

## Chapter 14. Meeting 14, Interfaces: Sequencers, Rhythm Machines, and Samplers

### 14.1. Announcements

- Music Technology Case Study Drafts due next Tuesday  
Draft should meet minimum requirements of final paper  
Contact me with questions or problems  
Submit draft digitally by midnight on Tuesday
- Next Tuesday: bring your laptops with PD-Extended and Martingale

### 14.2. Quiz

- 10 Minutes

### 14.3. Listening: Oswald

- Audio: John Oswald, "Black"

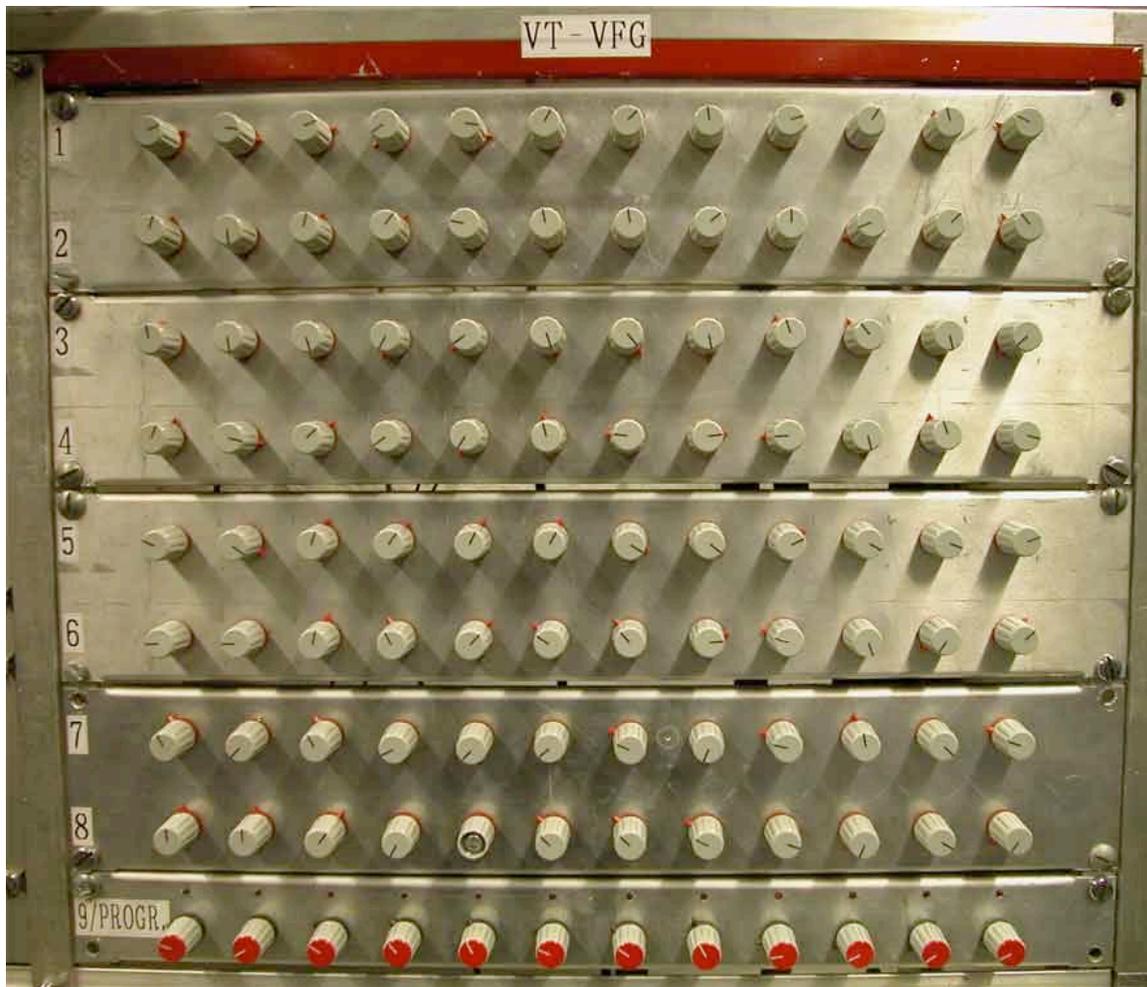
### 14.4. Reading: Oswald

- Oswald, J. 1985. "Plunderphonics, or Audio Piracy as a Compositional Prerogative." *Wired Society Electro-Acoustic Conference*. Internet: <http://www.plunderphonics.com/xhtml/xplunder.html>.
- 1960s: Mellotron, tape-based sample playback machine where each key pressed a tape-head onto a tape
- 1979: Fairlight Computer Musical Instrument (CMI): first polyphonic digital sampler  
YouTube ([http://www.youtube.com/watch?v=n6QsusDS\\_8A](http://www.youtube.com/watch?v=n6QsusDS_8A))
- 1984: Ensoniq Mirage sampler: first affordable sampler

- Can an instrument or a timbre be considered a composition, like a sample?
- Is it a problem that musical notation does not have a quotation mark?
- How can a casual home listener become a more active listener?
- Why, in Oswald's view, might all popular or folk music be public domain?

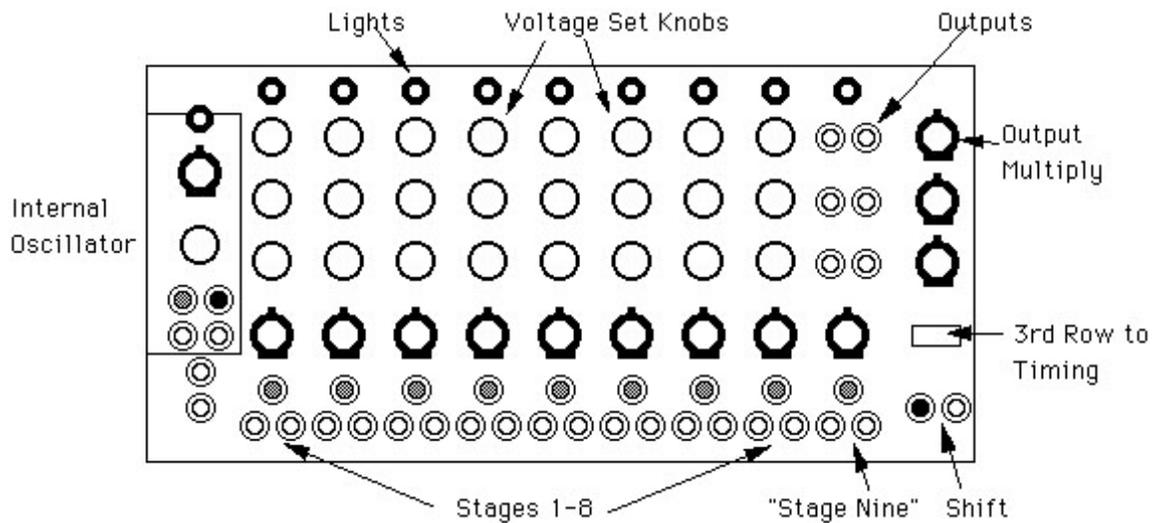
## 14.5. The Sequencer

- Numerous early synthesizers by Moog, Buchla, and ARP offered various forms of step sequencers
- At a minimum, provided a series of voltages that could be stepped through
- A custom-shaped LFO
- The Sonology Variable Function Generator: a custom sequencer capable at running at the audio rate



## 14.6. Moog 960 Sequential Controller

- Sequential controller provided a sequence of voltages that could be used to control any musical parameter
- Moog 960 Sequential Controller (1968)



Courtesy of the Electronic Music Studios at the University of California, Santa Cruz. Used with permission.



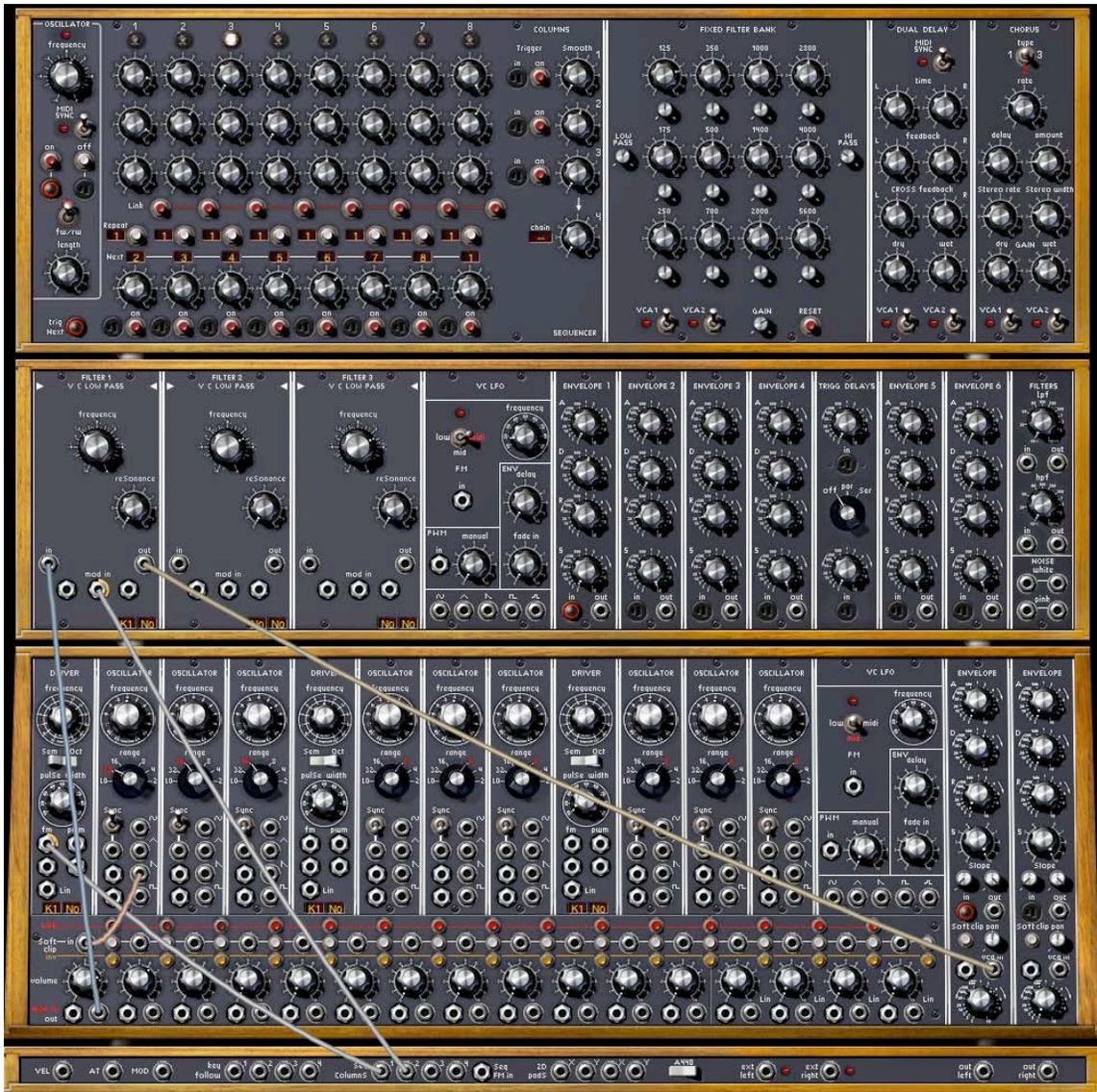
Courtesy of Synthesizers.com. Used with permission.

- Permitted 8 steps, each step with three voltages
- Each step could be played, skipped, or used as a point of loop-back
- With a Moog 962, three rows could be treated as one 24 step sequence
- Output could be shifted by another, independent voltage to create arpeggios
- Examples

YouTube (<http://www.youtube.com/watch?v=H2zpMKKamWI>)

YouTube (<http://www.youtube.com/watch?v=gNmzyZaqVwI>)

- Arturia virtual Moog modular, with row 1 modulating oscillator frequency and row 2 modulating filter cutoff frequency



Courtesy of Arturia. Used with permission.

## 14.7. Drum Machines: Early Experiments: Rhythmicon

- 1931: Henry Cowell commissioned Termin to build a machine that could play complex rhythms
- Could produce sixteen parts
- Schillinger with the Rhythmicon



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For more information, see <http://ocw.mit.edu/fairuse>.

- American Mavericks: The Online Rhythmicon: site  
(<http://musicmavericks.publicradio.org/rhythmicon/index.html>)

## 14.8. Drum Machines: Organ Accompanists

- 1959-1964: Wurlitzer Sideman

Analog sound sources employing tubes



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YouTube (<http://www.youtube.com/watch?v=QLgyQG8Pu8s>)

## 14.9. Drum Machines: Analog Drums

- 1970s: Rhythm Ace, by Ace Tone (later Roland)



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- 1978: Roland CR-78: programmable drum machine, analog drum voices  
 preset rhythms for Waltz, Bossa Nova and Rhumba; preset fills and variations



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YouTube (<http://youtube.com/watch?v=b0tdkP4GaGg>)

- 1980: Roland TR-808 Rhythm Composer  
transistor rhythm (TR); sixteen sounds; 32 programmable steps



Image courtesy of [dAvid](#) on Flickr.

YouTube (<http://youtube.com/watch?v=jUx7ax62OBo>)

- Numerous software emulations available: <http://www.hobnox.com/index.1056.de.html>

## 14.10. Afrika Bambaataa

- Associated with Afro-futurism
- From the South Bronx and development of hip-hop in the late 1970s
- Embrace of analog drum sounds and drum machines when not broadly accepted

## 14.11. Listening: Bambaataa

- Audio: Afrika Bambaataa, "Planet Rock" 1982

## 14.12. Drum Machines: Digital Sampling

- 1979: Linn Electronics LM-1

First programmable sampling drum machine; 18 sounds, \$5000



Courtesy of Roger Linn Design. Used with permission.

- 1982: LinnDrum

\$3000



Courtesy of Roger Linn Design. Used with permission.



**The LM-1 Drum Computer—  
a new breed of rhythm machine.**

- ★ Real Drum Sounds—digital recordings stored in computer memory
- ★ 100 Drumbeats—all programmable in real time
- ★ Easy to understand and operate, requires no technical knowledge
- ★ 12 Drums: bass, snare, hi hat, cabasa, tambourine, two toms, two congas, cowbell, clave, and hand claps!
- ★ All drums tunable in pitch
- ★ 13 input Stereo Mixer

- ★ Separate Outputs
- ★ Automatic error correction in programming
- ★ "Human" Rhythm Feel made possible by special timing circuitry.
- ★ Able to program flams, rolls, build-ups, open and closed hi hat, etc.
- ★ Programmable dynamics
- ★ Any time signature possible.
- ★ Plays Entire Song (intro, verse, chorus, fills, ending, etc.)
- ★ All programmed parts remain in memory when power is off
- ★ Readout of speed in beats-per-minute

- ★ Versatile editing
- ★ Programmed data may be stored on cassette tape to be loaded back in later
- ★ May be synced to tape

For a **free demo record** and the name of your local dealer, call or write today.

**Linn**

LINN ELECTRONICS, INC.  
4000 West Magnolia  
Burbank, California 91505  
(213) 841-1945

Courtesy of Roger Linn Design. Used with permission.

- 1984: Linn 9000

Sampling drum machine with MIDI sequencer



Courtesy of Roger Linn Design. Used with permission.

- 1988: Akai MPC60

Linn worked with Akai to create MPC series



Courtesy of Roger Linn Design. Used with permission.

- recent: Akai MPC1000

64 track MIDI sequencer, 32 voice stereo sampler, compact flash data storage



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- Pete Rock on the MPC (1:43, 2:43)  
 YouTube (<http://youtube.com/watch?v=Faad8AmCl8c>)
- Examples  
 YouTube (<http://www.youtube.com/watch?v=gFWazOuwwgw>)

### 14.13. Listening: Public Enemy

- Audio: Public Enemy: "Fight the Power"

### 14.14. Reading: Walser

- Walser, R. 1995. "Rhythm, Rhyme, and Rhetoric in the Music of Public Enemy." *Ethnomusicology* 39(2): 193-217.

**Figure 1: "Fight the Power," opening groove**

The musical score is arranged in a system of staves. The top three staves are for the vocalists, with lyrics: "give it gi - gi - gi - give it", "come on and get down", and "down". The J.B. (Jazz Band) part features the vocalization "uh!". The instrumental parts include Guitar, Synth, Noises, Bass, Cym/Sh (Cymbals/Shaver), Snares, and Kick. The score is in 4/4 time and consists of two measures.

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- Why does Walser see the use of transcriptions as important?

- What are common arguments why rap is not music?
- What techniques of sampler misuse and audio production are used to create the Bomb Squad sound?

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