did I do? I made a beat with ‘Impeach the President’ on it.

—Marley Marl (Weisfeld 2007, 07:58)
The primacy of sampling in discussions of hip-hop’s music presents an implicit assumption that once samplers were consumer products and used by beat makers they immediately established sampling as the common practice of hip-hop. Though Marley Marl began using E-mu’s Emulator in 1982/1983 and several consumer samplers were released in subsequent years, sampling as a practice and sample arrangements on recordings were not a standard of hip-hop production until 1987—eight years after the first hip-hop recording and six years after samplers became common in recording studios.

As described in the previous sections, sampling-like techniques started to be incorporated into the creation of hip-hop recordings for alternate purposes, like radio advertisements, but the poetics of hip-hop music continued to be driven by the drum machine/synthesizer/turtable combination. While E-mu was diligently working on making sampling technology cheaper, hip-hop beat makers were driven by the drum sounds and grooves of the Linn Drum LM-1, the Oberheim DMX, and the E-mu Drumulator, and the synthesizer sounds of Yamaha’s DX7 and FX-1.40 “In those days Kurtis Blow was the king as producer—producing the Fat Boys, himself, the ‘AJ Scratch,’ and all that other shit. They started throwing little singing hooks in there, havin’ them Linn and DMX drum beats—all that dumb shit soundin’ stupid,” expressed Marley Marl in a 1998 interview with journalist Chairman Mao (para. 3). Marley Marl’s use of strong language to denounce the aesthetic standards of hip-hop’s music before he started making beats from samples revealed a sentiment that I have also inferred from my consultants that lived through the mid-1980s, like Bob Power, Qiniso, and Lee Stone. As a young admirer of the tapes that he received after his older brother ventured to see the street deejays in the late 1970s, Lee Stone was candid in his dislike for the sound that followed the disco cover stage of hip-hop.
records: “When I got to high school, I mean the stuff that I was hearing, Run-D.M.C. and Kurtis Blow, that stuff didn’t sound like what I remembered hearing on those tapes from Harlem World. It sounded too commercial, and it goes back to my underground thing, so I didn’t like that stuff” (interview with author, Long Island, New York, October 12, 2011). Lee Stone was not interested in the electro sound of hip-hop and, while in high school, turned his attention to heavy metal, a music that gave him the same feeling he had listening to the deejay tapes years earlier. There is a level of ambivalence, and perhaps disparagement, toward many pre-sampling hip-hop records because of how they sounded and how rappers rhymed over drum machine beats. For some hip-hop devotees in the early 1980s, Run-D.M.C. and their sound embodied and epitomized hip-hop’s return to its sonic origins, “Drums. A little bass. That’s it. That’s the break” (emphasis in original; Grandmaster Flash 2008, 47). From a sound perspective, though, when a deejay created breakbeat mixes of the “get down parts” of recordings there were definitely more than drum sounds that were looped: usually bass, horn/string, and auxiliary percussion parts that could not be satisfactorily recreated with a drum machine and synthesizer.

As discussed in Chapter Two, there was friction within hip-hop culture about what recorded hip-hop music was supposed to sound like. Despite the popularity of disco music, the first recordings of hip-hop music from 1979 to 1981 had strayed too far from Bronx street culture that cultivated hip-hop during its formative years. The shift to the creative possibilities of sampling was a revelation because it was a means to reestablish the sound of the famous breaks that deejays utilized to make break beats in the 1970s. Afrika Bambaataa and Arthur Baker had the rhythms from popular breaks programmed into the TR-808 to make their singles from 1982 and 1983, but as detailed earlier, the rhythmic and, especially, the sonic fidelity from older breaks were not reproduced. In the early 1980s, Marley Marl produced and engineered electro
hip-hop and was tasked with the job of playing most of these early hip-hop recordings on Mr. Magic’s radio show. He disclosed that his impression of those recordings at the time was, “I can make better shit than this” (quoted in Chairman Mao 2012). During a productive week in 1985 he qualified his proclamation by making a group of beats, all constructed from samples, that over the next few years became hits and established sampling as a process for making beats (Weisfeld 2007). One of his most well-known beats, for “The Bridge,” quickly spread through the boroughs in 1985/1986 and enticed a college-aged Lee Stone to listen to hip-hop again: “I had stopped listening to hip-hop. The song that brought me back to listening to hip-hop, I heard Queensbridge (“The Bridge”) by [MC] Shan. I heard that and that spoke to me” (interview with author, Long Island, New York, October 12, 2011).

Marley Marl made "The Bridge" with rapper MC Shan for the 1985 Queensbridge Festival at Queensbridge Park, the outdoor space for residents of the Queensbridge N.Y.C.H.A. Houses. The track was purposed as intermission music and featured the drum sounds and pattern from “Impeach the President,” a 1973 recording by The Honey Drippers. When “The Bridge” was first played the crowd demanded that the song be played again, again, and again (Marley Marl 2013a). Similar to the spread of informal recordings of hip-hop through tapes and taxis in the late 1970s, “The Bridge” was a local hit record that spread when Marley Marl’s nephew began circulating a tape that he made of MC Shan’s performance during the festival. “The Bridge” was created in 1985 but was not officially released until 1986 when Bridge Records, a small Philadelphia label that released records by other Marley Marl rappers, picked up the record.

At its introduction, sampling in hip-hop was relegated to a secondary position in a musical support role, but could not be kept there as interest in sampling expanded and the sound
was featured on more recordings. The year 1986 was a watershed year for establishing sample-based hip-hop on recordings. Eric B. & Rakim’s “Eric B. Is President” was released and the track “I Desire” from Salt-N-Pepa’s debut album introduced the well-used “Amen break” from The Winstons’ “Amen, Brother” (1969) to commercial hip-hop. Sampling was a delayed discovery within hip-hop, but once it was established the proliferation of sampling as the common practice of hip-hop composition could be heard on several seminal recordings from the late 1980s.

**Establishing the Hip-Hop Beat Making Process Using Samples**

Similar to the earlier discussion of hip-hop beat makers’ use of drum machine technology, Marley Marl and subsequent beat makers who began to use samplers were not doing something radical with the developing technology. A standard practice had yet to be established for technology that was annually changing. Indeed, it is worth attempting to derive the intended uses of sampling technology from the directions that companies provided to users. The user manuals for professional audio instruments have included descriptions and visualizations of a standard configuration to ensure the effective use of an instrument. The manuals for the Fairlight CMI and E-mu’s Emulators instructed users, through text, to use a microphone in order to input audio that was to be sampled. The instruction manuals for mid-1980s samplers, though, began to expand their directed options. The manual for the first iteration of Ensoniq’s Mirage sampler demonstrated how to source sounds to be sampled (fig. 3-12), and presented a turntable as the source of sampled sounds.
The use of a turntable in the model configuration infers that the user was going to use vinyl recordings—commodities with copyright and other ownership protections—to create samples, a practice that did not become truly popular among hip-hop beat makers until 1987. A year later, the manual for Akai’s S900 rack mount sampler (fig. 3-13), a unit that included separate sample inputs for a microphone and for other audio sources, suggested that users source their samples from a synthesizer keyboard or “Player, Deck, CD etc.” The implication was again that a user was going to use commercial recordings to source samples. In contrast to the common notion that the E-mu SP-1200 drum machine/sampler was created with beat makers in mind, the instruction manual for the SP-1200 instructs users to use a “microphone, synth drum output, etc” (E-mu SP-1200 user manual 1987, 42).
Some companies that created samplers envisioned that their products were going to be used to sample from commercial recordings and others did not. It is more useful to see the development of sampling technology as a new frontier in professional audio that was seeking creative settlers; and similar to how the establishment of the cultural underpinnings of the American Northwest frontier was disparate from that of the Southwest, hip-hop beat makers that began using samplers had different intentions for their creative practice than other popular music creators entering the sampler frontier of the 1980s. Hence, I reiterate the need to avoid seeing the products of the early years of hip-hop sampling as exotic manifestations from the ‘hood—though many of the beats to be discussed were created in areas that are understood as ‘hoods, places where experiments with technology were not supposed or expected to occur. Instead, I see them, and encourage the reader to see them, as products of idiosyncratic and ingenious applications that took advantage of the capabilities of contemporaneous music technology in order to realize certain aesthetic goals and creative imaginings. For Marley Marl, one of his goals was to move away from the electro sound heard on hip-hop recordings, and the practice he accidentally initiated during a studio session with an Emulator was a means to that goal.
When Marley Marl started to create sample-based beats in 1985, it was not in a recording studio—recorded hip-hop had not engaged with sampling yet—so he did not have access to an $8000 sampler like the E-mu Emulator. Discussing his set up in the mid-1980s Marley stated:

I didn’t have no elaborate equipment, I just had the cheapest stuff that I could use. Three separate samplers, and an [TR-] 808 trigger and the samplers. Using the hi-hat from the 808—the open hi-hat and the closed one—and the boom from the 808 [kick drum] and the clap. (Weisfeld 2007, 11:58)

The samplers he used were multiple SDD-2000s (Sampling Digital Delay; released in 1985) from the Japanese electronics company Korg, one of many companies that in the years following the unveiling of the Fairlight CMI developed lower-cost consumer sampling devices. The Korg SDD-2000 (fig. 3-14) was a rack-mount hardware unit, which meant that it was in a form that allowed it to be mounted in a cabinet with other audio hardware that could be routed into a mixer.

**Fig. 3-14: Korg SDD-2000 (Sampling Digital Delay) rack sampler (rel. 1985), front panel**

Rack-mount hardware are typically devices that feed audio signal effects into a mixer: reverbs, compressors, limiters, and, as was the SDD-2000, delays. The SDD-2000 was made popular as a
digital delay by U2 guitarist The Edge, who used the unit to create his distinct guitar sound.

The sampling function, highlighted in fig. 3-14, though, was what attracted Marley Marl as a hip-hop beat maker—though his use of the delay function is heard during the introduction section of “The Bridge.” While I could not find the original retail price for the SDD-2000, because the sampling function was housed within a rack-mount unit, and not within a more expensive to produce synthesizer keyboard, it must have been significantly less than E-mu’s Emulators. In addition, Japanese electronic companies made it a point to price their products competitively in the American market (Vail 2000), case in point being Akai’s first rack-mount sampler, the S-612, released in 1985 at $995 (see fig. 3-15). At a price probably under $1000, buying two or three SDD-2000s was still cheaper than any available Emulator.

Fig. 3-15: 1985 Keyboard Magazine Advertisement for Akai S-612

Marley Marl created and stored the samples that he used in his beat compositions in the SDD-2000 unit. He connected the output from his turntable mixer to the rear input of the SDD-2000 (right side of fig. 3-16). After pressing the “SAMPLING” button on the front panel, once
the audio source passed +3 decibels (dbs) the sampler started to record audio. Marley then pressed the “REC” button to stop the recording of a sample.

**Fig. 3-16: Korg SDD-2000 (Sampling Digital Delay) (rel. 1985), rear panel**

According to Marley Marl (2013a), after a suggestion from his friend, he sampled the kick sound from “Impeach the President” on one of the samplers and the snare sound on another. It is important to remember that his first discovery with a sampler was extracting drum sounds, which was ideal for the limited amount of sample time of early samplers. Sample time is the total amount of sampled audio—measured in time units—that a sampling device can hold in its RAM (random access memory) at one time. The SDD-2000 could store a maximum of 4368 milliseconds of sampled audio or 4.368 seconds. To put the SDD-2000 sample time in context, the first Emulator (1981) had seventeen-seconds of sample time (Vail 2000). Consequently, the low amount of sample time was another factor in the SDD-2000’s lower price.

As a rack-mount sampler with limited function, the SDD-2000 did not feature an interface for playing back sampled audio. In order to playback or “trigger” a sample, a user of the SDD-2000 had to sync the unit with a device that had a performance interface like the keyboard of a synthesizer or the pads of a drum machine. Marley Marl decided to use the latter, his Roland TR-808 that he used for programming drum patterns before he started sampling. Returning to the rear panel of the SDD-2000 (fig. 3-16), the left side had a ¼ inch input labeled “TRIG.” In figure
3-17 we can see the rear panel of the TR-808; the highlighted section shows three ¼ inch sockets under the label “TRIGGER OUT.”

**Fig. 3-17: Roland Transistor Rhythm 808 (TR-808), rear panel**

(Extracted from user’s manual)

Under each socket is an abbreviation that corresponds to a sound produced by the TR-808: CB=cowbell; CP=clap; AC=accent (see fig. 2-10b in Chapter 2). Roland’s popular drum machine, released in 1981, allowed a user to bypass those sounds in order to trigger an external sound through their ports; and if a user synced the TR-808 to another device through its DCB (Digital Control Bus) slot (a precursor to MIDI with a similar form for compatibility) the triggered sound could be programmed by the TR-808’s sequencer. Thus, Marley was able to trigger sounds from three different sources using his TR-808. However, according to his account of making “The Bridge” (Marley Marl 2013a), he only used two of the 808’s three trigger ports for his two SDD-2000s (fig. 3-17). Figure 3-18 shows Marley Marl’s workflow for using sampled drum sounds from “Impeach the President” to make “The Bridge.” With the kick and snare sounds at his command he chose to recreate the rhythm and tempo The Honey Drippers’ recording.
The Mad Science of Hip-Hop: Chapter 3

Fig. 3-18: Marley Marl’s Workflow for making “The Bridge” beat in 1985

The drum track on “Impeach the President,” though, also features a hi-hat. Marley programmed the hi-hat part using the internal sounds from the TR-808, which created a timbral clash between the synthesized analog sound of the hi-hat and the sampled digital sound of the kick and snare. The use of heterogenous sound qualities in composition is an approach that is familiar to African descendants in the U.S. (Wilson 2001). Breakbeats and mixes from deejays usually featured timbres and instrumentation from disparate recordings, providing the early sound of hip-hop with a heterogenous sound quality that was an aesthetic characteristic of previous black musics in the U.S. The electro and hard beat/turntable styles of hip-hop featured the meshing of diverse sounds; Marley, though, instituted a very distinct heterogenous sound quality for hip-hop with his use of sampled and synthesized sounds. The timbral clashes that Marley established in his early sample-based composition became an aesthetic goal for other
beat makers as they gained access to samplers, perhaps reaching an apex with productions by The Bomb Squad and the Dust Brothers.

After completing the drum track, Marley finished the beat by adding a horn sample from “Scratchin’,” a 1975 disco recording by Magic Disco Machine. The horn sample provided the contrast needed for the chorus section of the song. To make the horn sample stand out he reversed the sample so the horn sound and its reverb played backward, he then triggered the sample with the kick program in his TR-808. As Marley states in his “Classic Recipes” video (2013a), many listeners thought Marley had created a weird sound for the record; using reversed sounds was usually reserved for drum tracks (see “Paul Revere” (1986) by the Beastie Boys).

The process of creating sample-based beats was established using a configuration of turntables and low-priced samplers that usually had other functions, and then configuring compatible drum machines to trigger samples. In 1985, plenty of technical knowledge was a prerequisite to a beat maker’s crafting of a sample-based beat. Understanding how to route a turntable to a sampler, use the sampler, and then configure a four-year-old drum machine to trigger external sounds and sequence those sounds properly was a large part of the process, even before figuring out where and how to record the audio output to tape—usually on a four-track consumer recorder. Making sample-based beats was thus established with a need for technical prowess in regard to audio technology. Also, a prospective beat maker that wanted to use samples had to have access to all of the equipment that Marley had or more expensive counterparts.

For people that did not have access to sampling technology, sample-based beats could be made using the pause tape method, as described earlier when referenced by Mike Simpson as a method for making his PSA beats. One of the more significant reasons that the creation of hip-
hop’s music moved to the sampler was because of the physical impossibility that a deejay could extract short segments of audio and quik-cut them at a speed that allowed them to be sequenced, as Marley Marl did with the kick and snare sounds from “Impeach the President.” Though he did not have a sampler, Chuck D initially created the sample-based beat for “Public Enemy #1” (1987) using two tape decks and the Roland CR-8000 drum machine. The production of “Check Out the Radio” (1984) had utilized a turntable to input instrumental sounds. Chuck D explained that he bypassed the use of the turntable because it was incapable of creating the sonic layers that he envisioned for his beat: “‘Blow Your Head’ was a favorite of mine at the rink, but you could never find anyone who could DJ it and put it together quick enough, so that’s why I had to use the tape decks” (Coleman 2005, 171). “Blow Your Head” is a 1974 recording by Fred Wesley & The J.B.s with a solo Moog synthesizer introduction that attracted Chuck D. “I pause-buttoned it together, did a vocal and overdubbed it on another tape deck” (ibid.). With the use of two tape decks and a focused ear, Chuck D was able to extract the parts of the synthesizer line that he wanted and create a sample arrangement using the tedious pause tape method. Sampling technology was available to consumers in 1981 but not financially realistic for deejays and prospective beat makers. Thus, in contextualizing Marley Marl’s hodgepodge of technology and Chuck D and Mike Simpson’s pause tape compositions, the establishment of sampling as a practice for crafting hip-hop’s music and the sound of samples as an aesthetic choice is an example of hip-hop’s beat makers embracing the limited access to and capabilities of technology needed to achieve their aesthetic goals.
The Sonic Historiography of Early Sample-Based Recordings: Sample Fidelity

As digital samples were becoming a compositional component in hip-hop’s music, sampling technology was in its nascent period. For early adopters, sampled drums or instrumental sounds from a recording were supposed to sound more natural, or less artificial, than their synthesized counterparts. But early digital sampling did not produce high fidelity outputs of extracted analog sounds. Analog sound refers to sound that is (re)presented artificially with varying values that correspond to the natural quality of sound waves, in other words are analogous to natural sound waves. Phonograph technology is analog: as sound waves enter the system they activate a needle that, depending on the pitch and amplitude of each sound wave, etches a distinct groove into a recording medium (cylinder, acetate, vinyl). Analog synthesizers and analog audio were classified as such because the pitch and amplitude of a sound wave were translated into varying electric pulses that struck a wire. In each case, the artificial production of sound replicated the variation of natural sound waves. Digital sound, because it is represented in bits (1s and 0s), is more finite in its (re)presentation of a natural sound wave. The graphs in figure 3-19, going from the top row to the bottom row, display how an electric analog system outputs an analog signal and how that signal is then digitally recreated once it is sampled under distinct sample rate and resolution conditions.
Analog signals are converted into digital format through pulse-code modulation, a process that determines how well a digital sound corresponds to its analog counterpart. When discussing the quality of an analog to digital transmission two parameters provide much of the information, sample rate and resolution, which factor into the overall bit-rate of a sound (Fries and Fries 2005). Early sampling technology used by hip-hop beat makers converted analog signals into samples at a low sample rate with a relatively low number of bits. In the language of beat makers and other music composers, the term ‘sampling’ refers to the act of extracting a piece of audio from an existing recording. E-mu Systems’ Emulator (1981) was the first instrument marketed with the word “sampler.” Scott Wedge, co-founder of E-mu systems explained that the use of “sampler” had a double meaning during development: “The in-house product name for the Emulator I was the ‘Sampler.’ For us, that was kind of a pun between Nyquist’s sampling
Theorem—which is an obscure piece of mathematics that underlies the whole genre—and the Whitman Sampler, a box with a whole bunch of different flavors of chocolates in it, because this was an instrument that could have a whole bunch of different sounds” (Vail 2000, 224). Digital samplers were key in expanding the sound palette of synthesizers, but electronic engineer Harold Nyquist’s theorem about sampling audio frequencies explained the early limitations on the fidelity of samples.

The Nyquist frequency is the frequency at which per second samples of audio become inaccurate and is approximately half the sample rate of a digital system. In the 1950s, Nyquist conducted research at Bell Laboratories on the transmission of digital audio over telephone systems (Howell 2005). He came to the conclusion that in order for a digital system to produce a certain frequency (pitch) it had to have a sample rate twice that frequency. Sample rate is the number of times per second that a digital system samples or records an analog signal. In figure 3-19 this concept is exhibited in the increase in the number of vertical bars in the bottom right graph; an increase in the number of times a system samples results in a better representation of the topography of an analog wave. Sound waves at higher frequencies (pitches) are moving so fast that early digital systems with a low sample rate could not reproduce them properly. The Fairlight CMI, the first digital sampler, had a sample rate of 16kHz (kilohertz) (16,000 samples/second). The digital sounds it created could not properly output frequencies above roughly 8kHz, which the designers of the CMI alleviated by automatically filtering out frequencies above that point (Vail 2000). To put 8kHz in context, the pitch C9 on a standard 88-key piano is roughly 8.4kHz and C4 is 260hz. The human ear, though, can perceive up to roughly 20kHz (aging leads to some attenuation). Thus, while the actual pitches of most digital samples from the CMI were apparent, the natural brightness and overtones of a sound that the
human ear can hear were lost. The CMI was also an 8-bit sampler, meaning each sample—of the thousands per second—had a bit depth, or resolution, of eight bits of data (1s and 0s). The resolution of each sample allows a digital system to account for the dynamics of an analog signal more accurately. In the same way that as resolutions of televisions increased to high definition (HD) screen images became clearer and of a higher quality, as the resolution of sampler technology increased so did the clarity of pitches and tones and the quality of audio in a sample.

Considering that most early digital sample systems filtered out certain frequencies or, like the products at E-mu Systems, used companders to improve the perceived sound of samples, it is logical to assume that the imperfections in sound produced by early sample systems were undesirable.\textsuperscript{44} For some, though, the imperfections were sought after. As previously discussed, Roger Linn’s 1980 drum machine, the LM-1, was being developed as the Fairlight CMI was in development and featured digital samples of percussion sounds. Fairlight’s co-founders and engineers Kim Ryrie and Peter Vogel built the CMI’s sampler with an 8-bit analog-to-digital converter at a 16kHz sample rate. The sampler in Linn’s machine was also 8-bit but had a sample rate of 27kHz. Nyquist’s theorem on sampling told Linn to design his analog-to-digital converter to filter out frequencies above approximately 13kHz: “Instead, I let some of the frequencies above that point get through because the results—which can get distorted—sounded like the sizzle of drums anyway” (Vail 2000, 291). As a drummer, Linn appreciated the imperfections of his sampled sounds because they faintly alluded to the sound of actual drums, a feat that was difficult to accomplish with stable digital samples at the time. A similar affinity with the imperfections of nascent digital sound was also established among beat makers that used low-bit samplers to sample sounds from vinyl recordings.
Aesthetically, distorted sounds provided a preferred coarseness to a beat, a coarseness that related more to the sound of 1970s vinyl recordings than to 1980s synthesizer instruments. The Korg SDD-2000 that Marley Marl used to make the beat for “The Bridge” probably had an 8-bit sampling system—the user manual does not detail the specifications of the sampler but that was the standard bit resolution in 1985. Figure 3-20 displays the waveform of the drum pattern from “Impeach the President” and how Marley Marl recreated the pattern for “The Bridge.” It is worth noting that the beat annotations visualize the regulation of the rhythm by the TR-808’s sequencer. Figure 3-20 shows the impact of an 8-bit sampler on sounds sourced from an analog recording.

**Fig. 3-20: Waveforms of “Impeach the President” (1973) (top) at 00:00 and “The Bridge” (1986) (bottom) at 00:12 with beat annotations and accompanying waveform labeling.**
When “The Bridge” was released it was a popular recording in New York City but it did not have the national popularity that Run-D.M.C. and the Beastie Boys were afforded with their drum machine/turntable compositions. The recordings from Def Jam Records at that time prioritized the drum machine and featured distorted guitar, but overall they had warm sounds that were well recorded and mixed on a 1973 Neve mixing board by Steve Ett at Chung King Studios in Manhattan. The drum sounds heard on Marley’s productions from 1985 to about 1987 were sought after by the producers at Def Jam who could not figure out how he made his drums sound the way they did (Steward 2006). Marley Marl established sampling in hip-hop with his extraction of drum sounds, and his crunchy drum sounds readjusted the sonic standard for hip-hop’s music.

By 1985/1986 there were several digital sampling devices that beat makers could use if their creative imaginations led them to the sampling process. Ensoniq is an American electronics company that was founded in the early 1980s by Bruce Crockett, Albert Charpentier, and Bob Yannes. Amongst hip-hop beat makers the company is known primarily for the ASR-10 (Advanced Sampling Recorder), a keyboard/sampler released in 1992. Ensoniq initially entered the sampling market in December 1984 with the Ensoniq Mirage, an 8-bit keyboard sampler that rivaled the CMI and the Emulator. After realizing that the sampler market offered a better entry point than the saturated synthesizer market, they embraced a research and development (R&D) and marketing strategy based on price point—a strategy that was also used by Akai with their S-612 rack-mount sampler. Ensoniq created an inexpensive custom chip for sampling and positioned their product at a price lower than previously released samplers from Fairlight and Emu; the Mirage debuted at a price of $1695 (Théberge 1997). The Mirage, though, became very
enticing once it was converted into a lower cost rack model (fig. 3-21) and sold for under $1200 in 1985.

**Fig. 3-21: Two models of the Ensoniq Mirage sampler**

(Cropped images from http://www.vintagesynth.com)

The low-price, low-bit Mirage became an entry point into sampling for beat makers. As Spectrum City transformed in Public Enemy and was given an advance from Def Jam Recordings for recording studio time, they added the sampler to their ‘turntable as a manual sampler’ and pause-tape processes for making beats. Hank Shocklee explained the sound quality impact of using the Mirage to music researcher Will Fulton:

> Taking the sound and putting it in the Mirage and then playing it back, it did something to it. To me, the Mirage was like the god. Because, you’re talking about a 4-bit sampler that took things and made it sound like something else. You could take a saxophone sound and bring it down to 4-bits, it now sounds like a teakettle. You’re like, ‘it sounds crazy, what is that?’ But you don’t know what it is. Now adding a little bit of reverb on it with a little EQ from the board. Now you’re taking the sound and you’re pushing the dimension. (quoted in Rivers and Fulton 2013)
The Mirage was actually an 8-bit sampler but, as discussed above, recreating the smooth topography of an analog signal was unworkable with any low-bit sample system and thus, even at 8-bit, the Mirage did some interesting things during its analog-to-digital sampling process. The saxophone-to-tea kettle transformation that Shocklee references in the previous quote is in reference to a sample from “The Grunt” (1970) by the J.B.’s, prominently heard on “Rebel Without a Pause,” Public Enemy’s 1987 single and a track off of their seminal recording *It Takes A Nation Of Millions To Hold Us Back* (1988). The Mirage was also used to create the samples heard on Public Enemy’s 1987 debut album *Yo! Bum Rush The Show*.

In the fall of 1985, in Southern California, Mike Simpson was also introduced to the Mirage when he enrolled at Citrus College after graduating from Pomona College of the Claremont Colleges. The decision to enroll at Citrus College was financial—it allowed him to defer paying his student loans—but it was fortuitous as the college had started an electronic music program that fall with a $20,000 grant it received. One of the professors recognized Mike from his late-night hip-hop radio show and gave him access to the college’s recording studio, which had a Fostex 8-track, a personal computer with *Texture* (one of the first sequencing software programs designed by Roger Powell), and a Mirage keyboard sampler. “It just happened that I’d figured out that I can use an audio trigger from an analog drum machine to actually trigger a sample on the downbeat on this sampler. I think the first thing I looped was “Funky President” by James Brown,” explained Simpson as he discussed his introduction to sampling through the Mirage. As he and John “King Gizmo” King became the Dust Brothers, the Mirage became a part of their workflow.

From 1985 to 1988 there was an annual increase in the number of hip-hop recordings that featured low-bit sample sounds and a decrease in the number of recordings that featured the
The year 1987\textsuperscript{45} was a highly contested year in this aesthetic transition and 1988\textsuperscript{46} saw the aesthetic leanings for hip-hop’s sound tilt toward digital samples and sample arrangements. During this three-year period, E-mu Systems released their SP-12 (Sampling Percussion) (1985) and SP-1200 (1987); Akai released their S900 (1986) and S950 (1988) rack-mount samplers and, in a joint project with Roger Linn, the MPC60 (MIDI Production Center) (1988); and Ensoniq released the EPS (Ensoniq Performance Sampler) (1988). While beat makers in the late 1980s used innumerable configurations of samplers and sample triggers, the samplers just listed were among the more popular as word-of-mouth and peer and mentor/protégé networks enlightened prospective beat makers about how their favorite beats were created. DJ Premier (Chris Martin), heralded beat maker for rappers Nas, The Notorious B.I.G. and Jay-Z and one half of the group Gang Starr, started making beats on his Yamaha drum machine in the mid-1980s while attending college in Texas, “[B]ut it wasn’t sounding like these hip-hop records that were coming out, because I wasn’t in New York at the time and did not know what they were using” (quoted in Tingen 2007). Premier moved to New York City in the late 1980s and befriended Large Professor (William Paul Mitchell), who taught him about the E-mu SPs and sampling techniques (Alarcón 2006, Tingen 2007). With the exception of the Ensoniq EPS having a 13-bit sampler and substantially higher variable sample rate, the samplers most used by beat makers once sampling became a common practice had 12-bit resolutions and low sample rates, which resulted in frequencies between approximately 13kHz and 20kHz responding with varying levels of distortion and noise. In general, sample-based beats had a crunchy and distorted start.

Within the group of sampling devices used by beat makers, the products from Akai and Ensoniq from the late 1980s/early 1990s period were accelerating the sound quality of samples.
As beat makers adopted new sampling devices with advanced digital conversion systems the sound of hip-hop in regard to sample fidelity and timbre shifted:

[T]hey came into the studio with the (Akai) S900 at that point … I listened to it.

8-bits, first of all I didn’t like it, it lost it’s whole—it was smooth. Instead of it being like “eeeeeennnnnnnn” (he makes a screechy sound while contorting his face) is was like “eeemmmmnnnnmmmm” (he makes a more hum-like sound with a comforting countenance). It was like, “what the fuck is—.” It was like “uuhhh, that’s disgusting.” It was real wimpy. (Hank Shocklee in Schmidt 2005, 0:58:21)

Shocklee was four bits off as the S900 was actually a 12-bit sampler with 7.5kHz to 40kHz variable sample rate, but his sentiment was nonetheless valid: a 12-bit sample was still relatively low fidelity but had an apparent quality to it that, despite Shocklee’s disparagement, beat makers at the time recognized and were eager to use for their own compositions.\(^\text{47}\) Lee Stone, like many other beat makers in the late 1980s, even began to use the SP-1200 as a trigger and loaded his samples into an Akai S950 because “[I]t was a cleaner machine. The 12[00], I wanna say it was 8-bit, it was like a real low grade bit. Great for drums but you couldn’t put anything in there to be usable because it would grain it out and become unusable” (Lee Stone, interview with author, Long Island, New York, October 12, 2011). Beat makers sample music that they are attracted to. For some, the early samplers eliminated the sonic characteristics that they wanted, and so they moved to better technology. Mike G, a hip-hop and house music producer since 1988/1989, explained his reaction to the increase in sample fidelity once he started using advanced sampling devices:
It’s the bit quality that was the most important thing. That was the difference. Just prior to the E-mu SP-12 the bit quality was 4-bit or 8-bit, I forget; and then it shot up to 12-bit in one shot, which more than doubled the quality. And all of a sudden the sounds that we were used to on the radio, unless they were actual instruments, they weren’t as good as these newer sounds. (Mike G, interview with author, New York City, April 21, 2006)

From Hank Shocklee’s perspective the increase in sample fidelity was a hindrance to the sonic quality of hip-hop’s music; however, the increase in the sonic fidelity of the predominant component of hip-hop’s music corresponded with an increased interest in hip-hop music throughout the U.S. music industry: independent recording labels that produced hip-hop recordings for niche pockets of hip-hop enthusiasts began to be purchased by major music/entertainment conglomerates. My intention is not to attribute hip-hop’s entry into mainstream musical consumption completely to the rise in sample rates and sample resolution, but it is difficult to ignore the coinciding phenomena that occurred in the early 1990s. As Mike G expressed, the early sample-based beats featured on “hip-hop radio programming” became dated as the high sample rate machines became available.48 When sample-based beats started being made on high fidelity machines (see: “U Can’t Touch This” (1990) by MC Hammer and “Ice Ice Baby” (1990) by Vanilla Ice), they began to diminish the Top 40 radio prospects of the Run-D.M.C. and the Beastie Boys pre-sampling sound—though the Beastie Boys changed their sound in the late 1980s. Thus, it is not a stretch to believe that early sample-based beats were excluded from commercially recorded hip-hop because some major record labels that helped distribute recordings from Def Jam and Profile Records may not have approved of anything less than the
highest available quality of sound when deciding on recordings they would push for major radio airplay.

The Sonic Historiography of Early Sample-Based Recordings: Sample Manipulations

But then we seen the game start to change, like around ‘86. It was Marley Marl, he would take a snare from a James Brown record and then he’d take the kick from some other record. Then he got a hi-hat from an O’Jays record and he got his little band right there in a sampling drum machine. Once I seen him doing that I was like, ‘yo, I want to do that shit.’

—Easy Mo Bee (Steward 2006, 22:01)

As others started to learn what Marley Marl was doing with sampler technology the practice was adopted and began a new era of hip-hop beat making. “When we did ‘Ego Trippin’ we were at the end of the DMX drums, the mechanical sound, and the beginning of sampling,” explained Ultramagnetic MCs rapper Kool Keith to journalist Brian Coleman (2005, 116). When sampling became the common practice for creating hip-hop’s music and began to dominate the sound of hip-hop in the late 1980s/early 1990s, there were several dynamics at play that impacted the practice of beat making. Even with the variety of options that beat makers were offered, certain sample manipulations from this period illustrate a common approach to the early sampling devices and to what hip-hop was as a musical form.

Time Restrictions and Sample Types

Advertisements for samplers in the early-to-mid-1980s attempted to create excitement about the new consumer products by emphasizing the unfathomed possibilities for the types of
sounds that could be stored and used (Théberge 1997). While false or incomplete advertising is a growing pain of media literacy and understood as an early ‘buyers beware,’ it appears that most advertisements for digital samplers left out the sample time restrictions—and hence restrictions in the types of sounds that could be sampled—because of contemporaneous microprocessor and RAM limitations. So, if we imagine an early 1980s sampler user wanting to have the sound of a lion’s roar at their fingertips, the hope was that the lion was terse in its regal expression. In the mid-to-late 1980s, though, hip-hop beat makers were not sourcing lion roars to create grooves. The grooves they wanted at their fingertips were breakbeats and a variety of musical elements from older recordings, which may not have fit within the sample time restrictions of certain samplers. Once samplers became a standard for making hip-hop beats, their user controls and technical limitations impacted the sound and structure of hip-hop’s music.

When Marley Marl initially discovered the compositional possibilities of samples, his creative ideas steered him primarily to drum sounds and then to a horn hit; sounds that barely last a second. A plausible assumption could have been made that another beat maker, perhaps one that was using pause-tape techniques, wanted to sample other, longer sections of a recording. Many did aspire to use longer samples rather than short spurts of sound and quickly figured out strategies for creating sample arrangements with the available amount of sample time. DJ Rob Swift worked in a studio with producer Large Professor in the late 1980s/early 1990s and described the limitations at that time and the process and decisions that beat makers made to get around those limitations:

People don’t have the patience to try to figure out how to sample a twelve-second loop with a machine that only allows you seven-seconds, you know what I mean, and that’s how I learned. Watching dudes like Large Professor take a sound that
lasts for twelve-seconds and dissect the sound with his ears and sample it into a SP-1200 that only gets seven or eight-seconds worth of sample time; but being sonically intellectual enough to say, “but if I take a second from this part and two seconds from this part, it’ll give me the whole loop. Alright, now I just gotta figure out how to piece it together again.” (Interview with author, New York City, July 23, 2011)

Some beat makers that wanted to use samples disregarded the available samplers because of sample time limitations. Mike Simpson described the Dust Brother’s early use of computer-based music software to avoid of the limitations of samplers:

The SP-12 had existed but you could only get two or four seconds of sampling on it, you couldn’t really do any phrase sampling…at the end of the day we knew that it was all about having a computer-based system to actually be able to make a whole record, and that was our goal, to just make a whole record with the computer. (interview with author, Pasadena, CA, July 28, 2011)

Each of the above statements describes how the sampling process of beat makers during this time was defined by the amount of available sample time in hardware they had access to and their ability to imagine competent sample arrangements with short segments of sound.

Figure 3-22 shows the advancement of the amount of sample time offered by the E-mu sampler/drum machines throughout the 1980s. The Drumulator (1983) was the machine that ensured the early success of the E-mu systems (Vail 2000); Rossum and Wedge took the sampling engine from the Emulator (1981) and created a drum machine, the Drumulator, with
the ability to sample for under $1000 to compete with the $4995 Linn LM-1, which featured sample drum sounds.

**Fig. 3-22: The progression of E-mu System’s Sampling drum machines with the amount of sample time**

![Image of E-mu System’s Sampling drum machines](image)

The technical tweaks to the Drumulator fed directly into the most important instrument in E-mu’s early history, the Emulator II (1984), which begat the SP-12 in 1985. The lineage of E-mu products is relevant to this section because, from 1981 to the release of hugely popular SP-1200 in 1987, E-mu’s flagship product, the Emulator, was at the forefront of sampling devices, and the state-of-the-art features of the different Emulators were slightly reduced and released as lower-cost drum machines. Thus, in the case of sampler/drum machines—the most used form of sampler by beat makers during this time—Moore’s law was essential to hip-hop music’s transition from short drum hit samples to layered sample arrangements. Additionally, the lower price of the SPs made sampling accessible to more people, and the inclusion of a sequencer and an interface that did not allude to traditional musicianship with a piano keyboard allowed beat makers room to explore new processes for composing musical arrangements.

Ego Tripping” freaked me out when I first heard it, because nobody had ever really looped a beat before. Crash Crew did it with ‘Get Up and Dance’ in 1980, but that was without a sampler. When I heard that first Ultra song I was like:
‘Wow, you can do that??!’ People take sampling for granted now, but back then it was crazy.

–Prince Paul (quoted in Coleman 2005, 113)

“The Bridge” was created in 1985 but was released as an official recording in 1986, and introduced the larger hip-hop listening public—still mostly metropolitan areas like New York City, Los Angeles, Oakland, Philadelphia, and Miami—to digital samples as the predominant elements of a hip-hop beat. As mentioned earlier, 1986 was the year that hip-hop recordings really started to feature samples. “Ego Tripping” by Ultramagnetic MCs featured a seminal beat that displayed the creativity that could be expressed with knowledge of recordings and five seconds of sample time. Ced Gee (Cedric Miller) was the beat maker and primary producer of the group and credits technology with the formation of Ultramagnetic MCs: “[I] was the first person in the ghetto who had an SP-12. My brother used to read up on music stuff and he told me about the SP at the time. It cost $2,500. And when I bought it, Ultra was formed” (ibid., 118). “Ego Tripping” (1986) was the group’s first single and introduced a new breakbeat to hip-hop: the drum introduction from “Synthetic Substitution,” a 1973 R&B recording by Melvin Bliss. After hearing “The Bridge” and “Eric B. Is President”—two hip-hop recordings from 1986 produced by Marley Marl with his drum sample method described earlier—Kool Keith decided that he wanted to rhyme over a breakbeat. He borrowed “Synthetic Substitution” from a friend and had Ced Gee make a beat from it (Batey 2010). Figure 3-23 shows the first five bars of “Synthetic Substitution” with the three sections that Ced Gee sampled for “Ego Tripping” in brackets with accompanying sample length.
The large bracket is the drum break sample and the latter two are piano chord stabs that he rhythmically scattered every two bars. The foundation for “Ego Tripping” consists of the short samples but is supported by Moe Luv, the deejay of the group, scratching in James Brown’s voice saying “get down” from his 1973 recording “The Boss,” as well as a synthesizer bass line. Other sample-based beats from this time also featured aspects of previous beat making methods, displaying the initial additive effect within the practice of beat making as older technologies were used in collaboration with newer ones. Deejays continued to have a role in the creation of hip-hop music at this time because they had access to recordings, and scratching was still an important layer to a beat because sample time was at a minimum and the sound was still a marker of hip-hop music.

Ced Gee’s beat for “Ego Tripping” used a short drum pattern from a recording to make a loop and then added other short stabs. The next era-defining practice in the development of beat making was chopping up a short sample and rearranging the parts into a new loop. Public Enemy, particularly Hank Shocklee, was at the vanguard of sample manipulation. Public Enemy signed with Def Jam records in 1986 after being pursued by Rick Rubin for two years after he heard their promotional recording “Public Enemy #1” in 1984. Once signed, they entered the
recording studio with most of their first album already done. Chuck D had spent hours and days listening to recordings, Shocklee had tinkered with all the latest music technology, and Keith Shocklee, Eric “Vietnam” Sadler, and Gary “G-Wiz” Rinaldo had contributed their musical ideas to complete the production team called the Bomb Squad. The Ensoniq Mirage was Hank Shocklee’s first sampler. After completing the beats for *Yo! Bum Rush the Show* (1987) he experimented within the limitations of the 1985 machine to make the beat for “Bring the Noise,” which was first featured on the soundtrack to the 1987 film *Less Than Zero*.

The Mirage had a variable sample rate that impacted the amount of sample time that a user could access. If a user wanted samples with a sample rate of 33kHz there were only two seconds of sample time available. At the other extreme, if a user created samples with a 8kHz sample rate then there were 6.5 seconds of sample time available. In using the Mirage to make beats, Shocklee has proclaimed that he only had three seconds of sample time at his disposal (Schmidt 2005), thus it is probable that the samples that he created in the Mirage had a sample rate of approximately 20kHz. The limitations of the Mirage as a sampler did not end there:

And it was, you know, the stars lined it up for me. I was doing this thing (*he mimes scratching on a turntable and pressing the sampler button*) again and I was trying to catch it and I caught the right piece of it in three-seconds. Because, you know, one thing about the Mirage is like when you have three-seconds and you know you only got three-seconds and your piece is really three and a half seconds long but you really want to catch the best three seconds out of that; well, you gotta keep doing it until you catch it right, the way you want it. Because there was no truncation really on that, you know … it was like, what you caught was what
you had to use. So, you had to make sure that you caught it, that you caught it right. (ibid., 0:52:39)

The ability to edit, especially to truncate, a sampled sound was not standard on some early samplers but was vital when sample time was at a premium. Deejays like Shocklee were able to get around this by manipulating a vinyl recording with their hand to make the desired section play as they activated the sampler. By 1987, all samplers included the ability to edit a sample, but this limitation explains the fact that some of most used samples from the early period of sampling were sourced from the beginning of recordings—popular samples from “Impeach the President,” “Synthetic Substitution,” “Funky Drummer (Bonus Beat Reprise),” and “The Grunt” can be heard at the beginning of their respective recordings. The core sample arrangement for “Bring the Noise” is impressive considering the limitations of the hardware used by Shocklee.

Figure 3.24 displays the 01:42 mark of Marva Whitney’s 1969 recording “It’s My Thing, Pt. 1.” This point of the recording features a solo tenor saxophone and a trap drum part that served as a segue into the second part of “It’s My Thing.”

**Fig. 3.24: Samples from “It’s My Thing, Pt. 1” (1969) by Marva Whitney, audible at 01:42**

With the Mirage, Shocklee sampled a little over one-second of audio from the track—where the saxophone is basically heard alone—and then chopped up that audio into the three highlighted
sections. He then rearranged them into a layer alongside drum programming and a later—after Chuck D recorded his vocals (Rivers and Fulton 2013)—added a loop of the introduction to Funkadelic’s “Get Off Your Ass and Jam” (1975) (fig. 3-25).

Fig. 3-25: Public Enemy “Bring the Noise” (1987), sample arrangement from verse section with drum programming

The title “Bring the Noise” is appropriate as the sample from the Funkadelic record is nine seconds of a delayed and distorted guitar that transitions to another delayed sound effect and concludes with an incomprehensible vocal exclamation. The loop is more than three-seconds, but was the result of the comprehensive beat making process of the Bomb Squad, which saw the use of samplers, drum machines, turntables, tape machines, and live instrumentation for creating beats. That section was either: a) recorded to tape and looped or b) they created a low fidelity sample and proceeded to chop it into pieces that once put together could resemble the original loop. What is particular to the “Get Off Your Ass and Jam” loop is that, because it is the result of
a technical effect, it has a regular timing but does not correspond to the meter of the song proper. Aesthetically, The Bomb Squad’s sampling process featured idiosyncratic uses of samples: “A loop would never be looped at two bars. It might be looped at 2 ¼ bars, so it wasn’t precise,” explained Shocklee (Allen 2006, 71). The “Get Off Your Ass and Jam” sample shows the use of a non-common time meter loop in a common time meter song. The “Get Off Your Ass and Jam” loop, though, is the noise that surrounds the foundation of the sample arrangement created with short samples.

**Filtering**

You had guys like Large Professor reinventing how to create beats, filtering songs, EQing songs in a certain way where he’d sample them and you wouldn’t know where he got that sample from unless he took the filter off and played that song for you the way it was supposed to be heard.

–DJ Rob Swift (pers. comm.)

Sampling and the use of samples to create beats did not always create sounds and products that were ready for a commercial recording, even as the gritty crunches of early samplers were embraced for their imperfections. When beat makers combined audio from a drum machine and from multiple recordings they had to negotiate the frequencies and textures of different eras of audio engineering; in addition, they did not always want every instrument in a sample heard, or for the sample to be recognizable. For music engineers, filtering is a form of audio signal processing in which certain frequencies are attenuated or suppressed in order to achieve a certain sonic image. Beat makers, particularly when sampling was rampant during the late 1980s/early 1990s, initially used filtering for aesthetic reasons but soon learned of the compositional uses of
different filtering techniques. Returning for a moment to “Bring the Noise,” the cacophony heard during the chorus section was a signature of the Bomb Squad’s style of layering of samples, but they had to manipulate the frequencies of each layer so everything could mesh according to their sonic standards. Chuck D revealed that they had to lower all of the bass frequencies out of Terminator X’s scratches during the chorus in order to get the full mix to sound acceptable. As they discovered the usefulness of filtering they realized that they could filter the bass out of a sample and the remaining sounds could be used to their creative ends (Coleman 2005). Filtering samples in order to make them sound better or to exploit a particular instrument in a frequency range was a defining type of sample manipulation from this time:

[H]eavy filtering has to be used which will get rid of the distortion and digital noise but this will also produce a more muffled tone as it will remove the higher frequency component of the sound even further. (emphasis added, Akai S950 Manual 1988, 76)

As discussed earlier, the first samplers used by beat makers did not produce high fidelity samples. High frequency—and some low frequency—details of a sound became distorted in sample systems with a low resolution or sample rate. In my conversation with Lee Stone he called the Akai S950 (fig. 3-26) a “cleaner machine” in terms of how it processed samples, but he also discussed how he made use of the filters on the machine to cover up some of the imperfections of 12-bit audio.
The manual for the S950 (quoted above), however, instructs users that, while the internal filters will eliminate the distortion and digital noise from sampling, the filters will result in a “muffled tone.” Beat makers embraced the muffled tone of samples as they sought out samples that could be blended with other samples. Sample-based beats heard on late 1980s recordings by De La Soul, MC Lyte, the Jungle Brothers, Queen Latifah, Big Daddy Kane, and others sound as if the audio was coming through a speaker smothered by a pillow, but this was the result of necessary filtering to remove digital distortion.

Filtering was also used to exclude unwanted instruments from a sample in order to emphasize a specific instrument. Producer Large Professor is widely credited with using filtering towards this goal and spreading the practice by teaching it to DJ Premier, which accounts for two producers who made a lot of well known late 1980s/early 1990s hip-hop beats. In an interview with journalist Jesús Treviño Alarcón, Large Professor divulged that, “Preem showed me an ill beat and at the time I was filtering records like taking the bassline out of a record and filtering. I showed him how to do that on the [S]950” (Alarcón 2006, 68). Sampling in hip-hop was established as a way to get better drum sounds and drum patterns in beats, which is what Premier offered to Large Professor, but filtering samples allowed beat makers to exclusively search for and utilize bass lines from previous recordings. Large Professor is known as the producer and

Fig. 3-26: Akai S950 rack sampler (rel. 1988), front panel

(Cropped images from http://www.vintagesynth.com)
rapper of the group Main Source and the first producer for rapper Nas. He also contributed multiple beats for Kool G Rap & DJ Polo’s 1990 album *Wanted Dead or Alive*, including “Money in the Bank,” which features a beat with a filtered bass line sample. Figure 3-27 shows the impact of filtering out frequencies to feature sounds in a particular frequency range.

**Fig. 3-27: “L-Dopa” (1970) by Maynard Ferguson, audible at 0:27 with low-pass filter at 150hz**

![Graph showing frequency response with and without filter](image)

Large Professor sourced the bass line from “L-Dopa,” a 1970 recording by jazz trumpeter Maynard Ferguson. The section that he sampled included a drum set and piano chords that are inaudible in “Money in the Bank.”

Filtering techniques were also used to exclude low frequency sounds in order to utilize vocals or, perhaps, a trumpet or saxophone sound from a previous recording. Producer Pete Rock (Peter Phillips) came to the same filtering conclusion that Large Professor did in 1989/1990 while using the Akai S950. As a sampled loop was playing from S950 he tinkered
with the buttons and knobs on the sampling device. When he enabled the filter option and started turning the knob, he also realized that he could eliminate the sounds that responded within a frequency range (Mason 2004). One of Pete Rock’s signatures was his use of horn samples, sounds that generally respond in the high-mid range and, because of their distinct timbre, can be effectively highlighted for appropriation. The beat for Pete Rock & CL Smooth’s first single “Straighten It Out” (1992) displays the use of directed filtering to utilize a horn riff from Kool & the Gang’s “Chocolate Buttermilk” (1969). The sample source, “Chocolate Buttermilk,” featured the descending horn line that enticed Pete Rock’s ear but also featured a funky kick pattern and snare attack. Using filtering, Pete Rock was able to attenuate the drum frequencies in the sample and create his own drum pattern under the horn line in the beat for “Straighten It Out.”

In the late 1980s/early 1990s, the sounds of filtered samples and muffled beats were distinct to hip-hop music. As the 1990s progressed sampling technology improved to 16-bit/48.1 kHz sample rate—a standard that closely matched the hearing ability of most humans—and hip-hop as a genre became a major-market commercial product that had to sound like one. Thus, hip-hop recordings began to be juxtaposed with recordings by Michael Jackson or Mariah Carey that were never described as “muffled.” The filter manipulations of samples during this era were also acknowledged years later. In 2004, while discussing a song he was working on with rapper Common, Kanye West stated, “And the sample … I took this melodic sample and muffled that shit, straight filtered the sample. I mean, who has filtered beats now? We took it back there” (quoted in Carfagna 2004, 75). By 2004, because of advances in technology, the increased use of live instrumentation, and more ardent prosecution of copyright infringements involving sample-based recordings, the sonic footprint of early sample-based recordings was marked in time. Throughout his interview with Dante Carfagna, Kanye referenced other era-specific techniques
and sounds that fellow beat makers considered passé but which he blatantly incorporated into his beat making practice.

The Sonic Historiography of Early Sample-Based Recordings: Sample Choices

*James Brown and Breakbeats*

Tell the truth, James Brown was old  
‘Til Eric and Ra came out with “I Got Soul”  
Rap brings back old R&B  
And if we would not, people could’ve forgot

–Stetsasonic, “Talkin’ All That Jazz” (1988)

James Brown was one of the most important figures and performers in the development of R&B. It is well known that Brown was also a pervasive figure, though mostly disembodied and only audibly present, in the development of hip-hop’s music. In the Bronx, Kool DJ Herc and the early breakbeat deejay cohort made “Give It Up Or Turn It A Loose” (1968) and “Get Up (I Feel Like Being A) Sex Machine” (1970) precious commodities because of what the breakbeats created from those recordings provoked in local dancers. The disco cover and electro sounds of commercially recorded hip-hop did not have much use for the grooves of James Brown. The aesthetic considerations within hip-hop culture in regard to why those early records sounded the way they did were discussed in earlier chapters, but even outside of hip-hop James Brown’s popularity declined in the late 1970s. He did not transition well into the electronic producer-driven genres of disco and synthesizer R&B and pop that arose in the 1980s. Sampling in hip-hop, though, became an ideal conduit for the Godfather of Soul’s populist resurgence.
When I started sampling, you know, I know that any James Brown loop or anything that he was going to use was going to be a hit.

–Marley Marl (quoted in Weisfeld 2007, 13:43)

Following “The Bridge,” one of the next Marley Marl sample-based beats that caused a stir in the New York City area was the beat for the debut single from Eric B. & Rakim, “Eric B. Is President” (1986). Marley created “The Bridge” by recreating the drum pattern from The Honey Drippers’ “Impeach the President” with sampled drum sounds from that record. Marley went on to use the same sampled drum sounds from “Impeach the President” to make distinct drum patterns for Biz Markie’s “Make the Music with Your Mouth Biz” (1986), Super Kids’ “The Tragedy (Don’t Do It)” (1986), and “Eric B. Is President.” Except for “The Tragedy (Don’t Do It),” each of those beats propelled the featured rapper to a recording deal and a subsequent album; “Eric B. Is President” also reinstated James Brown into the popular music zeitgeist of the 1980s. “I used to always rhyme off of [James Brown’s] ‘Funky President’ back in the day,” stated rapper Rakim (Coleman 2005, 68); his practice synced up perfectly with Marley Marl’s use of the song as a model for the drum pattern for “Eric B. Is President.”

Hip-hop listeners, including Easy Mo Bee (quoted at the beginning of this section), presumed that Marley was using a James Brown breakbeat to make “Eric B. Is President,” but he actually just recreated the “Funky President (People It’s Bad)” (1974) drum pattern with the drums sounds from “Impeach the President” (Marley Marl 2012b). The drum pattern is displayed in figure 3-28:
Fig. 3-28: Waveform labeling and beat annotations for “Funky President (People It’s Bad)” (1974) by James Brown from the beginning. Samples for “Eric B. Is President” in brackets

The false impression was legitimate considering that Marley did sample the introductory drum roll from “Funky President” and one note of the wah-wah guitar from the first bar of the song. In addition, Eric B. scratched in James Brown saying “fun-kay” from the second bar (bracketed in figure 3-28) and a vocal exclamation (“Everybody get up”) from “Get Up, Get Into It And Get Involved” (1971), another selection from James Brown’s discography. Figure 3-29 shows the four layers that comprise the core loop of “Eric B. Is President”; it is an excerpt from ten seconds into the recording.\textsuperscript{52}
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Fig. 3-29: “Eric B. Is President” (1987) by Eric B. & Rakim, two-bar loop arrangement audible at 00:10.5

The first two layers are the explicit uses of James Brown through samples of his vocals and instrumentals: the arrows in the first layer represent the rhythmic scratches of Eric B. that lead into the James Brown excerpts (up arrow=forward scratch, down arrow=backspin), and the second layer shows Marley Marl’s placement of the samples from “Funky President.” The bottom two layers are Marley’s drum programs. The “sampled drums” layer is the drum sounds from “Impeach the President.” The pattern of the kick and snare samples closely matches the annotated pattern in figure 3-28 except that Marley did without the second snare hit of the second bar and aptly placed the drum fill sample that begins “Funky President” to cadence the drum loop. The bottom layer shows the programmed hi-hat from the TR-808 that Marley used to complete the drum rhythm. “Eric B. Is President” is the first example of exploiting the
possibilities of making beats by excising and recreating parts of James Brown recordings, which
were popular among hip-hop music practitioners and listeners.

There is one recording by James Brown that was completely resurrected by the sampling
practices of hip-hop beat makers. A jam session in Cincinnati resulted in James Brown’s 1970,
7”, 45 RPM single “Funky Drummer,” which featured a drum break played by Clyde
Stubblefield that, along with “Synthetic Substitution,” has been a quintessential hip-hop drum
break. The original 1970, 45RPM of “Funky Drummer” featured five minutes and thirty-one
seconds of the Cincinnati jam session divided into two parts (02:36 and 02:55) to fit on the
limited space of the recording. At the 02:38 mark of part 2, Brown introduces Stubblefield as a
guitar chord sharply lands on the one. The drummer plays out the final seventeen seconds with
four and a half repeats of the break until the recording fades out. Thirty seconds before
Stubblefield is introduced Brown calls out, “You don’t have to do no soloing brother, just keep
what you got,” and “Don’t turn it loose, because it’s a mother.” When Stubblefield is given the
reins of the jam session, he lays down a one-bar groove that unexpectedly became a defining
aspect of hip-hop recordings in the late 1980s/early 1990s. Similar to “Synthetic Substitution,”
“Funky Drummer” was not used by deejays in the 1970s. In the 1985 recording “The Classy
M.C.’s” by MC Quick Quintin and MC Mello J, James Brown’s vocal from the drum break was
scratched over a synthesized drum beat. The drum break, though, was introduced by Marley
Marl on the beat for “It’s A Demo,” the 1986 debut single from the Queens hip-hop group Kool
G Rap and DJ Polo. The recording begins with a continuous triggering of a snare sample from
the “Funky Drummer” break, followed by the triggering of several vocal exclamations from
James Brown through a digital delay. The vocal samples are supported by a drum program that
consists of programmed hi-hats from a drum machine and a programmed kick pattern made to
imitate the one-bar rhythm of “Funky Drummer.” It appears that Marley attempted to recreate the “Funky Drummer” break similarly to how he recreated the “Impeach the President” break for “The Bridge”; the rhythmic complexity of Stubblefield’s drumming, though, was difficult to recreate with contemporaneous drum sequencers. The snare completes the imitation of “Funky Drummer”: Marley sampled one of Stubblefield’s snare attacks with its subsequent ghost notes. Marley also sampled the guitar heard at the beginning of the break, creating a stab from the A4 note that ended guitarist Jimmy Nolen’s “chicken scratch” riff as Stubblefield began his solo.  

The limitations of sample time available to Marley Marl in 1986 impacted the creation of the original “It’s A Demo”: every sample used to make the beat was a chop of a short vocal or percussive attack from the guitar or drums (approximately five samples altogether). Despite the use of short samples, “Funky Drummer” was prominent in the beat for “It’s A Demo,” and attracted the ears of hip-hop devotees privy to the happenings in New York City. In an act that displayed the impact of hip-hop beat makers, in 1986 Polydor Records released In the Jungle Groove, a compilation that responded to the rhythmic value that James Brown’s recordings had to deejays by placing some of the funkiest drum breaks on one vinyl recording. Subsequently, as the decade waned, more excerpts of James Brown’s catalog filled samplers—especially in the wake of improved sampling technology. Increased sample times in samplers enable beat makers to use the entire drum break from “Funky Drummer” as a loop, instead of chopping it up. The Bomb Squad featured the break in several beats, including the second verse of “Bring the Noise,” and producer/engineer Paul C (Paul C. McKasty) creatively manipulated James Brown as if he was hired to arrange for Brown himself on his beats for “Listen To The Man” by Kev-E-Kev & AK-B (1988) and “We Got To Get Paid” by Live N’ Effect Posse (1988). A revealing use
of the “Funky Drummer” at the end of the decade, though, was when Marley Marl remade “It’s A Demo” for Kool G Rap and DJ Polo’s 1989 debut album *Road to the Riches*.

The 1989 version of “It’s A Demo” displays the sonic force of a James Brown breakbeat loop compared to the use of chops. In the 1986 version the groove is primarily determined by the clock resolution of the sequencer that Marley used. The hi-hat is prominent in the mix and, while it has an apparent swing feel, it is still relatively rigid. The kick has a particular rigidity because the program attempts to emulate Stubblefield’s right foot, and for the most part does not succeed. Three years later, the drum program used for the hi-hat is less prominent in the mix and a full one-bar loop of Clyde Stubblefield’s drum break—with James Brown vocalizations on the off-beats of beats three and four—is immediately heard and provides the record with a rhythmic drive that a more confident sounding Kool G Rap crafted his lyrics around. The 1989 version of “It’s A Demo” also has a sample of a guitar lick from “Mother Popcorn (You Got to Have a Mother for Me)” (1969) to go along with the guitar stab that Marley used in the original beat. Jimmy Nolen’s dry, muted guitar lick from “Mother Popcorn” blended well with the large timbral presence of the “Funky Drummer” drum break. Additionally, Marley triggered the Nolen samples from each James Brown recording in such a way that they can seem to have come from a single performance—at least to those not familiar with James Brown’s recordings. While the song begins with all of the samples occurring simultaneously, during Kool G Rap’s verse Marley only used the guitar stab from “Funky Drummer,” the guitar lick from “Mother Popcorn” returns during the choruses. To complete the reconstruction of James Brown’s recordings into a beat, DJ Polo is also heard scratching in a grunt from James Brown.
1989 the number, another summer /

Sound of the “Funky Drummer.”

—Chuck D, from “Fight the Power” (1989) by Public Enemy

For hip-hop beat makers the break from “Funky Drummer” is ubiquitous and connected to the sound of hip-hop during the late 1980s/early 1990s. Other breakbeats that beat makers used as sampling rose in popularity also became well known through the multiple volumes of *Ultimate Beats & Breaks*—colloquially known to some people as Street Beats. Similar to Polydor’s release of *In the Jungle Groove* (1986), Louis "BreakBeat Lou" Flores—a deejay at the time—and Leonard “BreakBeat Lenny” Roberts started compiling the recordings that deejays, and sample-based beat makers, sourced for breakbeats. The first volume of *Ultimate Beats & Breaks* was released in 1986 and the series continued until 1991, resulting in twenty-five volumes (Mason 2007). BreakBeat Lou and Lenny were friends of Ced Gee, the beat maker for Ultramagnetic MCs, and learned about the sources of many popular breakbeats from him (Torres 2007, Weisfeld 2007). The arrival of *Ultimate Beats & Breaks* as hip-hop beat makers were adopting sampling as a creative practice could not have been more serendipitous. Loops of the funkiest breakbeats replaced the drum programs of the TR-808 and the Oberheim DMX and even the programming of sampled drums sounds. Breakbeats created on turntables fortified hip-hop as a musical practice in the mid-1970s and were then fortified as musical elements on recordings through the studio craft of the late 1980s. Along with James Brown records, breakbeats from the late 1960s and the 1970s (the general range of the recordings on *Ultimate Beats & Breaks*) established the future of hip-hop as a sample-based musical practice.
And by the mid-1990s James Brown samples and breakbeats were gone. Not completely, but definitely as the defining rhythmic characteristic of many hip-hop beats. Scotty Hard (Scott Harding) moved to New York City and started engineering hip-hop recordings in 1989, during the peak of breakbeat usage by hip-hop beat makers. He worked with several of the sample-based beat makers in the late 1980s and in an interview he stated, “And the earlier you go, the more closely associated they are to all the stuff off the Ultimate Breaks & Beats records. Then gradually people started getting other records” (Torres 2007, 141). In the previous quote Scotty Hard initially referenced all of the beats from around 1987 to the early 1990s, but in subsequent years he observed a shift away from the Ultimate Breaks & Beats compilations. During his research among sample-based beat makers, Joseph Schloss found that his consultants—most of whom were interviewed in the late 1990s/early 2000s—saw the use of the Ultimate Breaks & Beats compilations as lazy and contradictory to the ethical practice of digging in the crates to find breakbeats and other samples (Schloss 2004).

While ethics of practice impacted the use of Ultimate Breaks & Beats among some beat makers in the 1990s, for many beat makers breakbeats in general became less viable as a component of a hip-hop beat, as did the use of James Brown samples. A substantial reason for the decrease in breakbeat usage was the increased prosecution of copyright laws related to sampling in hip-hop. From an aesthetic perspective, though, a reason for James Brown’s popular decline within another black music genre was that beat makers from 1986 to approximately 1994/1995 saturated the sound of hip-hop with comparable breakbeats and James Brown samples. At a point in the mid-1990s using those samples became “played out” or culturally passé. In fact, the use of popular sampled breakbeats in general lost some luster because of how common they had become. In an interview Kanye West discussed the mentoring and instruction
he received in how to make beats in the mid-1990s and the rules that some of his mentors at the
time passed along to him (Carfagna 2004). One of the rules was that beat makers were not
supposed to use breakbeats: from a peer evaluation standpoint a beat maker could sample drum
sounds but you had to program/compose your own drum patterns. Schloss’ research into the
sample-based beat maker community displays the malleability of the fluid protocols of beat
making, and thus Kanye’s response: “Nigga, I’ll use a breakbeat, I’ll sample a snare right off
someone’s album now. You know? I don’t give a fuck. [laughs]” (Carfagna 2004, 75). While
breaking rules is characteristic of beat making, the fact that the rule was expressed displays the
transition away from the overt use of James Brown recordings and other breakbeats. Beat makers
on the West Coast (Los Angeles area and Oakland) and from the South (Miami, Atlanta, New
Orleans, and Houston) did not value breakbeats to the extent that beat makers from New York
City did. Listening to hip-hop from the mid-to-late 1990s, a time when hit hip-hop records came
from every domestic region, there is a pronounced absence of The Godfather’s grooves
compared to the early part of the decade. Some beat makers still use breakbeats, and to a lesser
degree James Brown samples, as a prominent component of their beats, but to hip-hop
enthusiasts it is apparent that the beat maker that uses those samples is referencing a specific
period in beat making.

Sample Potpourris

Here it is, a groove slightly transformed/
just a bit of a break from the norm

–DJ Jazzy Jeff and The Fresh Prince,
“Summertime” (1990)
Technological advancements and the musical changes they instigated were the principal guides for organizing the periodization of hip-hop’s music for this project. When I asked engineer Bob Power about changes in technology and its impact on hip-hop music he explained:

[T]he first wave of hip-hop was all about [TR-] 808s and cutting stuff in from a record … but then sequencing came in and sampling, so all of the sudden people could make their own beats and the 808 was out and the musical constructions could be a lot more elaborate because you could sequence a sample and have it play over and over again plus tune it in a way where everything kind of fit together a little bit better and could make much more elaborate constructions, and that was the second wave of hip-hop. (Bob Power, interview with author, New York City, June 10, 2011)

Power’s use of the word “wave” is appropriate when discussing the historical trajectory of style in hip-hop. Peering over the histories of jazz and even R&B/rock ‘n’ roll, it is possible to account for the survival of previous aesthetics and sounds as new ones appeared. For instance, big band orchestras were founded with new composers and arrangers of swing-style jazz decades after the 1930s, and singers like Sharon Jones, Amy Winehouse, and Raphael Saadiq re-approached the look and style of 1960s R&B in the 2000s. Hip-hop music, though, has been more evolutionary; older styles have struggled to continue being created after they were absorbed into newer developing styles and have been eschewed by younger fans for their outmodedness. Though Power did not make mention of the disco cover sound of hip-hop from the inception of hip-hop recordings (usually referred to as “old school”), the sample-based style that Power referred to as the second wave of hip-hop did completely wash over everything that came before and has framed the popular consciousness of hip-hop’s music. Synthesizers as the predominant
instrumental sound in a hip-hop beat did return during the latter part of the 2000s, but the beats made with those sounds were not reminiscent of what Afrika Bambaataa and Arthur Baker or Newcleus created in 1982/1983.

As Power explained, the transition away from the drum machine/turntable style of beats was the transition into a style defined by elaborate sample arrangements. Breakbeat sets from Grandmaster Flash or Grand Wizzard Theodore featured sections from dozens of recordings mixed together into a seamless stream of music that could last for hours. In the late 1980s/early 1990s, beat makers extended that practice to sampling but compressed the use of multiple samples into three- or four-minute songs and forty-five minute albums in service to rappers’ lyrical performances. As beat makers expanded the practice of sampling to other musical components—Marley Marl mainly sampled drum attacks—the instrumentation of hip-hop recordings was enlivened. Early disco cover hip-hop recordings featured the standard sounds of an R&B band (guitar, bass, horn section, trap drum set, and electric piano), and the sound of electro hip-hop recordings, like “Planet Rock,” featured algorithmic arpeggios and rhythmically stiff, perhaps unemotional, synthesizers motifs. The aesthetic backlash against these previous sounds resulted in a sonic paring down to the sound of Run-D.M.C. and the hip-hop records from Def Jam Recordings, which were generally just drum machines, a rapper, and turntable scratches. The use of samplers in beat making began with the extraction and use of drum sounds and then, appropriately, transitioned to the extraction of drum loops or breakbeats. The inclusion of diverse sample sources for piano or saxophone sounds increased the timbral and instrumental palette of hip-hop recordings:

My thing was just finding the kick and the snare or a clean piano stab or something to use on the records. So I just go down and dig for sounds. That was
my thing and I’d just make a beat, I didn’t have to have a beat from a record. That wasn’t my strength as a producer. (Ced Gee quoted in Weisfeld 2007, 20:43)

For his beat for “Ego Tripping” (1986), Ced Gee used the breakbeat from Melvin Bliss’ “Synthetic Substitution” (1973) as the foundation. However, as he described in the quote above, he expanded his process and started programming his own drum patterns with sampled kick and snare drums—ironically as other beat makers were moving to using breakbeats. The beat for Ultramagnetic MC’s 1987 single “Funky” displays Ced Gee’s progression in the use of samples and the progress of sample-based beat making as a whole in regard to creating drum patterns and combining sounds from multiple recordings.

Multi-layered sample arrangements from the late 1980s/early 1990s are compelling because they display the strategies beat makers used to get aspects of disparate recordings to harmonize in order to “heighten tension,” “animate a performance,” “add to the texture,” or “provide signals” (Blum 1991, 25–26). One of the strategies was to prioritize the samples in an arrangement. Through conversations and interactions with beat makers and my analyses of several beats featured on recordings during the late 1980s/early 1990s I have observed that when a beat maker used this strategy, there were three classes of priority given to a sample: (1) main samples are usually instrumental (piano, horns, drums etc.) and generally define the sonic and musical personality of the beat; (2) secondary samples can serve the purpose of a main sample during particular sections of a beat (e.g. the chorus or hook) but are more often utilized as musical supplements providing texture (rhythmic, melodic, harmonic, or vocal interjection) to main samples; (3) auxiliary samples in a sample arrangement are stabs, turntable scratches and other short sounds that are not sequentially repeated and can be used to animate or enhance the other layers of a beat or a rapper’s rhymes.56 My use of the term “main sample” and its meaning
arose from my interview with producer Lee Stone and from engineer/deejay/producer Young
Guru (Gimel Keaton), who referenced the notion of a main sample in the manner that I describe
during a 2012 talk at the 92 Street Y series “Sound and Vision.” The use of the terms
“secondary” and “auxiliary” sample are in relation to the term “main sample.”

The main sample of “Funky” is from Joe Cocker’s “Woman to Woman” (1972); it is
heard at the start of Cocker’s recording and is a one-bar, steady eighth-note pulse of an A-flat
pitch on a piano that is anticipated with an ascending chromatic anacrusis every fourth beat (fig.
3-30, left bracket).

**Fig. 3-30: Waveform of “Woman to Woman” (1972) by Joe Cocker, audible at beginning,
Ced Gee’s samples in brackets**

At 0:10 of “Woman to Woman” the piano part is augmented with a chorus of trumpets and
saxophones and drums (fig. 3-30, right bracket). Ced Gee also flipped this part as a main sample
to contrast non-verse sections. “Funky” does not have a standard chorus, before and after the two
verses the guys in the group are heard talking over the beat. While closely listening to “Woman
to Woman” and “Funky,” it is apparent that the pitches of the piano parts are not the same.

Cocker’s song is at 90 bpm and “Funky” is at 99 bpm; increasing the tempo of a sample using the sliders on an SP-12 or 1200 also altered the pitch of the sample, thus the piano sample in “Funky” is heard as a G instead of an A-flat. In “Funky,” the main sample is soloed at the beginning of the song and is subsequently surrounded by the other components of the beat, a strategy utilized in many pop and rock recordings as technologies like the mixing board and sequencer introduced more options for musical arrangement (Spicer 2004). Ced Gee’s placement of the piano part from “Woman to Woman” also displays the creative advantages to triggering sampled audio: he created a sixteenth-note stagger of one of the piano notes on the second half of beat three. He thus increased the piano loop’s rhythmic character, which was already intriguing because of the lack of an attack on beat one.

The secondary sample of “Funky” is a chop from the break section of Juice’s “Catch a Groove” (1976)—the same recording that Hank Shocklee used for the beat for Spectrum City’s “Check Out the Radio” (fig. 3-11). The sample is the eight-note pulse of the tambourine from the break section, decreased from 108 bpm to 99 bpm. As the secondary sample, the tambourine sample provides a rhythmic texture to the beat and is interspersed throughout the song, occasionally heard without the piano sample.
The auxiliary samples are also from the break section of “Catch a Groove,” specifically the short, non-percussion sounds that start and end the break. The break begins with the bass and horn attack that Shocklee exploited for “Check Out the Radio” and ends with a held out wah-wah guitar note and wind gush sound effect. In the sample arrangement for “Funky,” Ced Gee reversed the order of the samples so that the wah-wah/wind gust segued into the bass and horn hit. The wah-wah/wind gust auxiliary sample also includes a four sixteenth-note snare fill that Ced Gee placed in the beat without disrupting the rhythmic feel established by the other components of the beat.

Though they are not a part of the sample arrangement, kick and snare samples are used for the drum programming. Interestingly, the drums sounds are the kick and snare from “Impeach the President.” Marley Marl popularized those sounds with his beats for “The Bridge” (1986), “Make the Music with Your Mouth Biz” (1986) and “Eric B. Is President” (1986)—each with a distinct drum pattern—but he never disclosed what sounds they were or his process of
acquiring those sounds, which he initiated in 1984 when he accidentally sampled a snare sound while working on a remix at Unique Recording Studios. Ced Gee learned about Marley’s drum sampling process when he found Marley’s reel of drum sounds at Power Play Studios in Queens. On one occasion, in haste to leave the studio, Marley left his reel at the studio, at which point engineer Ivan “DJ Doc” Rodriguez and Ced Gee realized why Marley’s drums sounded so good and began to use his sounds. Soon after, Marley’s drum sounds were heard in the beats produced by Ced Gee for Boogie Down Productions’ first single “South Bronx” (1986) and their debut album Criminal Minded (1987), each recorded at Power Play Studios (Chairman Mao 2012).

Figure 3-32 displays the sample arrangement of “Funky” heard during the first ten bars of Kool Keith’s thirty-bar verse:
Fig. 3.33. Ced Gee's sample arrangement for Ultramagnetic MC's "Funky" (1987), audible at 0:54.
As a composition, “Funky” is composed of five samples—plus the drum samples from “Impeach the President”—that are layered and arranged differently throughout the recording in order to highlight the rhymed verses of Kool Keith and Ced Gee. The sample arrangement in “Funky” was not as elaborate as some of the arrangements of the Bomb Squad but the arrangement can be viewed as a template for how producers prioritized multiple samples.

Many sample-based beat makers abide by a rule of practice that sample sources should not be freely shared (Schloss 2004). Appropriately, for years Marley Marl hid his sampled drum practice from other beat makers. Digging for an obscure recording, finding a useful sample on that recording, and then flipping that sample in an interesting way into a beat brought admiration to a beat maker, and the more obscure the sample the more props (proppers or proper respect) were bestowed on a beat maker. But even as some beat makers over the past thirty years have averred the requisite of keeping sample sources secret (see quotes from DJ Premier in Schloss 2004), it is apparent that sample sources were shared, or not obscure enough. While listening to beats from the late 1980s/early 1990s that had elaborate sample arrangements, it was clear that beats from different beat makers had the same samples. In cases where the same sample is used in different beats, the creativity of beat makers is revealed through the way in which the same sample is flipped differently or given a different priority within a sample arrangement. The piano part from “Woman to Woman” was used in other hip-hop beats after Ced Gee flipped the sample—Teddy Riley used the piano sample in the beat to Wreckx-N-Effect’s “New Jack Swing II” (1992) and the most known use was by Dr. Dre in the beat for “California Love” (1995).

In the late 1980s/early 1990s, when elaborate sample arrangements defined the sound of hip-hop, James Brown samples were particularly popular. As a result, there were multiple beat makers that used the same James Brown samples. In individual instances, though, beat makers
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gave a James Brown sample a different priority—one beat maker’s main sample was another’s secondary sample. For example, the first two to four bars of James Brown’s “The Payback” (1973) were flipped in numerous beats, especially during this period of beat making. In 1990, Erick Sermon and Parrish Smith, the beat makers and rappers that comprised the group EPMD, placed the sample for “The Payback” as a secondary sample in their beat for “Mr. Bozack.” The next year Ice Cube rapped over Sir Jinx’s beat for “The Wrong Nigga To Fuck Wit” (1991), a beat that flipped “The Payback” as a main sample—Ice Cube even references the sample in his lyrics. There are other samples that were and still are frequently used. In most cases a beat maker distinguished his use of a sample from prior uses by giving the sample a different status within the beat; layering samples gave beat makers the opportunity to denote attributes of their personal creativity (i.e. everyone could sample but not everyone could do it well and creatively).

Regarding elaborate sample arrangements, the Bomb Squad productions for Public Enemy were seminal examples of layering samples. But layering was not the only way they used multiple samples. Though I could not find another example of this practice, in their beat for Ice Cube’s song “What They Hittin’ Foe?” from his 1990 debut solo album AmeriKKKa’s Most Wanted, the Bomb Squad constructed a sample-based, rondo-like arrangement from four samples. The song begins with its main sample, a two-bar loop from the beginning of “The Jugglers” (1973) by Average White Band. The sample is mildly distorted and there are no other components (drum programming or secondary samples) accompanying the sample. The main sample plays for four bars before a new sample enters for four bars: a one-bar chop from Stanley Turrentine’s “Sister Sanctified” (1972) looped four times. The main sample then returns for six bars followed by another sample for four bars. The third entrance of the main sample then plays for nine bars—truncating the loop by one bar—after which yet another sample is heard for three
bars.\textsuperscript{58} The song concludes with two bars of the main sample. “What They Hittin’ Foe?” was a noteworthy deviation from the standard sampling practice of layering multiple samples or having them arranged in a verse-chorus form.

Further advances in sampling technology constituted a catalyst for the proliferation of elaborate sample arrangements in the late 1980/early 1990s. As the 1980s transitioned to the 1990s, sampling technology briskly advanced from the inexpensive rack mount samplers to the first drum machine/sampler hybrids that became the predominant devices for beat making. However, while drum machine samplers like those from the E-mu SP and Akai MPC series were gaining popularity during this time, beat makers looking to use a variety of samples in their beats had to look beyond the available machines or augment the functionality of the units they already owned. Rap group Wu-Tang Clan’s producer/rapper RZA (Robert Diggs) was one of the first beat makers to start using Ensoniq’s EPS-16+ (1990), a 16-bit sampling keyboard, and its successor the Ensoniq ASR-10 (Advanced Sampling Recorder) (1992), a 16-bit sampler with over one minute of sample time. In an interview conducted for the documentary \textit{Beat Kings} (2006) he explained the impact of having more sample time:

\begin{quote}
And the way the EPS worked was that you could sample up to ten seconds on one key. When I got a hold of the EPS 16+ that’s when you heard at least about fifty more beats of mine, you know what I mean, that came out throughout the system. And then EPS had improved itself, [they] came out with the Ensoniq ASR-10. And once that got in my hand, it was a wrap. (Steward 2006, 15:53)
\end{quote}

The expansion from 2.5 seconds per trigger on the SP-1200 to 10 seconds on the EPS+ was indicative of the technological advances of the time, and RZA’s statement about the prolific
growth of his beat making output exemplifies the impact of the new machines on the creative capabilities of hip-hop beat makers.

Other beat makers that wanted to use multiple samples—Sean C, Lee Stone, Qiniso, and Mike G from my consultants—started syncing their drum machine/samplers to an external sampler to get more sample time and create samples with a higher sonic fidelity. Similar to the other tools that spread through word-of-mouth and mentor/protégé relationships, once one person took advantage of a new set up he began to advocate it to others; as Sean C explained:

Chill Will was another mentor of ours, he taught me how to use an MPC. When it was time for me—when I got some money to buy something—he told me, ‘get a MPC60 and get a [S]950. (Sean C, interview with author, New York City, October 11, 2012)

Chill Will was a deejay for Harlem-based rapper Doug E. Fresh. Once they started making recordings he began teaching other hip-hop enthusiasts how to make hip-hop music, including Sean C. A common workflow for beat makers was to sync an SP-1200 or MPC 60 with an Akai S900 or S950 rack sampler (fig. 3-32). This configuration of technology allowed beat makers to have access to more samples but to continue triggering them through the familiar interface of a drum machine’s pads.
But God don’t ever give me nothin’ I can’t handle /

So please don’t ever give me records I can’t sample.

–Kanye West, from “They Say” (2005) by Common

Analyzing hip-hop recordings from the late 1980s/early 1990s using Holm-Hudson’s notion of sonic historiography reveals how the early wave of sample-based beat making practices from the period was instigated by the capabilities of sampling technologies. In regard to the content and number of samples though, the recordings also reveal a moment in the history of hip-hop music production where creativity was not constrained by copyright litigation. In 1989, 1960s rock band the Turtles sued hip-hop group De La Soul for using a slowed down sample of their music in one of the skits on *3 Feet High and Rising* (1989) (Snowden 1989)—a seminal,
sample-filled hip-hop album from the period currently being discussed. Then, in 1991, Gilbert O’Sullivan filed a lawsuit against rapper Biz Markie and Warner Bros. for the unauthorized sampling of his music. The lawsuit forced Warner Bros. to remove the album from store shelves and release a new version without the unauthorized sample (Philips 1992).

The plaintiffs in each case were justified in seeking compensation for the unauthorized use of their compositions. The consequence of the high profile cases, though, was that by the mid-1990s, hip-hop beats that featured a creatively arranged potpourri of samples were generally non-existent. The substantial victories by copyright owners ensured that, in order to have a sample-based beat on an official release, all samples had to be cleared with the pertinent copyright owner(s). In response to this new demand, recording companies created sample clearance divisions to ensure clearance of all samples on an upcoming release, and sample hunter divisions to seek out uncleared samples of music for which they owned the copyright. For beat makers in the new climate of sample accountability, their creative process had to be filtered through certain legal conditions. Posdnuous (Kelvin Mercer), rapper from De La Soul, described the different creative atmosphere the group had to work through during the production of their 1995 album:

I think it was Stakes is High—where it was the first album I recorded where we sat down at the beginning of the album; the record company made sure, like, “you know what, let’s make sure we speak to whoever you want to clear samples.” And they went through a list of like, “Well, George Clinton’s in litigation with Westbound so don’t mess with his stuff right now. George Harrison don’t like rap so don’t mess with him.” We actually had a list of people not to touch. (Franzen and McLeod 2010, 26:38)
Law professor Lawrence Lessig has been at the forefront of advocating for the preservation of the way in which derivative culture in the U.S. was fostered and nurtured. In *Free Culture: The Nature and Future of Creativity* (2004), he passionately argued against the imbalanced relationship between culture and copyright. While music is not the sole cultural object discussed in the text, it is a product and practice that has overwhelmingly felt the effects of the changes to the idea of and controls over intellectual property. Lessig clearly stated that his argument was not that content creators do not have rights to financial compensation for their creative output, but that companies should not impede a developing culture by deterring a generation of content creators from using the available tools for creative output and dissemination, regardless if those tools are the Internet or sampling technology (Lessig 2004). The various motivations that precluded copyright owners from allowing their content to be used in a sample arrangement (demanding too much money or percentage of publishing, or “George Harrison don’t like rap so don’t mess with him”) had a direct impact on the sound of hip-hop’s music as the 1990s proceeded. Elaborate samples arrangements, though, persisted as beat makers did more with less: chopping up one recording and using loops, chops, and stabs from that recording in various ways. Recordings like “Funky” by Ultramagnetic MCs or the albums by Public Enemy—*It Takes a Nation of Millions to Hold Us Back* (1988) and *Fear of a Black Planet* (1991)—have thus stood as the quintessential representations of sample-based production from this period but also as relics of a bygone era that reappears on the rare occasion when a recording label agrees to the costs of negotiating the clearance of multiple samples or, perhaps, owns the sampled recordings.
Conclusion – Considering the Context of Beat Making’s Technological History

Music is inscribed between noise and silence, in the space of the social codification it reveals. Every code of music is rooted in the ideologies and technologies of its age, and at the same time produces them.

–Jacques Attali (1985, 19)

Since the first breakbeat compositions were constructed on two turntables, hip-hop music has been an ostinato-based music in which its creators have prominently featured groove in order to please listeners and, most importantly, dancers. Technological tools from the turntable to the sampler coincided with hip-hop’s development and facilitated the ability for deejays and beatmakers to find and create rhythmic combinations. As hip-hop beat makers honed their craft through the latest technological tools, and established a space for their music in the popular music zeitgeist of the late-twentieth century, they were in a symbiotic creative agreement with a generation of musicians and composers that were also adapting their imaginations and compositional style to the new technologies.

During this time, hip-hop beatmakers were only one group of musicians and composers seeking to exploit the options (and limitations) of turntables, sequencers, drum machines, and samplers. Interestingly, outside of hip-hop, most of the uses of the technology discussed in the dissertation were for creating ostinato-based music that was initially used for creating efficient and continuous accompaniment for dancers and then to open up spaces for creative autonomy. As discussed in Chapter Three, the 12” single that became a core musical conduit for disco music led to the creative use of mixers by disco deejays to create the disco break. Concurrently,
renowned disco producer Giorgio Moroder used drum machines to establish the groove of his compositions: “In 1974 the first cheap little drum machines came out, so I would use one of those, and I also had a real drum loop with several different tempos” (Moroder 1998, para. 8). Moroder used his “cheap little” drum machine to demo tempos for his compositions, the previous is in reference to his experimentation while creating the instrumental groove for Donna Summer’s hit “Love to Love You, Baby” (1975). By the late 1970s, and into the 1980s, grooves from drum machines had further seeped into pop and rock music—preceding and then coinciding with hip-hop’s use of the technology. On their early 1980s albums Duke (1980) and Abacab (1981), British rock band Genesis, particularly their vocalist and drummer Phil Collins, utilized a Roland CR-78 programmable drum machine on several of the tracks. These two Genesis albums, along with Collins’s debut solo album Face Value (1981) which included his seminal hit “In the Air Tonight” that was also famously anchored by a Roland CR-78 loop, were huge commercial successes and impacted the landscape of pop and rock music of the 1980s. Recordings by Blondie, Peter Gabriel, and Prince featured ostinato-based sections that amassed into larger forms. In regard to the impact of technology on form, in Chapter Two I discuss how the function of the Roland TR-808 influenced the switching on the drum parts in “Planet Rock.” In his article, “(Ac)cumulative Form in Pop-Rock Music” (2004), music theorist Mark Spicer detailed how British new wave band New Order utilized and Oberheim DMX to stagger the entrance and establishment of different grooves. Their song “Blue Monday” displayed how access to precise control over different drum machine and sequenced synthesizer parts allowed the band to create accumulative instrumental textures in service to the dramatic entrance of the vocal part.
The Practice of Hip-Hop Beat Making as a Historical Reference

We want to explain not only the music people are performing today, but also what they are not performing today that they performed yesterday, and why they may be performing something different tomorrow.

—Anthony Seeger (1994, 13)

Practitioners and adherents of a cultural or musical practice can better imagine their futures by understanding and preserving the practice’s history (Marable 2006). I have a sense that this is a widely held axiom when considering the importance of history, but is not entirely valid when applied to hip-hop music making or other musical practices. The idea that understanding the past can benefit the future is common and, in some ways, rational, but there are situations where aspects of the past are abandoned in light of the reality of the present or the possibilities of what is developing next. In his research on the Suyá Indians of Central Brazil, ethnomusicologist Anthony Seeger observed years of the group’s musical practices and how those practices aligned with the order and machinations of their society. Through his documentation he came to realize that some of the song repertoire the group had once performed had ceased to be actively performed. He even recognized an acute disparity between his research in the 1970s and that of another anthropologist in the 1960s. It became apparent that because the Suya moved their villages and interacted with different groups (intermarring with an Upper Xingu group and then assimilating a group of Gê-speaking Indians), a fluid social identification developed that impacted which song repertoire remained relevant (Seeger 1994). According to Seeger, the variables in regard to group identification among the Suya had an effect on their
association with their previous musical practices. Advances in technology have had a comparable effect on hip-hop beat makers’ association with the history of beat making practices.

As shown in this dissertation, technology is a significant variable in hip-hop beat making practice, and its importance has impacted the presence and value of history among practitioners. Late twentieth century technology has had a remarkable impact on the preservation of history. In certain societies, computers have made it less challenging to accumulate historical documents and aggregate historical data, and the Internet has streamlined accessing those documents and data. As such, it is possible to come to a logical assumption that advances in technology have had a positive impact on a society or group’s understanding of and engagement with their history. However, as was discussed in the introduction of this dissertation, one should be wary of viewing technology as a panacea. Technology, in general, is a collection of artifacts that facilitates human actions by the use of tools (Ong 1982). Advances in technology have produced better tools but have had mixed results in regard to human action, including the engagement with and representation of history. In his discussion of how the written word has come to dominate human interaction with language, Walter Ong cited Greek philosopher Plato’s warning about the impact writing technology would have on the memory capabilities of humans. Ong proceeded to examine the consequences of writing, the printing press, and the computer on oral language. Each advance in communication technology reduced the dynamic sound of the voice to “quiescent space” (ibid., 80), shifting the acquisition of historical knowledge from orally recited poetry to the literacy-based interaction with words stored on a scroll, paper, and finally in bits of digital information.

The ability to store information increased accessibility to that information (text can travel easier than a human), and the amount that could be stored. Each advance in technology, though,
decreased our communication through the spoken word and altered our association with history. In regard to music, since the early 1900s, recordings have been a “stopped-clock” technology—archiving the history of performance practices and serving as a place for reconstructing a selective memory of the past (Kenney 1999). In *The City of Musical Memory: Salsa, Record Grooves, and Popular Culture in Cali, Columbia* (2002), the late ethnomusicologist Lise Waxer displayed how recordings had a fascinating effect on how the Caleños in Cali, Colombia constructed their musical tradition. Some of the Caleños she interviewed regarded recorded salsa and its associated dance as a local tradition and asserted that Cali was the world capital of salsa—a genre that originated in New York and was a descendant of Cuban son montuno. In Cali, recordings were more important than live performance; thus, Caleños’ engagement with and representation of their imaginary connection to a foreign musical tradition was embedded in the grooves of vinyl and acetate recordings. Technology did not have what could be perceived as a logical effect on an understanding of their music history: perhaps the archiving and teaching of *bambucos* and *pasillos* (Waxer 2002), or a Luddite-like revolt against salsa recordings in favor of stronger engagement with pre-1960s music traditions. Waxer viewed this phenomenon positively; instead of a global, mass mediated music dwarfing local practices and alienating the local population, salsa recordings were liberating, enabling Caleños to forego traditions and imagine a different future.

In regard to beat making as a musical practice, its history has a strained relationship with contemporary practices because of the impact of technology. The history of hip-hop is always present because the majority of hip-hop music is documented in recordings, some which are well known and were discussed in this dissertation. However, for many younger beat makers the desire for the latest technology disrupts their association with previous beat making practices and
the sounds those practices produced. A long-term result of this situation is that the current sound and ethos of hip-hop music is very much detached from that of the 1980s and 1990s. As I have listened to some of my consultants and read statements made on blogs and social networks I have recognized a steady, but not overwhelming, disparagement of contemporary hip-hop. The predominant reason given for the lack of perceived quality in hip-hop music is the idea that hip-hop recordists value sales success and neglect creativity and artistic integrity. While this may be true, and more relevant in regard to the content of rap lyrics, I offer the idea that the constant changes in the practice of making hip-hop music has created a disconnect between the understood quality of early hip-hop music and the perceived lack of quality of contemporary hip-hop music. The constant changes in the technological means and methods of making beats and the impact of those shifts on how hip-hop sounded presented me a new perspective on what history and tradition is in hip-hop, a genre and culture that builds itself on its persistent novelty. As a result, while discussing contemporary practices with older beat makers, I began to deem less relevant any statement that began with “traditionally … .”

*Seeking Tradition in the Technological*

In proposing a new approach for feminism, Donna Haraway (2004) perceived the cyborg, a popular science fiction character, as a model for reviewing and revising social constructions. She presented the cyborg—usually characterized as an ambiguous social hybrid—as a fictional, and perhaps prospective, persona that was becoming more analogous to the dissolution of our essentialized social constructions (especially in regard to feminist theory) and, more pertinent to this dissertation, our persistent biological intermingling with technology. “One consequence is that our sense of connection to our tools is heightened,” concluded Haraway (2004, 36) as she
unraveled her understanding of humans as biological organisms that were becoming biotic systems in sync with technological devices. With technology informing and advancing human action, especially in regard to the making of hip-hop music, the prospects of a technology-based tradition being preserved and recognized for its value to the future are precarious.

Beat makers are disciplined by tradition; there is a recognizable form to most hip-hop beats—they are usually in a verse-chorus form with a quadruple meter—and a common practice to making sample-based beats, though that practice has gradually become less utilized than it was previously (Marshall 2006). However, despite the less than forty years that beat making has been a practice, many younger beat makers are not connected to or aware of any tradition in regard to the overall practice of beat making, specifically how the creative processes are enacted (some younger beat makers may not have ever programmed a drum machine or self-edited a sample). I have interviewed and interacted with professional, amateur, and nascent beat makers of different ages, and individuals at each of these levels have novel stories to tell about their individual understanding of and adherence to beat making history and tradition.

The State of Hip-Hop Technology and Beat Making Practice in the 1990s into the 2000s

As a musical practice connected to the capabilities of current technologies, it is not surprising that every generation of hip-hop practitioners has approached beat making from a different technological starting point and with different methods. As the 1990s began, the E-mu SP-1200 and the Akai rack mount samplers (S900 and S950) remained the instruments of passage into beat making because of mentor/protege and peer relationships. When Lee Stone started making beats in the early 1990s he purchased an Akai S01 (rel. 1993) rack mount sampler. He triggered samples from the S01 with his Casio CZ-101 keyboard and sequenced
them in an Alesis MMT-8 (rel. 1987). He purchased the S01 because it was cheaper than other
samplers on the market and because it had some advanced technical specifications the others did
not (particularly in sample rate). But soon after he decided to purchase the standard tools of that
time. Stone reached this conclusion after learning what beat makers were using to make his
favorite records from rapper Pharoahe Monch (Troy Jamerson):

[T]he funny thing too Patrick, was stuff that I had. The S01 sampler was actually
newer than the [Akai S]950 and the SP-1200 in terms of being in the marketplace,
but I went back. I had that first [but] it didn’t work for me, I didn’t have the right
sequencer. But I looked to see what other heads were using. That’s (the SP-1200)
what [Pharoahe] Monch was using; [producer] Buckwild, when we went to his
house, he had that. This is what he (Pharoahe Monch) said Large Professor and all
of them dudes had—and Pete Rock. So I got what they got. Again, I was behind
because I probably should have brought a [Akai MPC] 3000, because of the kind
of stuff that I liked to do. (interview with author, Long Island, New York, October
12, 2011)

In the early 1990s, the SP-1200, Akai S950, and Akai MPC 60 mkII were pieces of hardware
that were used with other supplementary hardware to complete the workflow of a beat maker. As
the decade progressed, the workflow for making beats simplified: a beat maker did not need
multiple pieces of technology to make beats, though sound modules were used to expand the
palette of available sounds. In many cases, beat makers in the late 1990s used one machine that
was effective in every facet of beat making: sampling, drum programming, sequencing, and
arranging. Ensoniq’s ASR-10 (1992) and Akai’s MPC 3000 (1994) and MPC 2000 (1997) were
machines that surpassed previous sample/drum machines in regard to memory and sequencing
capabilities and became standard instruments for hip-hop beat making. However, these machines also demanded a new logic to the practice of making beats when compared to the machines used in the 1980s.

The release of the Akai MPC 2000XL (1999), the first beat making instrument I owned, was probably the last time that there was any de facto consensus about the standard instrument of beat making. I own a t-shirt with an MPC 2000XL emblazoned on the chest area. That shirt initiated my relationship with Eddie Herrick, a beat maker who started making beats in the 1990s. In 2010, while I was in St. Petersburg, Florida, he saw me wearing the shirt and approached me with a look of confirmation usually seen between passing fraternity brothers and stated: “I have one of those.” Eddie was shocked that someone in that area was wearing a shirt with an MPC on it; we started a conversation that led to an interview. Just like my other consultants that were active in the 1990s, I asked him:

Why did you decide to get an MPC?

Eddie Herrick: I was living in Tucson, Arizona at the time and—I was a deejay at the time, you know, kind of a bedroom deejay and played out a little bit here and there. It was pretty much the new shit that was out, you know. Akai had released the 2000, it had been out since like ‘96. So I got my 2000XL right when it was coming out, like a couple months after it had come out. It was like the new thing, so if people wanted to make beats you got the MPC; that was pretty much it.

(interview with author, St. Petersburg, Florida, February 17, 2010).

The 2000XL was the predominant sampler used in the early 2000s when producer/rapper Kanye West led a renaissance of sampling in major hip-hop recordings. To this day the 2000XL remains
an icon of beat making that, for older hip-hop aficionados especially, emits authenticity despite not being used much by younger beat makers.

In the early 2000s, as the 2000XL was becoming the standard tool for making beats, a variety of software sequencers and digital audio workstations (DAWs) were also adopted by beat makers. Comparable to the late adoption of samplers, hip-hop beat makers did not embrace software and DAWs as they entered the consumer music market in the 1990s. But the generation of beat makers that began creating in the 2000s saw software tools as a more viable option than hardware choices that previously dominated the practice. The generation that was starting to make beats during this period favored software over hardware. Regardless of the prevalence of peer-to-peer (P2P) sharing of software sequencers, most of the basic programs to get started making music were well under $1000—the MPC 2000XL (1999) originally retailed for $1500. In addition, most software programs, because of their comprehensive visual interfaces compared to the small screens on hardware instruments, provided beat makers with more options that were accessible through less button prompts (or mouse clicks) and a faster workflow for making beats. Captin Planit (Steve Borba) started making beats in 2000 when he was sixteen years old. He expressed one of the reasons why he gravitated toward software instruments:

> I love the sequencer on the MPC, but I don’t love not having control over each one of the elements that I have. … When I was using HammerHead [Rhythm Station] and FL (Fruity Loops) Studio (software sequencer) it was much more point and click, it was painting. (interview with author, New York City, September 8, 2011)

The disparate interfaces (physical buttons and small display versus mouse and software window) resulted in different approaches to the same practice of sampling audio, programming drums, and
arranging those components. Captin Planit preferred the software interface because he could access and assess all the elements of his beat; his computer screen displayed all the elements as blocks of audio waveforms. Then he was able to quickly manipulate (or paint) his sonic arrangement—in the context of Haraway’s concept of the cyborg, software instruments resulted in an advance in beat makers’ entwinement with technology as they could more quickly translate their imaginings through a more efficient and intuitive tool. Without a comparable visualization interface to manipulate audio, using a hardware instrument necessitated a level of tedium not present in most software programs. For older beat makers, though, software instruments had their own drawbacks. Motor habits associated with music are resistant to change (Blum 1992), and transitioning to software was not seamless for some beat makers that learned their craft through machines. As a beat maker that was accustomed to the physicality of triggering sounds on a hardware instrument, Lee Stone was initially averse to software programs:

I was against the software at one time because I didn’t know it … and I have still yet to use it for the construction of beats. When I used to do house music with Mike I loved using software. In terms of hip-hop, to me it always sounded like there was something off using software, like the drums didn’t feel right. This is, again, my sensibility. (interview with author, Long Island, New York, October 12, 2011)

In the early-to-mid-2000s, advances in technology caused a rift in the practice of beat making that is still evident as younger beat makers are unfamiliar with many of the instruments, processes, and techniques discussed in this dissertation. Rick Hertz, a beat maker in his early twenties, illuminated the contemporary state of the history of beat making practice during our conversation:
Patrick Rivers: Did you ever experiment with any kind of hardware or was it always software for you?

Rick Hertz: No, it was always software. I probably went to my boy’s house and messed with an MPC, but it’s just that the workflow for the software world just makes more sense to me. And I knew that around 2006 when I first got software … Now Kanye West, Timbaland, and all the big producers [are] using software. I kind of saw that it was going to go in that direction, so I’m glad I hopped on it early. So now I’m very accustomed to it and familiar with it, and I don’t have any problems with using software at all. (interview with author, New York City, August 27, 2012)

The increased profile of beat makers like Kanye West and Timbaland in addition to the increased accessibility of beat making technology from a price and product standpoint, increased the acknowledgement and appreciation of beat making in the 2000s. However, that resulted in the abandonment of previous practices and the sounds associated with those practices. As software technologies became the dominant facilitators of making beats, a new sound of hip-hop was established that is in many ways unrelated to earlier hip-hop music.
The three chapters that comprise this dissertation are an investigation of technology as a force constructing categories and styles of hip hop. They are also a documentation of the degree to which different technologies imposed themselves on human actors and were reciprocated with a degree of imposition. Technology made beat making but beat makers also made the technology they used (Taylor 2001). Specifically, beat makers made different technologies respond to the dynamics of a culture’s aesthetics and its practitioners’ taste. Hip-hop culture and music, though, did not stop in 1991.

In the introduction, I detail why the historical narrative of this dissertation ends in 1991 and some of the developments that warranted such a decision. My research unveiled several interesting developments in hip-hop beat making that I will continue to document in the near future. Hip-hop music from the South, specifically Miami, Atlanta, New Orleans, and Houston, emerged in the late 1980s/early 1990s and expanded the boundaries of hip-hop beat making and initiated what Roni Sarig (2007) has coined the “Third Coast.” As the quote from DJ Premier in Chapter Three about the Texas hip-hop scene showed, different regions of hip-hop beat making were established with different technologies. Understanding how the culture of “bounce music” in New Orleans interacted with the drum machines and samplers beat makers like Manny Fresh were using is something I am currently looking into. Another significant subject within hip-hop beat making in the 1990s that is not covered in this dissertation but a part of my research is the initial merging of hip-hop beat making practices with R&B music. Teddy Riley is properly given
credit for layering the hard beat and sample aesthetics of hip-hop with sultry, melismatic vocals in the late 1980s. Partially the result of Riley’s use of the Akai MPC 60’s rhythm algorithm, the style that became known as “New Jack Swing” (Cooper 1988) became largely popular in the early 1990s—especially after Riley produced Michael Jackson’s 1991 album Dangerous. In addition, Riley’s combination of hip-hop and R&B was the foundation of Andre Harrell’s Uptown Records, a label that employed Sean Combs, better known as Puff Daddy, P. Diddy, and Diddy. The “sophisticated” urban sound that defined the hip-hop sound on Combs’ Bad Boy Records was a direct descendant of Riley’s hip-hop/R&B recordings. Thus, delving into the history of hip-hop/R&B could have been an entire chapter, if not a dissertation.

This project seeks to understand hip-hop’s music making history and how different technologies informed the practices beat makers established. But it has become more evident that technology is also constantly reinscribing those practices while suppressing the possibility that many beat making practices could be passed down or become established procedure for future beat makers. Every new generation of technology changes how beats are made and how hip-hop music sounds. Is this situation detrimental to hip-hop music? From the perspective of the contemporary sound product of hip-hop, it depends who you talk to, but it is hard to deny the quality of some contemporary beats that are disparate in approach and sound to anything discussed in this dissertation. A more tangible impact may be revealed in how those engaged with beat making associate with the heritage of black American musical practice going forward. Irrespective of who is creating it, hip-hop music is a link in a long chain of black American musical practices. Deejay practices in the seventies were informed by soul music, the beats on the first hip-hop recordings used disco as a template, early sample-based producers were informed by everything, and even the electro-based beat for “Planet Rock” contained the
recreation of a funk break. It will be fascinating to observe how young people involved in beat making through current technological tools associate with hip-hop beat making history, but also how their musical practices inform their relationship with the practices of black American musical heritage. Hip-hop music was a valuable conduit for keeping older black musics prominent. With some younger beat makers, it is difficult to ascertain if they will sustain the profile of older hip-hop practices and even more difficult to contemplate their perceived accountability for older black musics.

Though this history of beat making is not complete, I believe it is valuable to those interested in understanding the relationship between a musical practice and the technology. More importantly, I hope this study is valuable to people who have embraced hip-hop during their coming of age years, are interested in studying music, and, like I was as a college student, are fascinated by the practice of making beats and hip-hop music. While I was unable to think of audio on a recording as material to be manipulated, many of the middle school through college students I teach not only see all audio as prospective creative material but also have access to less cumbersome tools to turn their thoughts into compositions. Hip-hop music should be, and in many cases is, taught as a compositional practice. I hope the history detailed in this dissertation will provide a more substantial foundation from which to teach hip-hop music and the practice of making beats. I intend to document as much beat making history as possible; however, further advances in micro processors and music technology, changes in the copyright laws, or a new dance could change the sound of hip-hop and its related music making practices. Thus, as I complete this dissertation and move on to my larger project on beat making, I look forward to how beat makers and technology dictate where hip-hop music and culture proceed.
Endnotes

1 The understanding of recordings as primary documents has been pertinent to many writings on
Marshall 2007). Krim's objects of interpretation yielded categories based around certain identity
attributes, but he proposed his argument without explicating how notions of identity are
embedded during stages of the recording process. I deem it necessary to consider the prospective
impact on identification when a deejay starts making records in a studio after being locally
known as a party/street deejay or when a nascent beat maker chooses to use hardware samplers
while software production programs are becoming the popular standard.

2 Musicologist Mark Katz’s Beat Making Lab at the University of North Carolina–Chapel Hill
was established in 2011. It is a model of the type of expansion in music pedagogy that will
probably become more prevalent as more prospective music scholars that grew up with samplers
and DAWs enter undergraduate music programs.

3 Busta Rhymes was previously a member of Leaders of the New School (L.O.N.S.), a hip-hop
group from Long Island, NY that released two albums in the early 1990s.

standard practice of these genres. The labels for these genres have their own complications.
While the use of conventional instruments like the electric bass, saxophone, guitar, and trap
drum set are prominent in the creation of these genres, Sly Stone’s use of a drum machine on Sly
and the Family Stone’s album There’s a Riot Going On (1971) and Bernie Worell’s
experimentation with electronic sounds on late 1970s Parliament and Funkadelic recordings
broaden our understanding of R&B and its successors. These cases perhaps foreshadowed the
complete degradation or transformation of the label as compositional and aesthetic expectations
of conventional R&B/soul became flexible in the late 1990s into the 2000s. I had several double-
take moments in the 2000s when hearing the programming on New York City radio stations
WBLS and the late WKRS Kiss FM, stations that initially catered to the R&B/soul format.

5 Musicologist Amanda Sewell recently detailed the impact of the O’Sullivan case on the amount
and type of sampling heard in hip-hop recordings. Her article, “How Copyright Affected the
Musical Style and Critical Reception of Sample-Based Hip-Hop,” exhibited how certain hip-hop
artists that made prolific use of samples before the lawsuit, subsequently lowered the amount of
samples they used, and the type of samples, in order to continue creating in the new environment
of sample litigation.

6 The South Bronx is generally regarded as the birthplace of hip-hop despite it being well known
that the practitioners and events are connected to multiple regions in the whole borough of the
Bronx. DJ Kool Herc lived and threw his first party in the West Bronx.

7 In Lying up a Nation (2003), ethnomusicologist Ronald Radano discussed the discursive
creation of black music. He argues that the racial discourse that separated American Negroes
from their Euro-American counterparts also formulated the separation between their musics. This
correlation has led to the defining of Black music through certain prejudices about Black racial
differences, particularly the connection to the movement of the black body to sensual rhythm, rather than aesthetic differences.

8 The title or word ‘hip-hop’—as a sign for the culture and music presently discussed—was introduced in 1978 by rapper Cowboy from Grandmaster Flash and the Furious Five as a part of one of his rhyming routines. Following the success of “Rapper’s Delight” (1979), hip-hop vanguards, particularly Fred “Fab 5 Freddy” Brathwaite and Afrika Bambaataa, promoted the term as a representation of the whole culture, which had been reduced to just rapping. The term was cemented in, at least, New York City/Tri-State area media outlets by 1981.

9 In his memoir, The Adventures of Grandmaster Flash (2008), Grandmaster Flash describes his early fascination with his dad’s turntable and record collection. Some of the memories he shared were of family celebrations around the turntable. Additionally, deejay and hip-hop luminary Afrika Bambaataa described his first deejay set in 1970 where he and another guy each used one turntable and a flashlight to communicate when each deejay should play their next record (Fricke and Ahearn 2002, 45).

10 Graffiti art galleries went through a boom and bust economic cycle in the 1980s. Charlie Ahearn’s independently made feature Wildstyle (1983) featured all the elements of the culture and a graffiti writer as the lead role. Break dancing events, like the 1981 battle in Lincoln Center between Rock Steady and Dynamic Rockers, received national news coverage. The motion pictures Beat Street (1984), Breakin’ (1984), and Breakin’ 2: Electric Boogaloo (1984), and even a scene in Flashdance (1983) instigated a fascination with break dancing in the early-to-mid 1980s, including a breaking display at the 1984 Olympics in Los Angeles (see Sachs 2009 dissertation). Films like these and the practices they presented, though, didn’t make it out of the decade. They were replaced by the hip-hop infused films like House Party (1990), New Jack City (1991), Juice (1992), and Menace II Society (1993), which portrayed activities of Black teens and young adults (partying, gang banging, drug dealing, and rapping) to first-rate, rap dominated soundtracks.

11 Grandmaster Caz (a.k.a. Casanova Fly) was a member of the hip-hop group the Cold Crush Brothers and is now appropriately acknowledged as the actual writer of Sugarhill Gang rapper Big Bank Hank’s verse in “Rapper’s Delight” (1979).

12 One of most popular breaks came from “It’s Just Begun,” the title track from The Jimmy Castor Bunch’s 1972 album. In the summer of that year, “Troglodyte (Cave Man)” became the album’s hit single (Vincent 1996). Later in the decade “It’s Just Begun” revitalized the album as the eight-second conga and timbales solo, and the subsequent guitar and saxophone solos, supplied plenty of material to create breakbeats.

13 On the centennial of John Cage’s birth, WNYC New York Public Radio host John Schaefer made a comment in his blog to the effect that hip-hop artists need to have more knowledge, and subsequently acknowledge, Cage’s use of the turntable for composition in the 1920s. For the sake of chronology this may be valid. But in terms of the reality of cultural knowledge building and cultural practice in 1970s Bronx, early deejays have no debt of acknowledgement to pay to Cage. A similar critical debate will arouse with Pierre Schaeffer’s musique concrète and the
lineage of sampling. Overall, this notion is comparable to asking Italians to acknowledge the Chinese for their decision to cover their dried water and flour concoction with tomato sauce.

14 Disco’s place in hip-hop history has been contingent on the genre being redeemed after its decline in the early 1980s. Disco, and its impact, are disparaged or ignored in many of the histories of hip-hop. Reggae is given relatively more prominence as a precursor, which is appropriate but deficient in a discussion pertaining to all the dynamics of hip-hop’s beginnings.

15 In scholarly studies of a music’s history the issue of the ‘The Great Man’ paradigm of traversing historical periods has been pervasive. Thus, the notion of the “cultural hero in hip-hop” is problematic as it can be configured to resemble the prejudicial strategy of presenting history as a succession of iconic male achievement. This possibility is difficult to deny; the cultural hero is a de facto masculine role because of the gendered awareness of the noun ‘hero’. Consequently, using the concept cultural hero can perhaps be perceived as dismissing the possibility that the filler of that title role could be a woman. My use of this term, though, is in reference to the heralding of a type of figure within the culture, not those that may have become that figure. Though it is difficult to ignore that the influential hip-hop recordists that inhabited the role of cultural hero were typically men, the ambit of this project is not the overt and inherently gender restrictive discourse, networks, and practices of hip-hop recordists. The issues that surround the gendered roles of hip-hop recordists were broached in conversations with my consultants.

16 In 1977, before “King Tim III (Personality Jock)” or “Rapper’s Delight,” Flash, at the height of his cultural hero powers, was approached to create a record but rejected the offer. “I would have to admit that I was blind. I didn’t think that somebody else would want to hear a record re-recorded onto another record with talking on it. I didn’t think it would reach the masses like that. I didn’t see it” (quoted in George 1993, 52).

17 As Fink explains in his article, the “2/4” (two-four) name for the backbeat pattern was irrespective of meter and was a colloquialism amongst Motown musicians. “2/4” was in contrast to the “4/4” (four-four) pattern, which was a name for the “four on the floor” or four snare hits pattern also institutionalized at Motown.

18 The beat for “Rappin’ Partee Groove” also contains the same electronic keyboard sound, chord progression, and bass groove heard in “Christmas Rappin,’” a Larry Smith production for Kurtis Blow.

19 In the concluding record to his debut album College Dropout (2004), Kanye West admitted that he grabbed the drums off of the Dr. Dre produced recording “Xxplosive” (1999) to make beats for Jay-Z and other rappers.

20 Increased numbers of non-black hip-hop consumers appeared in the mid-to-late 1980s.

21 In his article “ORCH5, or The Classical Ghost in the Hip-Hop Machine” (2007), Fink delved deeper into Kraftwerk’s melodic and motivic composing. He displayed how the synthesizer line in “Trans-Europe Express,” which is imitated in “Planet Rock,” was actually sourced from a commonly used theme among German classical composers. Fink interpreted Kraftwerk’s use of
the *Weltschmerz* theme as representative of the final decline of classical music and its use in “Planet Rock” as a placing classical music in a revival state between death and rebirth.

22 The recordings that have been discussed were all single releases. In this sense, the growth of the hip-hop industry was comparable to the development of the R&B/rock ‘n’ roll recording industry, though hip-hop transitioned to album-length releases quicker.

23 The *creative* use of samples, though, was and is not afforded to every sampler owner.

24 It is discouraging when discussions of hip-hop records, in any medium or status of publication, refer to the rapper when referencing a beat. A hypothetical example: “that record is great, I love how Jay-Z sampled the music from *Annie*.” Jay-Z has ten ‘executive producer’ credits in his twenty-year history and is never mentioned as a beat maker, not even tangentially, by himself or people he has frequently worked with.

25 “Sampling” also has other meanings in the realm of sound design, particularly in reference to how sounds are created for digital instruments.

26 In the early stages of learning how to make beats I was not privy to the social process of digging in the crates to find samples. I used CDs and later digital files to source my samples. In my discussions with younger beat makers I have come to realize that not using vinyl records has been a practice since the mid-to-late 1990s.

27 Analysis of the tonometry of a musical practice through the analysis of the Hertz of frequency responses was a feature of comparative musicology through the establishment of ethnomusicological research. From Hornbostal to Hood understanding tuning and tonal systems through Hertz has been opaque at best (Ellingson 1992). In my research into sound design by studio engineers I have recognized how certain tones appear in a parametric equalizer but I have yet to formulate a relevant, and descriptive, presentation of what is happening as pitches change in an equalizer, particularly prominent bass pitches.

28 Adjusting the tempo of a sample has been a practice since the late 1980s and has defined the sound of beat makers (Kanye West’s early sped up samples) and regions (Houston’s slowed down samples for chopped and screwed beats).

29 In addition, from a creative standpoint, having one aspect or excerpt from a sample source interact with a different excerpt from the same sample source can result in an aesthetically pleasing, if not unexpected, outcome.

30 The release of Run-D.M.C.’s 1984 debut *Run-D.M.C.* displayed the promise of album length rap records over the single-based industry established in 1979. An example of the trend toward album length hip-hop was apparent when, in 1986, Afrika Bambaataa & Soulsonic Force released *Planet Rock - The Album*, four years after the single “Planet Rock” was released.

31 This is in contrast to consumer audio, an industry more focused on home consumption of music.
The story of the initiation of sampling in hip-hop is not a settled story, at least from my perspective as a researcher. In different interviews in magazines and documentaries Marley Marl is quoted as saying that he used different samplers and different recordings to source the snare sound; the latest being a November 2013 interview with NPR. I used this quote because of the specifics that he divulged about the sampled recording and because it corroborates more explanations of his first-time sampling (Rose 1994, Chairman Mao 1998, Gonzales 1999). I have not yet been able to get an interview with Marley Marl.

Marley Marl is listed in the credits for “Cosmic Blast” and “Captain Rock to the Future Shock,” each released in 1984. After listening to each record I find it difficult to hear the distinct sound of a sampled snare attack, but I am of the belief that the Marley discovered sampling while working on the tracks for the “Cosmic Blast” single because of the hip-hop elements—scratching and beat boxing—heard on that recording, and not on “Captain Rock to the Future Shock,” which is more of a straightforward electro recording.

While storing his sampled sounds on a reel-to-reel was the only plausible option considering the lack of memory on the sampler that he purchased, in 1985 Bobby Nathan wrote an article in Keyboard magazine encouraging people using samplers to save their sounds to tape instead of on the memory systems of samplers. His rationale was that saving the sounds to tape ensured that once samplers inevitably improved in quality a user could continue using their sampled sounds without worrying about having outdated digital samples.

Mark Katz (2012) offers a lengthy analysis of “The Adventures of Grandmaster Flash on the Wheels of Steel,” incorporating a musical analysis of the Flash’s techniques with a social analysis of the records he mixed together.

In Beat Kings renowned beat maker 45 King detailed how in 1984 he started making breakbeats using reel-to-reel tape: “First I was looping records on a reel-to-reel, splicing the records together; chopping it on the downbeats. So, like a four-bar loop, would go round and round. There were SP-12s, but I didn’t have SP-12 money” (Steward 2006, 08:41).

In some writings about sampling (Théberge 1997, Chang 2009, Katz 2010) Pierre Schaeffer’s tape manipulations for his musique concrète are referenced as precedents for the sample practices of hip-hop beat makers. Pause tapes are probably the closest comparison to musique concrète but, in general, the aesthetic and composition goals of each practice are unrelated.

I must acknowledge that I received the manual sampler notion while in conversation with music researcher Will Fulton.

Rhythmic deejays scratches are not heard during this section of the recording and appear to have been layered on top of Shocklee’s layer by Grand Wizard Kay Jee, one of the Spectrum City deejays. At 02:37, Chuck D recites, “Kay Jee cut it up for the radio. Hit it!,” followed by 0:20 of Kay Jee scratching for eight bars.

These compositional tools can be heard on hip-hop recordings from 1983-1986 by Whodini (Whodini, Escape), LL Cool J (Radio), the Beastie Boys (License to Ill), Mantronix (Mantronix: The Album), Schoolly D (Schoolly-D and Saturday Night! - The Album), The Showboys (“Drap
Rap (Trigger Man”), Stetsasonic (On Fire!), and California-based artist Egyptian Lover (One Track Mind) and Too Short (Players and Raw, Uncut, & X-Rated).

41 Disclaimer: despite the use of instruction manuals to illuminate a point, most beat makers, including myself, learned their instruments through mentorship, inquisitive tinkering, and trial and error.

42 Reviewing many of the early musical instruments that included a sampler it is interesting that many of them featured other functions that ensured their usefulness, just in case users did not want to sample their own sounds. The second version of the first Emulator (the Mark II from 1982) was packaged with pre-made sounds on a diskette for users that just wanted a synthesizer with more natural sounds and other samplers were housed within sequencers. In contrast, Akai’s first sampler, the mostly forgotten S612 (released 1985), was not popular because of its limitation of just being a rack sampler. Sampling was a technological breakthrough and innovation but it took time for technology companies to promote the technology as a hardware seller on its own merits; and in many cases the design of the sampling device necessitated other functions.

43 In my conversation with engineer Bob Power he told me that the Akai S612 was the sampler that Stetsasonic and De La Soul used before moving on to better equipment. Here was his take on the machine: “this incredibly primitive thing that had like two seconds of sampling time.”

44 Distorted digital frequencies—frequencies that are not represented with a high enough number of samples—are perceived as such because, without enough samples to reproduce analog frequencies, the signal-to-noise ratio of those frequencies tilts toward noise. A compander improved the sound quality of digital samples by getting more signal from higher, and perhaps lower, frequencies. A compander compressed or flattened the dynamic range (in general, the natural diversity of amplitudes) of an analog sound before digitizing the sound. This process allowed more frequency data of an analog sound to be converted, albeit without its natural dynamics. Once the sound was digitally reproduced, the compander then restored the dynamic range of the original analog sound. This explanation is in reference to digital audio; there were also compressors that manipulated the signal-to-noise ratio of electric analog signals.

45 Highlights from the drum machine/turntable/synthesizer style included: Rhyme Pays by Ice-T, Bigger and Deffer by LL Cool J, How Ya Like Me Now by Kool Moe Dee, and Lyrical King by T La Rock. Albums that heavily featured digital samples included: Paid in Full by Eric B. & Rakim, Yo! Bum Rush the Show by Public Enemy, Down By Law by MC Shan and Criminal Minded by Boogie Down Productions.

46 Critical Beatdown by Ultramagnetic MC’s, Long Live the Kane by Big Daddy Kane, Strictly Business by EPMD, Lyte As a Rock by MC Lyte, Straight Outta Compton by N.W.A., In Full Gear by Stetsasonic, and Straight Out the Jungle by The Jungle Brothers. Renowned follow-up recordings from Eric B. & Rakim and Public Enemy also made the sound of digital samples unavoidable for hip-hop enthusiasts in 1988.
Variation in the sample rate depended on the amount of sample memory users utilized. If the full sixty-three seconds of sample time was used, the sample rate was only 7.5kHz. Below the maximum sample time the user could negotiate the amount of sample time and sample quality.

New York City did not get a dedicated hip-hop music station until Hot 97 (WQHT) focused its programming on rap music in 1994.

The beats for Pete Rock and CL Smooth’s “T.R.O.Y. (They Reminisce Over You), Main Source’s “Fakin’ The Funk,” and every beat on Black Moon’s debut *Enta da Stage* had filtered sample sounds used in a variety of combinations.

The exception was James Brown’s collaboration with Afrika Bambaataa for the 1984 single “Unity.”

Brown’s 1979 album *The Original Disco Man* is a primary example of Brown’s struggle to transfer the energy from his 1960s and 1970s recordings to the new production styles.

An important aspect of the beat is the imported bass line from Fonda Rae’s 1982 single “Over Like A Fat Rat.” Because the recorded length of the two-bar bass line was beyond the capabilities of the sampler he was using, Marley recreated the bass line using his Casio CZ-101, which was an affordable synthesizer that provided similar sounds to the Yamaha DX (Marley Marl 2012b).

After doing some online research into the sample sources for this version of the song, I came upon some information explaining that the vocal samples that are without drums are comedian Eddie Murphy’s impersonation of James Brown from his stand-up routine.

Jimmy Nolen created the “chicken scratch” guitar strumming style by strumming close to the bridge of the guitar and slightly muting the strings along the fret board. The sound is prominent in James Brown’s “Papa’s Got a Brand New Bag” (1965).

As hip-hop entered the 2010s there have been, for the first time, rappers repurposing styles from previous years. Brooklyn-based rapper Joey BadA$$ and his crew, Pro Era, have sought early 1990s style beats from Pete Rock and DJ Premier and have promoted themselves as a reimagining of hip-hop from that period.

The terms that I present are less exhaustive than those of musicologist Amanda Sewell. In her 2013 dissertation, “A Typology of Sampling in Hip-Hop,” and her 2014 article, “Paul’s Boutique and Fear of a Black Planet: Digital Sampling and Musical Style in Hip-Hop,” she presents a taxonomy of samples used in the beats on *Paul’s Boutique* by the Beastie Boys and *Fear of a Black Planet* by Public Enemy. Sewell’s taxonomy is comprehensive in its description of the layers of a sample arrangement and the purposes served by different samples. Her model is beneficial to the study of hip-hop beats. It is well organized and proposes a theoretical approach to hip-hop beats. But, regardless of her apparent distance from the actual practice of beat making or understanding of the origins of the beats on *Paul’s Boutique*, her analysis does not give a sense of beat makers’ process of arranging sound.
The prolific use of “The Payback” is an example of a James Brown recording that was not primarily used in hip-hop because of its drum break, and another example of beat makers leading the revitalization of James Brown in popular music.

I am aware of the unnamed samples from “What They Hittin’ Foe?” I do not list the other samples because they are not listed in online sample databases or on the Wikipedia entry for the album.
Appendices

Glossary

analog sound: sound that is (re)presented artificially with varying values that correspond to the natural quality of sound waves.

auxiliary sample: short samples (stabs, turntable scratches and other short sounds) that are not sequentially repeated and can be used to animate or enhance the other layers of a beat or a rapper’s rhymes.

beat: the instrumental part of a hip-hop recording or the drum loop or percussion parts of a hip-hop instrumental.

beat juggling: the deejay practice of seamlessly manipulating a variety of drum breaks, an extension of Grandmaster Flash’s quik-mix practice.

beat maker: a creator of instrumentals that accompany rappers and singers.

break: or drum break or ‘get down part.’ The section of 1960s/1970s recordings where the the drummer and/or percussionist, bassist, and, occasionally, guitarist vamped on and developed rhythm-oriented phrases that lent themselves to being repeated as ostinatos.

breakbeat: a self-contained musical entity featuring the continuous looping a (drum) break.

chop: a sample phrase length shorted than one bar of music but longer than just a spurt of sound. Also known as the beat maker action of extracting audio from a recording.

chop arrangement: the reconfiguration of separate chops of sampled audio into a new loop.

clock theory method: Grandmaster Flash’s procedure for finding the break on a vinyl recording by correlating the face of a vinyl record with the prominent points of a clock.

compander: a hardware device that improved the sound quality of digital samples by getting more signal from higher, and perhaps lower, frequencies during the analog to digital conversion process.

cut: the deejay action of seamlessly transitioning the sound output from one turntable to the other.

deejay: the phonetic representation of the abbreviation of disc jockey (DJ). In hip-hop, the deejay was the person that controlled and curated the music at parties. Simultaneously, the deejay was the initial creator of hip-hop music, manipulating two copies of a recording into breakbeats.
**disco break:** the extended section of a disco recording that highlighted the instrumental component of the recording. Initiated by record producer Tom Moulton.

**DJ:** an abbreviated title that precedes the name of hip-hop disc jockeys, e.g. DJ Kool Herc

**digital sound:** analog sound that is (re)presented digitally with finite values of bits (1s and 0s) and can only approximate the natural quality of sound waves.

**drum machine:** a device that originally enabled users to play automated rhythms in different meters and at different tempos, and later enable users to program and save rhythms for playback.

**emcee:** the phonetic representation of the abbreviation of master of ceremonies (MC).

**hi-fi:** an abbreviation for high fidelity. Used in consideration of audio equipment that produce high quality sounds.

**hip-hop:** a culture that consolidated in the Bronx, New York in the early 1970s and features the practices of graffiti writing, break dancing, deejaying, rapping, and beat making, and particular vernacular, fashion, and perspective.

**hip-hop music:** the instrumentals heard on recordings that accompany rappers.

**loop:** a sample phrase length of at least one bar of music—typically never more than four bars—from a recording that is repeated, also referred to as being looped.

**main sample:** the predominant sample that defines the sonic and musical personality of a sample-based beat

**mix:** refers to the recording project given to a mix engineer that contains all of the recorded parts (sounds, instruments, vocals, etc.)

**mixer:** a device that compiles the audio signals from two turntables into a single signal that can be heard through the same loudspeakers or headphones.

**mixing:** in regard to deejaying, it is the seamless transition from one recording to another recording. In regard to making recordings, it is the process of balancing all of the audio signals from the separate tracks of a mix using a multitude of editing effects.

**original beat:** a beat that does not contain samples and is typically composed of synthesized sounds and, perhaps, standard acoustic instruments (also referred to as a beat from scratch).

**quik-mix:** Grandmaster Flash’s procedure for seamlessly moving from the audio of one recording to the audio of another using volume controls and then a crossfader.

**sampler:** devices that enable users to extract and save segments of audio and the manipulate that audio in a variety of ways.
**sampling**: a compositional technique using recorded media as material.

**secondary sample**: sampled loops and chops utilized as musical supplements that provide texture (rhythmic, melodic, or harmonic) to a main sample in a sample-based beat.

**sequencer**: a device that stores the information of a performance gesture from an electronic instrument and enables a user to compose multiple lines of music and play them back polyphonically.

**sound module**: a hardware device that contains the sounds featured in a particular synthesizer. It enables beat makers to expand the sound options of their keyboard and/or drum machines through MIDI connections.

**stab**: a sample phrase length that is seconds-length and used for percussive effect or to decorate a loop or chop arrangement.

**trigger**: the beat maker action of activating a sound through a physical interface, such as a drum machine pad or synthesizer keyboard.

**workflow**: a beat maker’s procedure for making a beat facilitated by the technologies the beat maker has access to.
Interviews


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Sample Interview Questions

When did you first start listening to hip-hop music?

What were some of your impressions of hip-hop?

When did you decide to start making beats? How did you get into the practice?

Why did you start making beats?

Did you have any instruction in making beats? Were you all self-taught?

Whose sound or what type of sound were you interested in when you began making beats? Did you have a reference point?

In terms of your reference points, how did your technology help you achieve those sounds?

Where do you search for samples?

When it came to sample use, talk about why you chose to use certain samples and how use samples?

How do you come up with drum patterns? What’s your process of getting kicks, snares, and hats together?

What was/is your process of making a beat?

How many sounds do you have at your disposal? How did that impact your beat making?

How did/does the sounds you have access to affect your beat making?

How many rappers or singers have you given beats to or produced in the studio?

What is your process for working with a rapper or singer?

Describe the environment in the studio during your sessions.

What has changed from producing music earlier to now?

What are some of you favorite hip-hop tracks/albums?
The Mad Science of Hip-Hop

Technology Timeline

**Hardware**

Turntables
- 1971 – Technics SL-1100 Direct Drive Turntables
- 1972 – Technics SL-1200 series

Mixers
- 1971 – Bozak CMA-10-2DL
- 1971 – Alex Rosner’s “Rosie” stereo mixer
- 1977 – Integrated Sound Systems GLI PMX 7000

Drum Machines
- 1978 – Roland CR-78
- 1980 – Linn Electronics LM-1
  - Oberheim DMX
  - Roland CR-8000
- 1981 – Roland TR-808
- 1983 – E-mu Systems Drumulator
- 1984 – Roland TR-909

Samplers
- 1979 – Fairlight CMI
- 1981 – E-mu Systems Emulator
- 1985 – E-mu Systems SP-12
  - Ensoniq Mirage
  - Korg SDD-2000
  - Akai S612
- 1986 – Akai S900
- 1987 – E-mu Systems SP-1200
- 1988 – Akai MPC60
  - Akai S950
- 1990 – Ensoniq EPS-16+
- 1992 – Ensoniq ASR-10

Synthesizers
- 1974 – Moog Micromoog
- 1978 – Sequential Circuits Prophet 5
- 1982 – Roland TB-303
- 1983 – Yamaha DX7
- 1985 – Casio CZ-101
- 1988 – Korg M1

**Software**

- 1985 – Roger Powell *Texture* (MIDI sequencer)
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The Mad Science of Hip-Hop


Discography


Filmography


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Webography


