

Historical Overview

Computer Music

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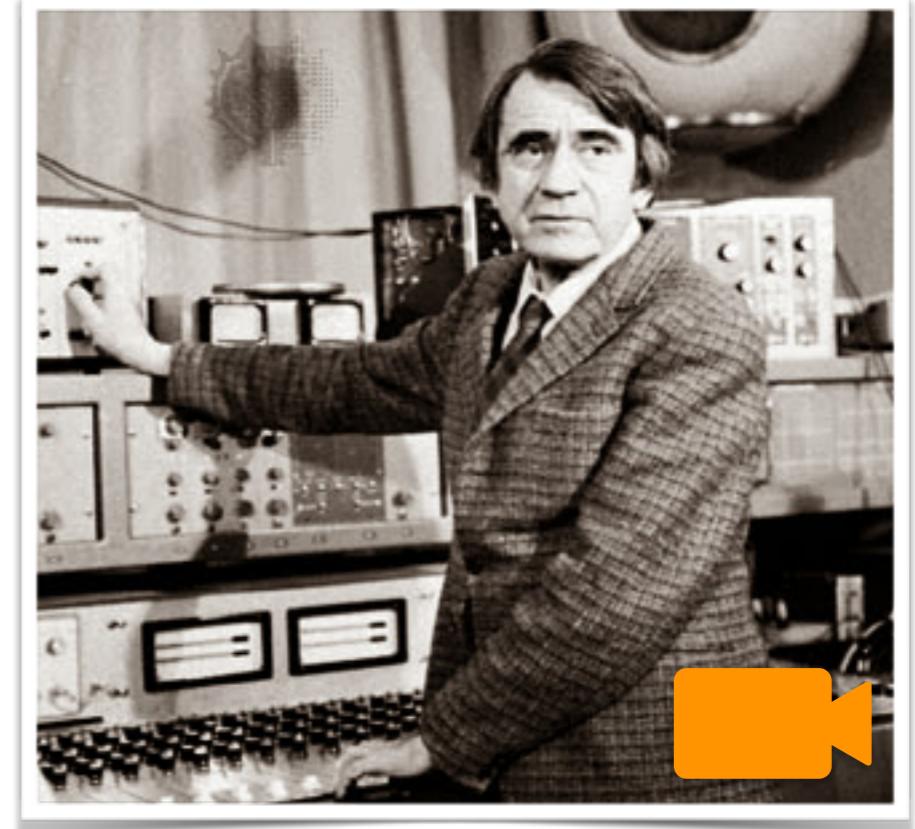
Filmuniversität Babelsberg
KONRAD WOLF

Computer Music



Music Concrète | 1948

- Pierre Schaeffer initiates **sampling** by producing taped recordings of natural sounds at French National Radio
- Edits and transform sounds (reverse or changed playback times, ...)
- Similar experiments at West German Radio Corporation (WDR) by Herbert Eimert & Werner Mayer-Epper, Studio Cologne



Source: <http://electronicorgy.blogspot.com/2013/>

Music Concrète | 1953/54

- Karlheinz Stockhausen works with Schaeffer in Paris
- Uses novel techniques for his musical compositions
- Releases **Elektronische Studien I & II**



Source: <https://www.amazon.de/Stockhausen-Gesang-Jünglinge-Studien-Version/dp/B06XG342S8>



Historical Overview

MUSIC 1 | 1957

- Max Mathews writes first computer music program that allows to **synthesize** digital audio waveforms, Bell Labs AT&T, New Jersey
- Inspires many computer music languages and programming environments to come like MAX/MSP, PureData, SuperCollider, ...
- First composition *The Silver Scale* by Newman Guttman



Image source: <https://i0.wp.com/120years.net/wordpress/wp-content/uploads/500004418-03-01.jpg>

The Illiac Suite | 1957

- Lejaren Hiller & Leonard Isaacson write first major **computer-assisted score** with an Illiac I computer, University of Illinois, Urbana-Champaign
- General idea to use certain algorithmic rules to accept or reject randomly generated pitches & rhythms
- Score written by computer, music played by real musicians



Image source: <https://www.secretsofsongwriting.com/wp-content/uploads/2013/05/photo49.jpg>

Mark I & II RCA Synthesizer | 1959

- RCA initiates research to find a formula that auto-generates pop hits in the early 1950's
- At Columbia-Princeton Electronic Music Center, Herbert Belar & Harry Olson design massive modular synthesizer system that allows composers to create music electronically

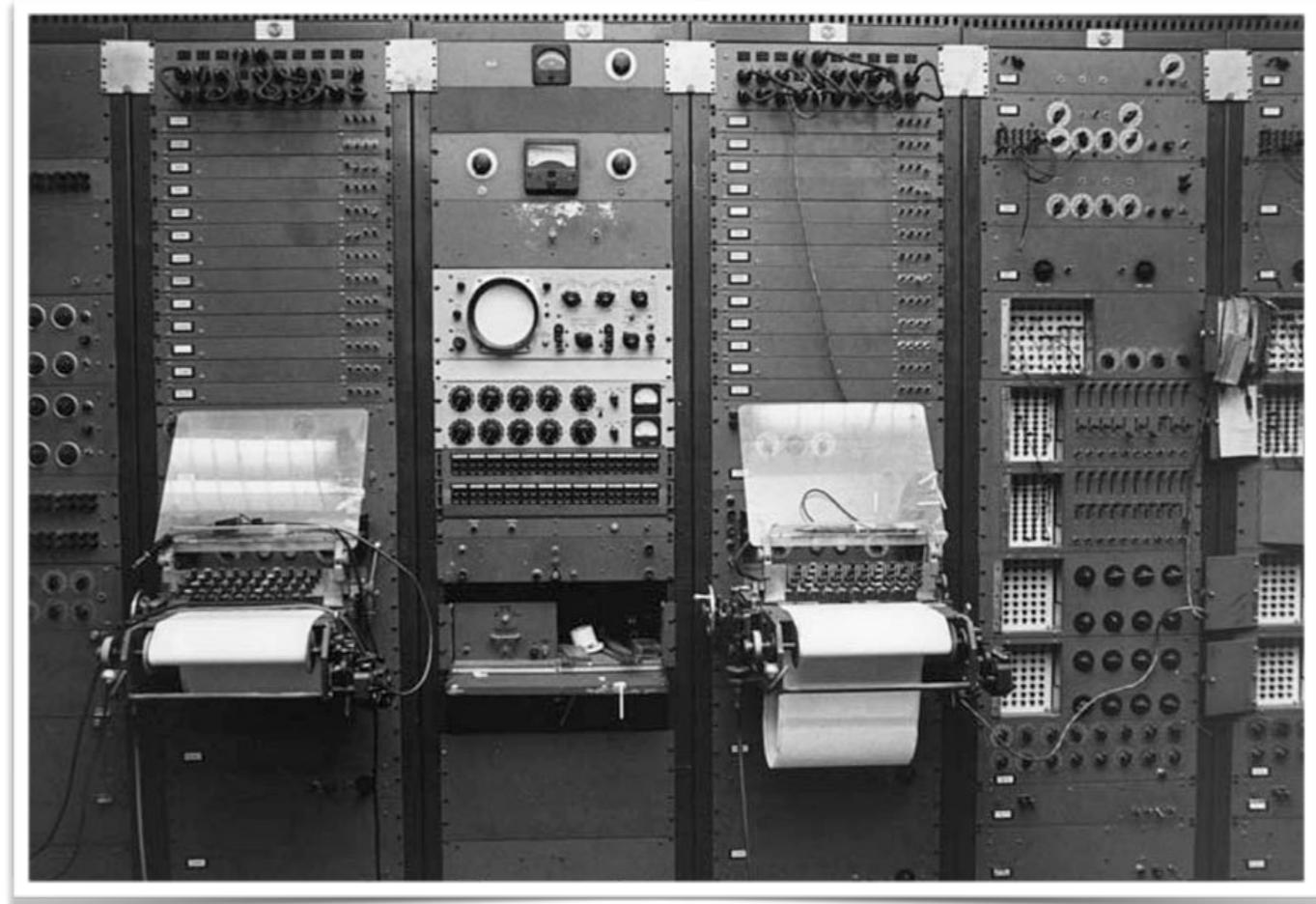


Image source: <http://120years.net/the-rca-synthesiser-i-iiharry-olsen-hebert-belarusa1952/>

Mark I & II RCA Synthesizer | 1959

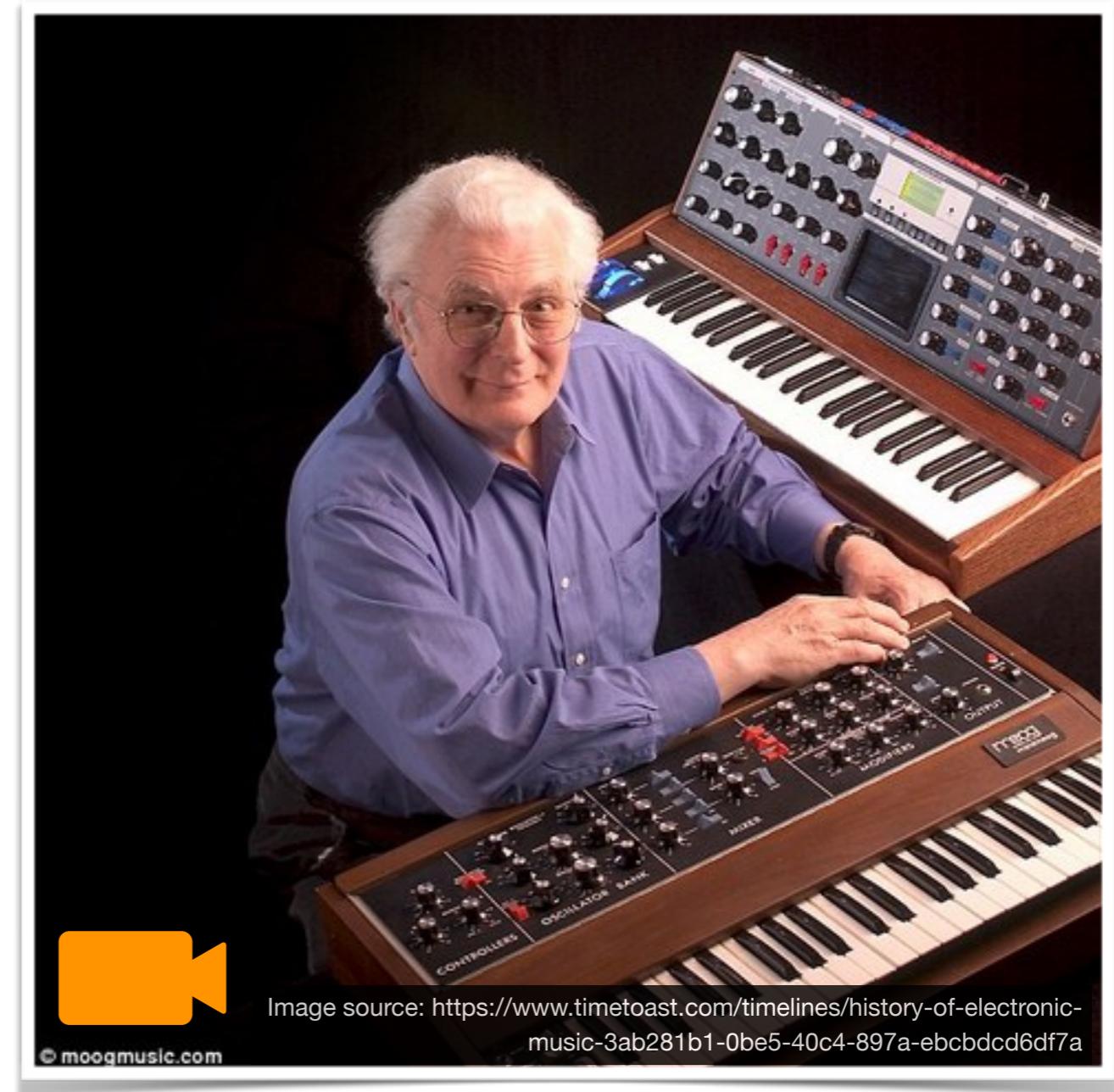
- Mark I & II Synth introduces paper punch role system to determine the score via keyboard input
- A kind of binary code is punched in paper that determines values for pitch, timbre, volume and envelope per note



Image source: <https://i0.wp.com/120years.net/wordpress/wp-content/uploads/rcapunchroll-1.jpg>

Moog & MiniMoog | 1964 & 1969

- Robert Moog & Herb Deutsch develop first commercially available analog synthesizer Moog Modular Synthesizer
- MiniMoog comes as compact synth for live performances & further simplifies use



Historical Overview

Fairlight CMI | 1979

- Peter Vogel & Kim Ryrie develop first digital 8bit sampling instrument
- CMI provides for a digital sampler, a graphical waveform editor, additive synthesis & a sequencer
- CMI was strongly used in 1980ies pop music, in particular, by Peter Gabriel, Kate Bush and many more artists

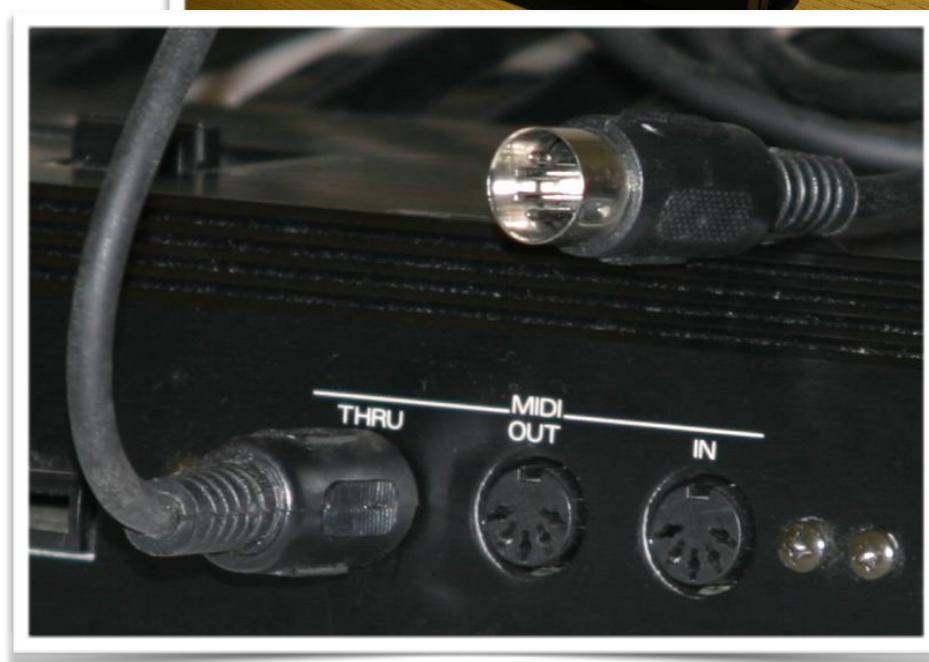


Image source: https://i2.wp.com/120years.net/wp-content/uploads/fairlight_cmi_03.jpg



Digital Synths & MIDI | 1980s

- Throughout 1980's use & development of **microprocessors** leads to the rapid success of **digital synthesizers**
- Yamaha DX-7 first standalone digital synthesizer available for the mass market
- **MIDI** (musical instrument digital interface) standard is introduced that describes communications protocol & digital interface
- ATARI ST first home computer with MIDI port



Historical Overview

Software | 1990s

- German company Steinberg releases software sequencer **Cubase** in 1989
- Introduces time line & virtual tracks interface that becomes standard in digital audio workstations (DAW)
- In 1997 Steinberg introduces Virtual Studio Technology (**VST**), a software interface for audio plug-ins to integrate software instruments & FX into DAWs



source: <https://www.musicradar.com/news/tech/a-brief-history-of-computer-music-177299>



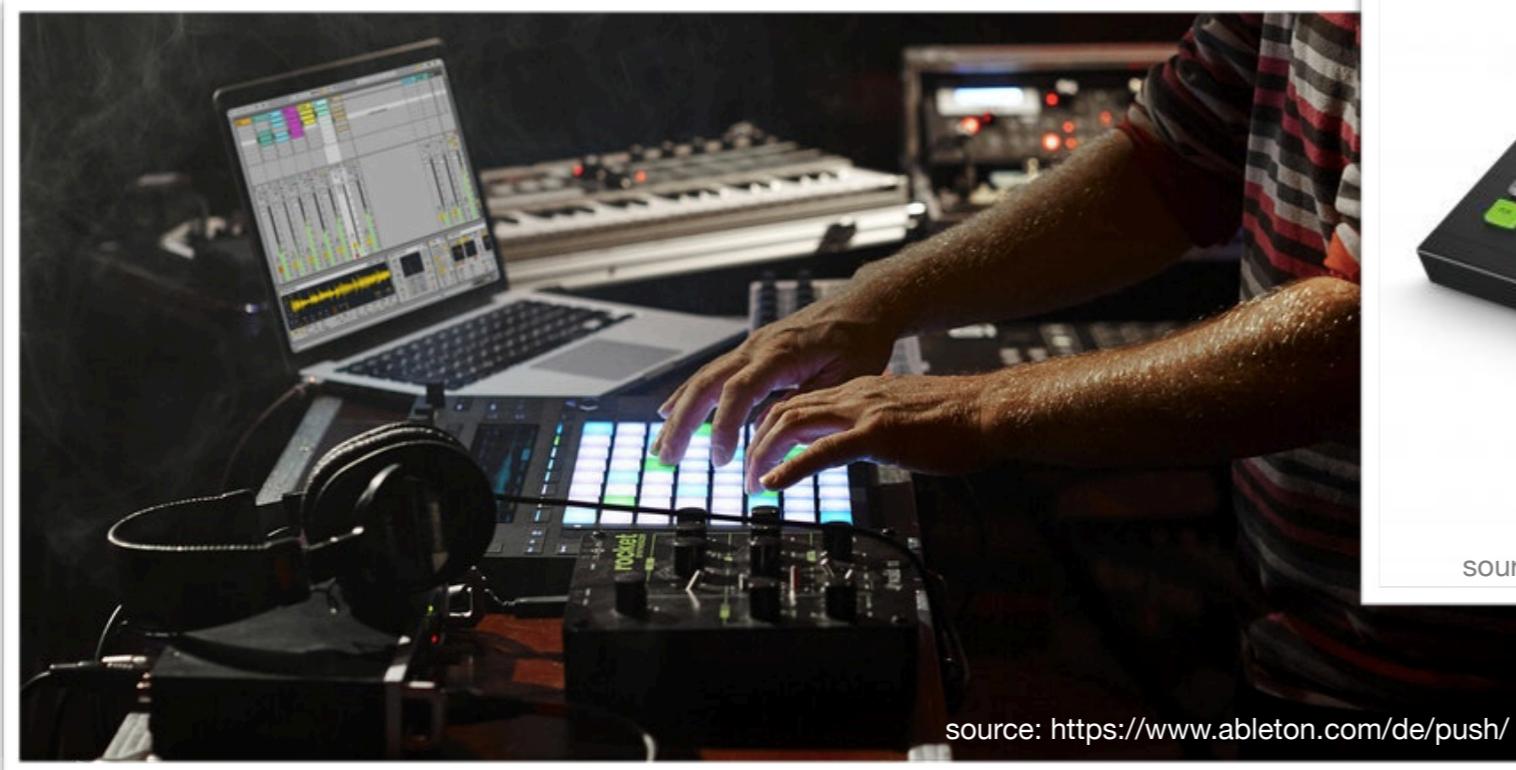
source: https://www.steinberg.net/de/products/cubase/cubase_elements.html

USB Audio | 2000s

- With the invention of Universal Serial Bus system in 1996 onwards, USB audio interfaces & audio controllers become more and more available to consumers



source: <https://www.musictech.net/2013/11/steinberg-ur44/>



source: <https://www.ableton.com/de/push/>



source: <https://www.elevator.de/native-instruments-maschine-studio-black.html>

Browser-based Audio | 2010s

- Audio software development was bound to standalone software applications for many years due to the necessity of fast (real-time) audio processing
- Meanwhile real time audio applications can even be developed for the web, i.e., using the Web Audio API that comes with every web browser



References

- Historical overview | last access 181021
 - <http://www.doornbusch.net/chronology/>
 - <http://www.csounds.com/community/computermusichistory/>
 - <https://www.musicradar.com/news/tech/a-brief-history-of-computer-music-177299>
 - <http://artsites.ucsc.edu/ems/music/equipment/computers/history/history.html>

