Modular Synthesizers

A Brief History and Functional Description of the Modular Music Synthesizer

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Modular - adjective

French modulaire or directly from Modern Latin modularis, from Latin modulus "a small measure"

1 : of, relating to, or based on a module or a modulus

2 : constructed with standardized units or dimensions for flexibility and variety in use, as in modular furniture

3 : composed of interchangeable units (first recorded 1936)
Syn•the•sis - noun

Etymology: Greek, from syntithenai to put together

1 : the composition or combination of parts or elements
   so as to form a whole

2 : the combining of often diverse conceptions into a
   coherent whole; also : the complex so formed
Who’s on first?

• 1837 - C.G. Page (Salem, Mass) - first to produce electronically generated sound (not necessarily associated with a musical instrument).
• 1885 - Person and Ernst Lorenz - ‘Elektrisches Musikinstrument’ - the first musical instrument designed to produce electrically generated sound.
• 1897 - Taddaeus Cahills - Telharmonium - electromechanical instrument.
• 1936 - Oskar Sala - Mixturtrautonium - first synth using Subharmonic synthesis
• 1939 - Homer Dudley invents the Parallel Bandpass Vocoder (VODER) - A key operated speech synthesizer
• 1940 - Homer Dudley invents the The Voder speech synthesizer as a way to transmit speech over telephone lines
• 1948 - Hugh LeCaine - Electronic Sackbut - First voltage-controlled synthesizer
• 1948 - Dr. Raymond Scott - Wall of Sound - First polyphonic Sequencing Workstation (electromechanical) and the Electronum - first sequencer.
• 1950 - CSIR - Mk 1 - The first known use of a digital computer for the purpose playing music
• 1956 - Louie and Bebe Barron - Produced the first all-electronic musical score for a major motion picture - MGM's 'Forbidden Planet'
• 1957 - Max V. Mathews at Bell Labs - MUSIC - the first digital synthesizer. Technically, it was a computer program, though it set the stage for every digital synthesizer that proceeded it.
• 1963/64 - Don Buchla - model 100 modular - 1st "modern" modular synth
• 1969 - EMS - Synthi VCS-3 - first non-modular mini-synth
• 1970 - Robert Moog - Minimoog - 1st Mono Synth with keys (non-modular)
• 1971 - Tonus/ARP - Soloist - 1st preset mono synth
• 1971 - John Chowning - developed FM synthesis using the MUSIC-IV language, a direct descendent of Mathew's
When Modulars Roamed The Earth
The Current Modular Landscape
Shared Standards?

- Pitch Control Voltage = 1 Volt/Octave
- Gate Signals are positive voltages, typically in the +5V to +15V range
- Waveforms are typically bipolar +/-5V and unipolar 0 - 10V
- Systems should be designed to handle all the above without dying
System Differences

• Module size
• Power Supplies and power busses - +/-15V, +/-12V, Headers or Sockets
• Patch System Religious Wars - 1/4", 1/8", 3.5mm, and Banana
• Adaptors are available for cross-system integration
Some Current Modular Makers

4ms • ADDAC • Analogic-ACS • Analogue Solutions • Analogue Systems • Bubblesound • Bananologue • Blacet Research Buchla & Associates • Club of the knobs • Curetronic • Cwejman Cyndustries • Doepfer Musikelektronik • Division-6 • Elby FLAME • Flight of Harmony • Future Sound Systems • Intellijel Livewire • Macbeth Studio Systems • Makenoise • Malekko Heavy Industry Mattson Mini Modular • Metalbox • Metasonix MFB • Modcan Oakley Sound Systems • PAiA Electronics • Plan B Synthesizers Sound Transform Systems (Serge) • STG Soundlabs • Synthesis Technology (MOTM) • Synthesizers.com • Synthetic Music Systems • Synthtech • Synthwerks • The Harvestman Tiptop Audio • Technosaurus • Toppobrillo Wiard Synthesizer Company
Module Types

- Audio Generators
- Audio Modifiers
- Control Voltage Generators
- Control Voltage Modifiers
Audio Generators

- Voltage Controlled Oscillators (VCO)
- Wavetable Generators
- Clock Generators
- Noise Generators
- Periodic Waveform Generators
- External Audio Sources
Audio Modifiers

- Voltage Controlled Filters
- Voltage Controlled Amplifiers
- Ring Modulators
- Phasers, Flangers and Time-based
- Audio Dividers and Wave Multipliers
- Clippers and Symmetry Processors
- Mixers, Panners, and Location control
Standard Filters

- **Low Pass**
- **High Pass**
- **Band Pass**
- **Notch**
CV Generators

• Periodic
  – LFO, Sequencers, and Arpeggiators

• Aperiodic
  – Envelope Generators and followers, Random Voltage Generators

• Manual Controls
  – Joysticks, Knobs, Keyboards, and Touch Plates

• Exotic Controls
  – Motion, Light, Pressure Sensors, MIDI to CV Converters, and DAW Audio Interfaces
CV Modifiers

- Polarity Inverters
- Mixers and Manual Level Controls
- Slew Rate Converters
- VC Polarizers and Polarizing Mixers
- Logic Modules
- Quantizers and Level Detectors
Combo Modules

- Vocoder Systems
- Voice Modules
- Filter Banks and Formant Filters
- Multiples of Standard Modules
Layout and Patching

- The Banana and Coaxial Patch Cord
- Religious War
- Pin Matrix
- Switch Matrix
- Dedicated and Semi-Patched Systems
Patch Memory

- Photos and Drawings
- “Presto-Patches” and plug cards
- Dedicated Digital Programmers
- Programmable Normalization
www.synthwerks.com