U6 Music Technology > Drum Machines

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A drum machine is

- an electronic musical instrument designed to imitate the sound of drums or other percussion instruments.
- used in a variety of musical genres, not just purely electronic music.
- sample playback (ROMpler) or percussion-specific synthesizer.

Why use a drum machine?

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Why use a drum machine?

- useful if a 'live' drummer is not available
- doesn't require drumming technique/training
- can create beats that are not physically playable
- modern drum machines can produce unique sounds

The Early History of the Drum Machine

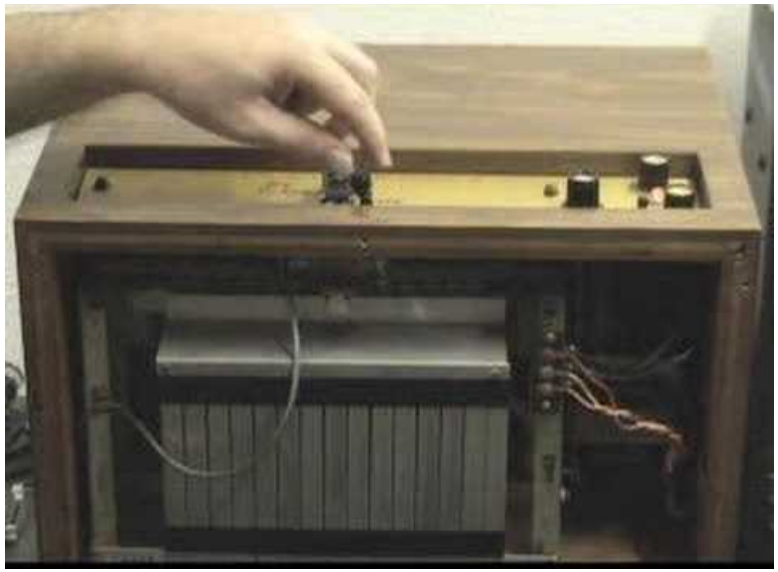
The Rhythmicon (1930)

- designed by Léon Theramin
- sixteen different rhythms, each at different pitches, playable in any combination
- operated by keys
- Key 1: one note (fundamental pitch) per bar
- Key 2: two notes (first harmonic) per bar
- Key 3: three notes (third harmonic) per bar
- etc.
- http://www.youtube.com/watch?v=HkodVcuPVAo
- Example (with graphics):

http://www.youtube.com/watch?v=e8Ybqb7VwXY
Shows keys 1, 4, 5, 8, 12 and 14 working together

Chamberlin Rhythmate (1947)

- 14 tape loops, each with 3 tracks
- sliding head to select desired loop
- included volume and a pitch/speed control and also had a separate amplifier with bass, treble, and volume controls
- loops were of real acoustic jazz drum kits playing different style beats
- http://www.youtube.com/watch?v=JmAbtzMChHk



Wurlitzer Sideman (1959)

- first ever commercially-produced drum machine
- choice of 12 electronically generated, predefined rhythmic patterns
- sound source was a series of vacuum tubes which created 10 preset electronic drum sounds
- drum sounds were 'sequenced' by a rotating disc with metal contacts across its face, spaced in a certain pattern to generate parts of a particular rhythm
- also included a panel of 10 buttons for manually triggering drum sounds
- http://www.youtube.com/watch?v=55DnnMWm5Tg

Raymond Scott's Rhythm Synthesizer (1960) and 'Bandito the Bongo Artist' (1963). Used in his album, "Soothing Sounds for Baby" (1964):
http://www.youtube.com/watch?v=MRuJ82CnEGI

Rhythm machines were included into electronic organs in the late 1960s.

Ace Tone (later called Roland) manufactured:
- FR1 Rhythm Ace (1967)
- still pre-programmed at this stage

The first major pop song to use a drum machine was "Saved by the Bell" by Robin Gibb, which reached #2 in Britain in 1969:
http://www.youtube.com/watch?v=l-uzRYCFmUw

Drum sound synthesis

- Early drum machines used analog sound synthesis:
- Snare drum or maraca sound = burst of white noise
- Bass drum sound = sine waves or other basic waveforms
- etc.
- Not terribly faithful to original, but
- Each model had a unique character
- Now developed something of a cult status!

Programmable drum machines

Eko ComputeRhythm (1972)
- 6 row push-button matrix or
- punch cards with pre-programmed rhythms through a reader slot
- http://www.youtube.com/watch?v=BSNtRDsTuGw

Roland CR-78 (1978)
- Included four memory locations for storage of custom patterns
- http://www.youtube.com/watch?v=b0tdkP4GaGg

Digital sampling

Linn LM-1 (1980)
- First drum machine to use digital samples
- Only 500 were ever made.
- Distinctive sound of 1980s pop
- http://www.youtube.com/watch?v=KMad5DLHNOw

But perhaps the most famous and most widely used model of drum machine was the

Roland TR-808 (1980) **and TR-909** (1984)
- Analog-generated sounds

Programming a drum machine

- Option 1: Real time
- User presses trigger pads
- Option 2: Step-sequencing
- Pattern built up over time by adding individual sounds at certain points by placing them, as with the TR-808 and TR-909, along a 16-step bar.
- Example: a generic 4-on-the-floor dance pattern could be made by placing a closed high hat on the 3rd, 7th, 11th, and 15th steps, then a kick drum on the 1st, 5th, 9th, and 13th steps, and a clap on the 5th and 13th.
- Machines can quantize entries that are slightly off-beat in order to make them exactly in time.
- If the drum machine has MIDI connectivity, then one could program the drum machine with a computer or other device.

Have a go!

http://lab.andre-michelle.com/fl-909

To create the dance beat described above:
1. Press 'Clear'
2. Click 'CH' (a red bar should above above it)
3. Click steps 3, 7, 11 and 15
4. Click 'Bass Drum'
5. Click steps 1, 5, 9, 13
6. Click 'Clap'
7. Click steps 5, 13
8. Click 'Start'

Now try composing your own beat.