Electronic Musical Instrument Technology

Luke Hastilow
History of EMID...

- **Technologies** of past times and their relevance to **System Architectures**
- **Needs** of Musicians of the time, **Social Impact** and **Implications**, **Acceptance**
- The **Analysis** of changing technologies and the consumer Electronics **Marketplace**
- Factors relevant to the design of new Electronic Musical Instruments and Interfaces
1917... The Theremin

- **Electronics** was essentially a new field. Radio, Sound Reproduction, Innovations…
- Pre-Transistor age. **Vacuum Tube** Technology dominated Electronics
- Social Acceptance depicted the **Theremin** as some sort of **Magic Box**!
- The device wasn’t **practical** or **affordable** for the consumer.
“ASTONISHING”

DAVID ANSEN
NEWSWEEK

THE REMIN
AN ELECTRONIC ODYSSEY

This sound he created was strange.
His life was even stranger.

A FILM BY STEVEN SEAMAN
1967... The Stylophone

- The Field Effect Transistor invented in 1947 at Bell Telephone Labs, USA
- The Stylophone was able to reach the consumer in the guise of a Gadget or Toy
- Simple Single Oscillator design made it affordable, simple, robust & portable
- Later picked up by Professional Musicians and made it into the world of Pop Music
1970’s... Modular Synthesis

- Simple Voltage Controlled Electronic Circuits were developed and Patched together to produce complex sounds.

- Bob Moog pioneered with the Moog Modular, the first practical Synthesizer

- The complexity and thus cost allowed such technology to be accessible by only the rich

- Electronic Synthesis Instruments condemned as unnatural & socially unacceptable
Late 1970’s Developments...

- Patching Modules was inconvenient, time-consuming & *impractical* for the Musician
- A *common set* of Modules and their connections found to be most useful
- To meet the needs of Musicians Patch cables replaced by *fixed switched* designs
- Less required Modules combined with *consumer demand* for Synthesizers brought about more *affordable* designs
Introducing... the Mini Moog

Newest in the expanding line of Moog products is the Mini Moog, a compact, moderately priced miniature synthesizer designed and built especially for live performance. The Mini Moog incorporates the basic synthesizer features to be found on our large modular systems in a lightweight, portable package designed to be easily set up and played. Front panel controls and switches eliminate the need for patchcords. The Mini Moog can be used to process any audio
1980’s... Analogue/Digital Hybrid Technology

- **Micro-electronics** and Manufacturing technology facilitated more complex, advanced, compact, and affordable designs.

- Developments in Synthesis and needs of Musicians as performers **defined** the modern Synthesizer **Interface**.

- **Digital Electronics** technology now at the forefront. New Synthesizers applied this technology mainly in Synthesizer **control**. The development and use of **MIDI** arose.
OSCAR PETERSON
met Roland HR-70, TB-303 en
TR-606

Roland
WE DESIGN THE FUTURE
Roland **TB303**
Arturia Jupiter 8V
Yamaha DX-7
1990’s... Embedded Digital Computer Technology

- **Computer Technology** now facilitated **Embedded** Computer systems, Sampling, ADC, DAC, & Digital Audio Formats

- **Audio Sampling** now at the forefront, with **extremities** in its social impact.

- Later Instruments combined both **Sampling** and **Synthesis Technology**

- **Wavetable Oscillators, Digital Signal Processing, & Advanced Control** arrived
AKAI S1000KB
AKAI S1000
Waldorf Microwave
The year 2000...

- **Portability, Performance, Versatility** and **DJ Technology** now **major** Influences

- The rise of **Software Synthesis** led to the traditional **Instrument** becoming merely a **Controller** for **DSP** based Software

- The Versatility and scope for limitless configuration of Synthesis components in Software inspired new methods of **Interaction** and **highly configurable** control
KORG Electribe
AKAI MPC1000
Novation Remote 25
Alesis X25
Conclusions...

- **Available Technologies** have a major impact on **System Architectures**.

- All Electronic Musical Instrument Technology is essentially **Modular**.

- **Innovative Technology must fit** into the **Consumer Market** – Practical, Affordable, Desired, Versatile, Configurable.

- Determining **Future directions** requires an **analysis** of the **Consumer Market**.
Linkage...

http://www.obsolete.com/120_years

http://www.vintagesynth.com

http://nime2008.casapaganini.org

http://www.synthzone.com