

Hip-Hop Instruments

The Technology and Technique of Hip-Hop Production

Turntablism

Merry Go Round

- Jamaican-born DJ Kool Herc pioneered the technique of using two records and mixing between them to extend "break" sections, what he calls the merry-go-round.
- This innovation wasn't planned or practiced ahead of time, it was a reaction
 Herc had by watching the dancers, drawn from the musical and cultural
 influences of Jamaica and the mixed community in the South Bronx.



Scratching

- The invention of "scratching" is credited to DJ Grand Wizzard Theodore, which was created by accident.
- It quickly became a defining sound: the DJ manually spinning the record while it was audible.
- Additional moves including rhythmic manipulation of the crossfader were employed with and against scratching.



Grandmaster Flash

- Groundbreaking technique on the turntables.
- Inventor of the turntable "cue"/ headphone system, which makes the cut cleaner and more in tempo.
- Extended two-turntable techniques.
- Connected technique and technology, which turned turntable into an instrument.





Break Mix

- Punch phase
- Scratch phase
- Silent phase
- Meliodic scratch
- Crossover



Turntablism

As rappers and beatmakers became more popular, the DJ was often sidelined to just a supporting role, doing a few scratches on Hip-Hop tracks and/or playing the instrumental tracks for rappers to rap over at live shows, rather than being the main event. In some cases this leads to DJs branching out on their own to make records and hold events that further develop the craft of DJing, where the focus is on scratching and mixing records in elaborate ways.





dubsport Beat Junkies



Drum Machine & Sampler

Drum Machine

- The term drum machine is usually used to refer to a machine which comes with pre-recorded drum sounds that can the be programmed in different sequences, creating different rhythms. They differ from later sampling/sequencing machines as you cannot record in any sounds you like, you simply use the sounds which come with the machine.
- One of the most widely used drum machines in Hip-Hop is the Roland
 TR-808 drum machine, often referred to simply as the "808". Its drum sounds were not considered realistic, but this became part of the machine's strength: it has unique and instantly recognizable hand claps, cowbells, and bass kicks, among other sounds.



BUILDING THE BEAT: INSIDE LEGENDARY ROLAND TR-808 TRACKS

Roland

Afrika Bambaataa & The Soulsonic Force - Planet Rock (1982)

- Planet Rock frames a futuristic sci-fi vibe (drawing partly on George Clinton and avant-garde visionary jazz musician Sun Ra).
- It's built around two songs from German electro-pop group Kraftwerk:
 "Numbers" and "Trans Europe Express".
- Bambaataa also uses a vocoder to characteristically alter his voice (as well as a few influential samplers).
- Planet Rock was the first hit using the Roland TR-808 drum machine.



Planet Rock Samples

Kraftwerk - Trans Europa Express (Hook/ Riff)

Kraftwerk - Numbers (Multiple elements)



Oberheim DMX & Run DMC - Sucker MC's (1983)

- Oberheim DMX is a programmable drum machine first released in 1980, which contributed to many classical sounds in 1980s Hip-Hop.
- Producer Larry Smith produced Run-D.M.C.'s classic "Sucker M.C.'s" and other famous Run-DMC tracks, like "Together Forever" and "Darryl and Joe" using the Oberheim DMX drum machine.
- The sound is very stripped down: the only elements are a drum machine,
 some keyboard stabs, scratching and the voices, which work in dialog





Roland TR-909 & Schoolly D - P.S.K. 'What Does It Mean'? (1985)

- One of Schoolly's most impactful works was his 1985 single "P.S.K. What
 Does It Mean?" With its heavy kick and snare pattern, razor sharp hi-hats,
 and splashing cymbal rashes programmed on the Roland TR-909 and held
 together by a cavernous reverb.
- "P.S.K." is considered the **first gangsta rap**. Schoolly D is from Philadelphia and P.S.K. refers to the "Park Side Killas" gang he affiliated with.
- "P.S.K." has been sampled many times—most notably by Notorious B.I.G.
 ("B.I.G. Interlude") and Siouxsie and The Banshees ("Kiss The For Me").

Schoolly D - P.S.K. 'What Does It Mean'? (1985)



Sampler/Sequencer

- This is a machine which both **samples** sounds by recording them in from records, TV, or any other audio input (rather than using pre-recorded sounds that come with the machine), and is then also used to **sequence** those sounds, usually through tapping out rhythms by hand on a series of "pads", where each pad plays back a sampled sound. Two of the most popular and widely used sampler/sequencers are the E-mu SP-1200 and the Akai MPC.
- The **SP-1200**, manufactured by E-mu and brought out in 1987, is responsible for a lot of the beats produced during Hip-Hop's golden age. Its limitation on sampling time (10 seconds) pushed the producers to be creative with what they sampled and how they used the samples. "There were less options but it made you work. Your limitations make your brain think more." Buckwild



THE ENDURING LEGACY OF THE SP-1200



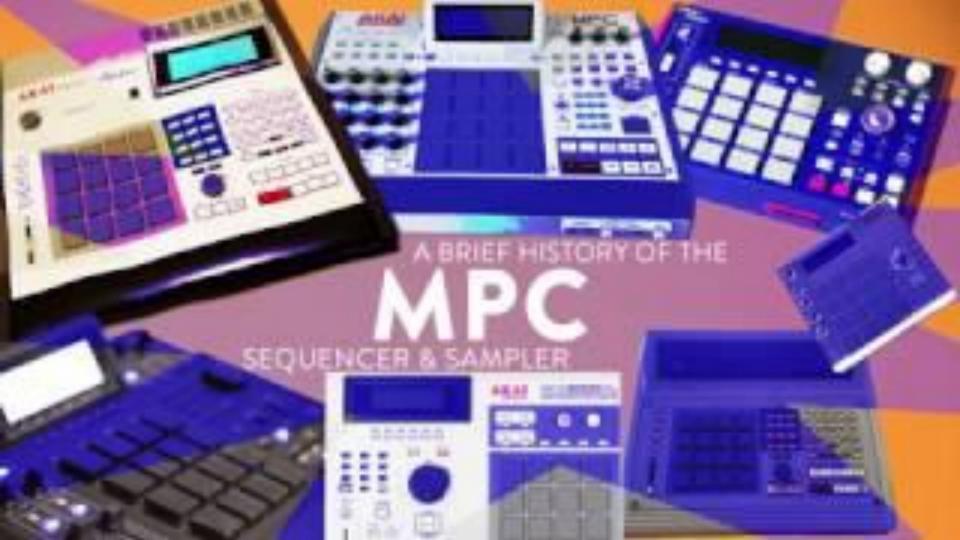
SP-1200 & Pete Rock, C.L. Smooth - They Reminisce Over You (T.R.O.Y) (1991)

- "They Reminisce Over You (T.R.O.Y)" is a classical Hip-Hop song produced by Pete Rock on the SP-1200 sampler.
- This song is a tribute to their friend who passed away. It tells a story, CL is talking about how he met Trouble T Roy (who died accidentally). "They Reminisce Over You" spells "Troy".
- T.R.O.Y was a rare rap song at that time period that appeared to be emotional (Hip-Hop and rap songs barely play with emotions, especially in old-school times).



Sampler/Sequencer

- In 1988 Akai launched what was to become the main successor to E-mu's SP-1200 – the MPC (originally MIDI Production Center, now Music Production Controller). It allowed more sampling time than the SP-1200 and had a pad layout that a lot of beat-makers prefer.
- The MPC remains the standard beat-making machine today, despite legions of imitators, including computer software that mimics the MPC's function.





VOX POP



EARWORM



DAW (Digital Audio Workstation)

- Pro Tools
- Logic Pro X
- Ableton Live
- FL Studio
- Garage Band
- Reaper
-







Records & Crate Digging

Records

- Records, whether albums, singles, or EPs, are the raw material of Hip-Hop music creation. Going out and finding these records is known as record "digging" or crate digging.
- Crate diggers gain a substantial amount of historical knowledge about
 musicians, record labels, recording aesthetics, and production techniques,
 from digging for records. The knowledge you are privy to is garnered, not just
 from the recording itself, but also from the liner notes, album credits, and even
 the album art. Here, you will discover how this activity relates to Hip Hop
 culture and music making, and why some beatmakers and DJs spend hours
 on end engaged in this activity.



Piece Everything Together



Sampling



Stetsasonic - Talkin' All That Jazz (1988)

- "Answer" to Mtume, jazz musician who had called out sampling as lazy and uncreative.
- Built on a jazz sample: "Expansions" by Dr Lonnie Liston Smith.
- Manifesto on how hip hop's sampling relates to earlier styles, and how it can even reactivate the work of older artists.

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

Many people whose music was sampled in the 80s and 90s are now revered by a generation who otherwise might never have heard of them. This musical education was an important part of the culture, sadly lost with the decline of sampling in Hip-Hop.



Copyright and Sampling

- Who owns music?
- How do they own it?
- How much of it do they own?
- Is there an inherent mis-match between the cultural history reflected in the law and that of hip hop? And does that matter?
- How has enforcement of laws surrounding the ownership of music affected hip hop production?



Sampling and Clearance

- In the narrowest legal sense sampling in early Hip-Hop violated rules regulating both use of the recording itself as well as the underlying composition in question.
- If you use a sample of another record, you'll have to clear and pay for use of the recording. There are caveats.
- If the musical material sampled is a significant factor in the new work, you will also have to clear and pay publishing. This will generally involve granting a % writing credit (and hence a percentage of the publishing revenue streams) to the songwriter(s) whose work is being sampled.

Sampling and Clearance

- Because the law is not (and cannot be) specific about a threshold for infringement, in the early days of hip hop people tried to get away with whatever they could.
- In many cases litigation is complicated by the fact that the rights involved have been sold a number of times and it is sometimes unclear who owns them.
- In some senses, this is not so different from music as usual which is, and has always been, full of borrowing, licit and illicit.
- The law remains vague, so practice is based largely on precedent. Problem is that very few cases make it to judgement so precedent is thin. The business effectively exists within an ongoing negotiation between the artists, labels, publishing companies and legal system.

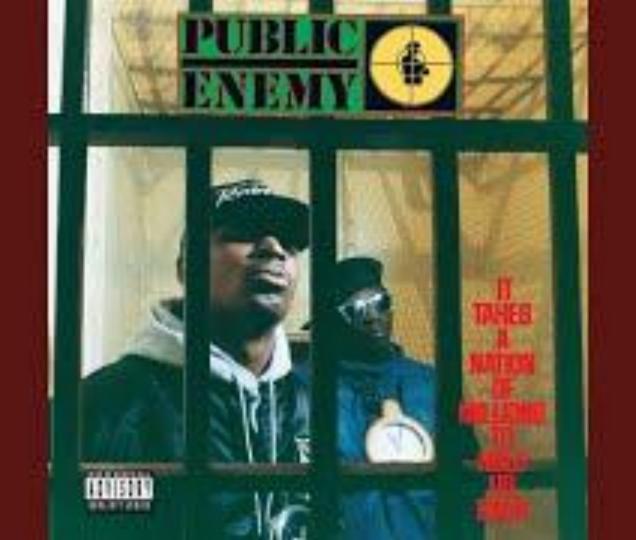


Influence on Production

- The sample-heavy sound of late-80s Hip-Hop production effectively died with all these lawsuits. Songs based on a single recognizable and cleared sample became more common, as did music with original backing.
- To keep things legal for sampling nowadays, there are services that provide libraries of pre-cleared content.
- With consolidation of publishing catalogs, officially sanctioned samples are becoming more common: i.e. it feels like the publishing shopping the hook instead of the producer digging for it.

Public Enemy - Night Of The Living Baseheads (1988)

- Sampling became central to Hip-Hop music making starting in the mid-1980s.
 This song, produced by The Bomb Squad, uses a sample collage technique that is rarely used anymore (clearing samples, or asking permission and compensating the original songs copyright holder can be expensive).
- This song contains samples from 21 songs.



Three Registers of Sampling (Can Co-exist)

- The "Sound"
- Reference: the new piece is pointing to an older piece and its context
- Intertextuality: the new piece is referring to other people's use of the same sample

Sampling in rap is a process of *cultural literacy* and *intertextual reference*. These samples are highlighted, functioning as a challenge to know these sounds, to make connections between the lyrical and musical texts. It affirms *black musical history and locates these "past" sounds in the "present." — Tricia Rose*

Sampling (Tricia Rose Special Reading 1)

- Prior to Hip-Hop, the most desirable use of a sample was to mask the sample and its origin; to bury its identity. Samples were used to "flesh out" or accent a musical piece, not to build a new one.
- Hip-Hop producers have inverted this logic, using samples as a point of reference, as a means by which the process of repetition and recontextualization can be highlighted and privileged.
- For the most part, sampling, not unlike versioning practices in Caribbean musics, is about paying homage, an invocation of another's voice to help you to say what you want to say.

Sampling (Tricia Rose Special Reading 1)

- Sampling technology as used by Hip-Hop DJs and producers is similar to the
 narrative originality in oral cultures: "narrative originality lodges not in
 making up new stories... [instead] formulas and themes are reshuffled rather
 than supplanted with new materials."
- Hip-Hop DJs and producers reshuffle known cultural formulas and themes. It is in this context that narrative originality is lodged.
- In the age of mechanical reproduction, these cultural formulas and themes are in the form of recorded sound, reshuffled, looped, and recontextualized.

9th Wonder

- The North Carolina DJ and producer 9th Wonder (Patrick Douthit) came to national attention as a member of the group Little Brother in the mid-2000s.
- He was known for creating soulful beats using the DAW Fruity Loops, which was somewhat marginalized for being a non-professional program.
- The following video describes his process when creating the beat for Kendrick Lamar's "Duckworth" (2017). The DAW he seems to be using in the video is Maschine.



Theoretical Work on Remixing/Sampling

An extended, systematic investigation to sampling as an aesthetic expression, which pointed out its black origin but the discussion isn't around black practice but promoted the act to a common practice of art making.

Remix Theory: The Aesthetics of Sampling

Generally speaking, remix culture can be defined as the global activity consisting of the creative and efficient exchange of information made possible by digital technologies that is supported by the practice of cut/copy and paste.

Vocals/Beatboxing





Beatbox and African Vocal Traditions*

- Rap's "human beat box" shares many vocal sounds found in African vocal traditions.
- Marc Dery describes this link: "The hums, grunts and glottal attacks of Central Africa's pygmies, the tongue clicks, throat gurgles and suction stops of the Bushmen of the Kalahari Desert, and the yodeling, whisding vocal effects of Zimbabwe's m'bira players all survive in the mouth percussion of such "human beat box" rappers as Doug E. Fresh and Darren Robinson of the Fat Boys."

Beat Boxing

- Before expensive drum machines became readily available to the average young person wanting to rhyme, beat boxing was fundamental
- Producing the sounds of a drum machine with one's mouth and tongue stands in the tradition of **scatting**, a style in which vocalists replicate instrument sounds.
- Rather than instruments, however, beatboxers replicated the sound of late-twentieth-century technology complete with multiple beats, beeps, eeks, motors, and robotlike vocal interruptions.





High Tech in Hip-Hop Production

Note: all slides with * at the end of the

title are optional

Music Technologies in Hip-Hop Production*

Auto-tune

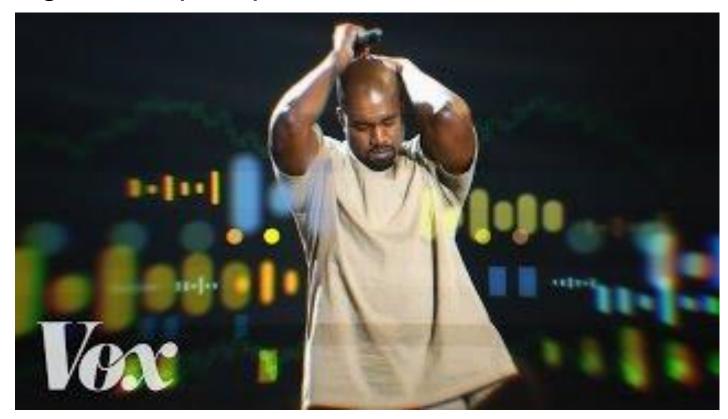
The principle of auto-tune consists in applying a time-varying transposition (or pitch shift), which is controlled by the fundamental frequency of the input signal so that the pitch becomes tuned to a given musical scale.



Music Technologies in Hip-Hop Production*

Spatial audio

Binaural techniques for stereophonic sounds; pan left/center/right; HRTF functions



Music Technologies in Hip-Hop Production*

Vocoder (Cross-synthesis)

The general idea is to combine two sounds by "spectrally shaping" the first sound by the second one and preserving the pitch of the first sound. A variant and improvement are the removal of the spectral envelope of the initial sound (also called whitening) before filtering with the spectral envelope of the second one.



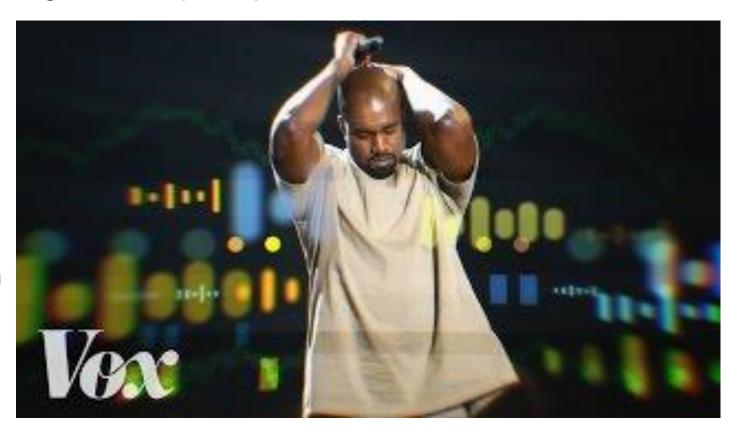
Music Technologies in Hip-Hop Production*

Room acoustics (Reverberation)

Convolution with room impulse responses;

Model reverberation with room geometry

Spatial audio effect



Music Technologies in Hip-Hop Production

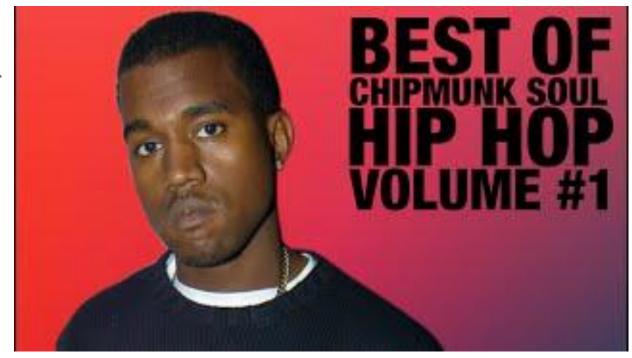
Chipmunk Soul

Features high-pitched, cartoonish soul samples. The "chipmunk soul" style was enormously popular in the early to mid-2000s.

Early producers took

whole chunks of soul

songs with vocals on top
and sped (pitched) them
up to the hip-hop tempo
of the time.



DJ Screw

- One of the most distinctive and influential figures in Houston rap was DJ Screw, a prolific mix and radio DJ.
- He pioneered a style of slowing down records and then cutting them up (i.e. "<u>chopped and screwed</u>").
- He remixed nationally famous tracks for the local scene and also made beats for local rappers.
- This sound, associated with getting high on codeine cough syrup, became the
 defining feature of much Houston rap, and has had a revived national
 influence again over the last 5 -10 years.

VOX POP

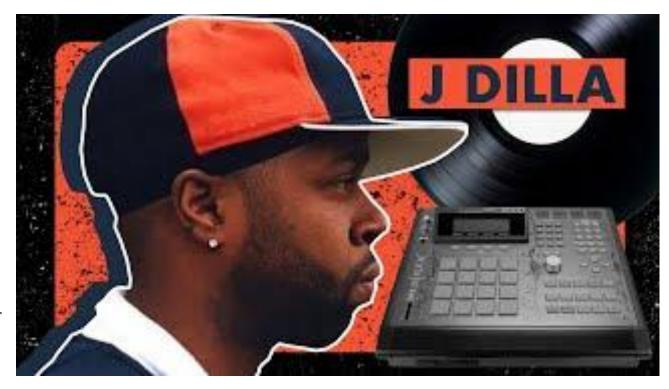


EARWORM



Straight Time (Quantization)

Roger Linn devised the "timing correct" function, where the user could set the resolution of the grid (with minimal division restriction), and any errant note would be pulled onto the nearest gridline, a process later called "quantization".



Swing

Swing is a kind of rhythmic expression that seems to be indigenous to African American culture developed in jazz of the first half of the 20th century.

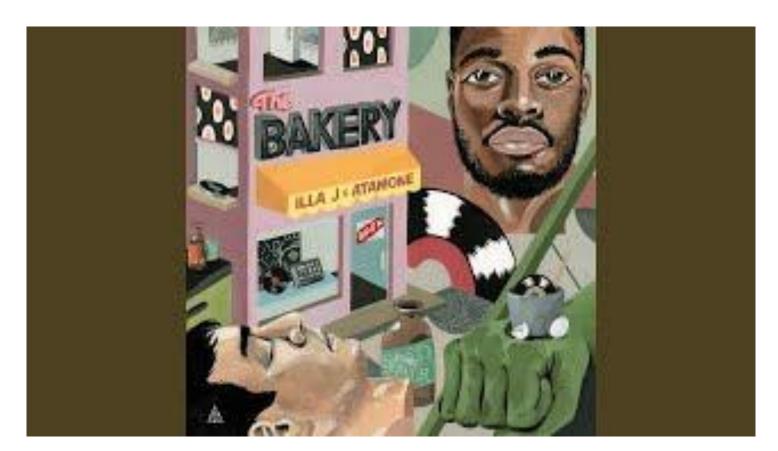
As duple subdivisions, swing divides the interval of a pulse into two unequal portions, of which the first is slightly longer.



In the Pocket: Backbeat Delay*

- The backbeat consists of a strongly accented snare drum stroke or handclap on beats two and four of a four-beat metric cycle, where the beat is typically a moderate tactus rate.
- If we consider the downbeat to be exactly when the bass drum is struck, then
 the snare drum is very often played ever so slightly later than the midpoint
 between two consecutive pulses.
- The drummer is said to play "in the pocket"; it's heard as "relaxed" or "laid back" as opposed to "stiff" or "on top."

Layback

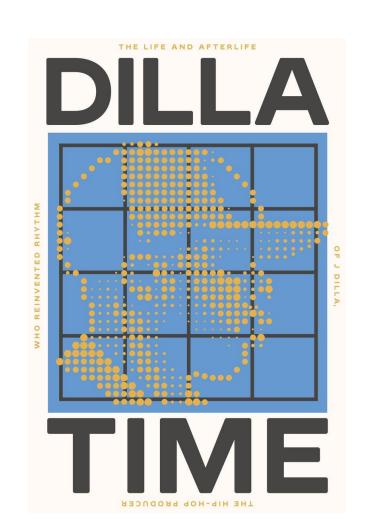


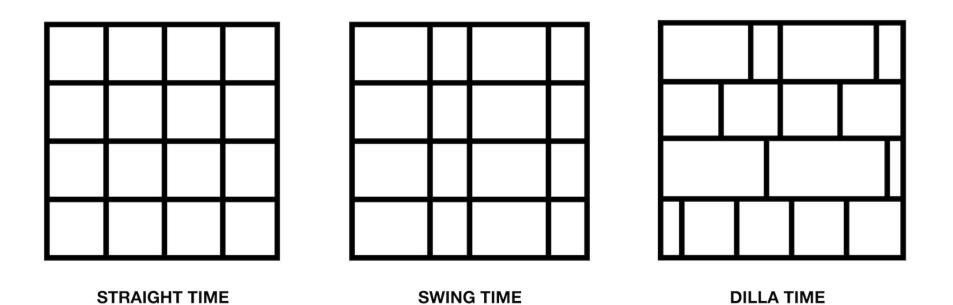
Groove*

- Groove-based music features a steady, virtually isochronous pulse that is established collectively by an interlocking composite of rhythmic entities and is either intended for or derived from dance.
- Among other functions, groove gives rise to the perception of a steady pulse in a musical performance.
- In groove-based music, this steady pulse is the chief structural element.
 Musicians are able to evoke a variety of rhythmic qualities, accents, or emotional moods by playing notes slightly late or early relative to a theoretical metric time point.

J Dilla

- The king of microrhythm
- A Hip-Hop producer who reinvented rhythm
- Simple-complex production technique (Jay Dee swing/ Detroit swing)
- Legendary instrumental Hip-Hop album Donuts released a few days before his death
- Virtuoso of selecting and flipping samples in unprecedented ways





Rhythm (Tricia Rose Special Reading 1)

- The organizing principle which makes the black style is rhythm. It is the most perceptible and the least material thing. — Leopold Sedar Senghor
- Rhythm. Rap music is so powerful because of rhythm. Harmony
- The complexity of rap music, like many Afro-diasporic musics, is in the rhythmic and percussive density and organization.
- Rhythm and polyrhythmic layering is to African and African-derived musics what harmony and the harmonic triad is to Western classical music.
- Caribbean music and Hip-Hop both privilege repetition as the basis of rhythm and rhythm as the central musical force.

VOX POP



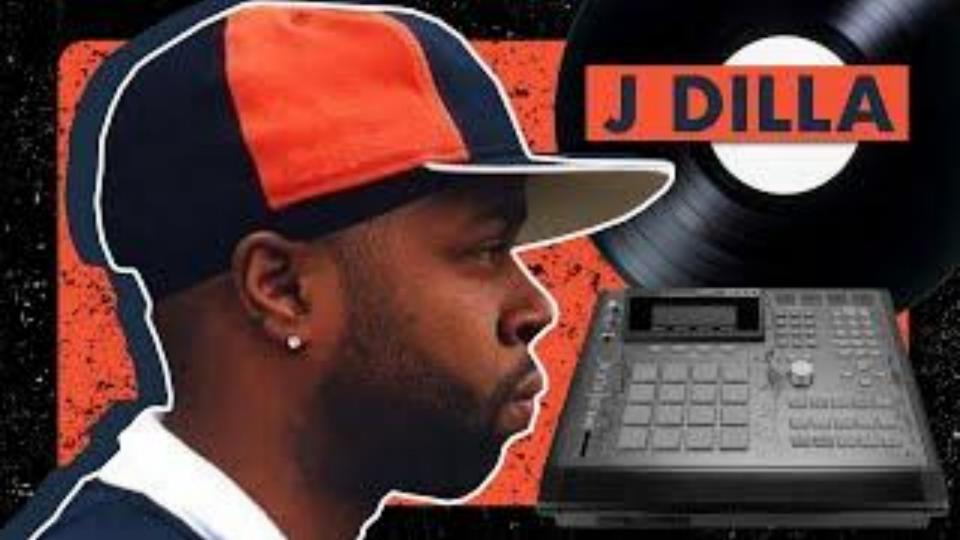
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Sample Flipping & More Techniques*

J Dilla did not pioneer every practice he employed. But alongside his rhythmic innovation and experimentation with error, there are several other methods that J Dilla refined or perfected, among them:

- Converting time signatures: e.g. converting 3/4 timing to 4/4 time count
- Colliding time signatures: polyrhythm, e.g. 4 against 6
- Verbal illusions: using chopping and filtering to transform words
- Odd bar loops: a way to create polyrhythmic arrangements
- Chopping to create new harmonic progressions
- Odd entrances and off loop points
- Reharmonizing existing harmonic material

Note: You don't need to memorize or understand these techniques if it's difficult for you.



A Tribe Called Quest - Find A Way



VOX POP



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Low End Texture (Tricia Rose Special Reading 1)

- The lowest, "fattest beats" being the most significant and emotionally charged.
- Volume, density, and quality of low-sound frequencies are critical features in Hip-Hop production.
- Hip-Hop production philosophy reflects this emphasis on bass and drum sounds: "keep it hot, keep the drums up front and boost that bass."
- Both the instruments (e.g. drum machines) and mixing strategies in Hip-Hop prioritize greater range of low-frequency resonance.

LA Beat Scene & Alternative Hip-Hop

- During the early 2000s, many LA beat makers, who were frustrated with dealing with emcee skills that they felt were sub-par, started concentrating on making instrumental tracks.
- These practitioners were inspired by the alternative and underground Hip-Hop sounds associated with LA, such as J Dilla, Madlib, and MF DOOM.
- During the 1990s and into the 2000s, the commercial music industry had invested heavily in gangster rap being the primary sound of LA, therefore it was necessary to market groups and artists that didn't fit into that mold as alternative/underground Hip-Hop.

The Pharcyde - Runnin' (1995)

- Pharcyde were an L.A. based group who became successful in the early 1990s with a more bohemian inflected West Coast sound.
- This song is from their second record *Labcabincalifornia* (1995) and is notable for production by legendary beatmaker *J Dilla*, a Detroit native who later moved to LA and is buried there after his premature death.
- Primarily based on a <u>bossa nova recording</u>, where Dilla samples song fragments to make an entirely new beat.
- The deliberate looseness and unevenness of the time feel in his later productions became the signature of his method and has become hugely influential especially in recent years.





Hip-Hop as Countercultural Practice (Rose's Paper)

- These break beats are points of rupture in their former contexts, points at which the
 thematic elements of a musical piece are suspended and the underlying rhythms
 brought center stage.
- Rap producers have <u>inverted the logic</u> that the most desirable use of a **sample** was
 to mask it thus burying its identity. They use samples as a point of reference, as a
 means by which the process of repetition and recontextualization can be highlighted
 and privileged.
- This leakage means that the bass will take up more space than is "normally" intended and bleed into other deliberately emptied tracks, which gives the bass a heavier, grittier, less fixed sound. In traditional recording techniques, leakage is a problem to be avoided, it means the sounds on the tracks are not clearly separated, therefore making them less fixed in their articulation.

Hip-Hop as Counterculture (7:20)

- In Hip-Hop, it seems the world is flipped, everything works in an opposite way.
 The logics are inverted.
- Hip-Hop "voices for the unvoiced".
- These rules also apply to orality. When people are told to hide their true thoughts/feelings, Hip-Hop says "keep it real"; when the society tries to mute them, Hip-Hop says, I'm going to say it out loud.

Controversy and Censorship

Censorship

- In the 1980s concerns of lyrical content in heavy metal and rap songs in particular led to the formation of the Parents Music Resource Center (PMRC)
- The PMRC convened congressional hearings and pushed for a voluntary ratings system for popular music similar to that administered for films by the MPAA (Motion Picture Association of America)
- This ultimately resulted in the "Parental Advisory: Explicit Content" stickers for records and CD's (there's an E in a square on streaming platforms for offending songs)

Lawsuits

- At the height of this wave of public concern, Judas Priest were sued in 1990 for alleged responsibility for a suicide, via subliminal messages delivered through a recording
- NWA's "Fuck tha Police" and Ice-T and Bodycount's "Cop Killer": Offensive lyrical
 content. It is worth remembering that these debates happened against a backdrop
 of both historically high crime rates in the US and a growing public and media
 awareness of police brutality.
- 2 Live Crew "Me So Horny": Obscenity. The legal basis of obscenity is "community standards". Literary scholar Henry Louis Gates argued that when read in context of the history of deliberate exaggeration and bawdiness in African American traditions like toasts and the dozens, the work of 2 Live Crew was not obscene.



Case Study: <u>2 Live Crew</u> (8:45 - 22:30)

- In June 1990, the members of the rap group 2 Live Crew were arrested and charged under a Florida obscenity statute for their performance in an adults-only club in Hollywood, Florida.
- The arrests came just two days after a federal court judge had ruled that the sexually explicit lyrics in 2 Live Crew's album, *As Nasty As They Wanna Be*, were obscene.
- This obscenity judgment, along with the arrests and the subsequent trial, prompted an intense public controversy about rap music, a controversy that merged with a broader debate about <u>the representation of sex and violence in</u> <u>popular music, about cultural diversity, and about the meaning of freedom of expression</u>.

