My First Sony
Article for *Positionen*
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In the fall of 1997 Andrew Woodmansey hired me to prepare a report on "New Instrument Design" as part of the background research for The Music Box, the projected entertainment complex for the new Sony headquarters in Berlin. I wrote an overview of acoustic and electronic musical instruments and software (both commercial products and proprietary artist-built instruments), described existing music-related museums and research facilities, suggested guidelines for the creation of an artist-in-residence program, and made several proposals for exhibitions that would allow "hands-on" musical performance by a general public. I drew on my experience as a designer of odd instruments for my own music, the many artists' projects I supervised while visiting artistic director of STEIM (Amsterdam)[1], and a general awareness of the innovations of my colleagues in the field of experimental music.

My work had negligible direct effect on the Music Box as built: I did help broker a co-operation with ZKM (Karlsruhe)[2] that led to the inclusion of a modest artist's commissioning program, and I suspect I was useful translating "American to European" in some meetings with the ex-Disney cowboys who were in charge of the technology of "location based entertainment" that came to dominate the final design. But some of my unrealized proposals still seem relevant six years on, especially in the context of the theme of this issue of Positionen. Here is an excerpt from the report:

SOME SUGGESTIONS FOR THE MUSIC BOX
How to put them together in a unique, world class institution of both entertainment and cultural value? The following design goals are proposed:

- to make The Music Box a unique center, not a variant on an existing model.
- to maximize participant flow and usage -- avoid queuing.
- to create a structure that is open for future expansion and change with minimal disruption.
- to utilize equipment that is as reliable as possible and to use redundancy to minimize down-time in case of equipment failure.
- to allow for solo performance and ensemble activity, emphasizing the social and performance aspects of music.
- to allow for both active participants and passive audiences, and to create situations that will tempt the passive to take action (the Karaoke model).
- to blur the distinction between musical instruments and passive home media, using non-traditional controllers as gateway to broadening the definition of music, both as an activity and as a consumable product

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[1] www.steim.nl

[2] www.zkm.de

(record/tape/CD).

- to build in enough flexibility and variation to encourage repeat visits, not just by school children.

In response to these guidelines let us consider a handful of exhibition scenarios:

Cellular Instruments

A solution to the challenge of a hands-on musical instrument experience that allows visitors to mix and match controllers, sound modules and software devices with the great freedom and creativity.

On entering the exhibition, the visitor encounters a number of bins containing portable custom-made MIDI controllers: tiny keyboards, guitar-like controllers, balls, gloves, hats, mbiras, percussion objects, simple microphones, etc. All are wireless, incorporating infra-red data transmitters, with rechargeable battery packs. None make sound themselves.

Throughout the area are numerous "sound stations," each containing an infra-red receiver, computer with interpreting software, a sound module, and some kind of sound system. Whenever an instrument gets close to a sound station, its data is received and the visitor can begin playing it. Thus, carrying one instrument a visitor can walk from station to station, encountering different sounds and different musical scenarios.

Every station has a different kind of musical sound and structure, running a gamut of possibilities. Some might have purely electronic sound (synthesizers, samplers, signal processors), while others could be electromechanical (solenoid triggered scrap metal, a MIDI Player Piano). Entertainment technologies could also be included: CD players, videodiscs, cable TV, videogames. Some might let the user control the sound or action directly, while other could incorporate software that processes the player's actions: pressing a key triggers a recorded riff, squeezing a pad adjusts a track in a mix, plucking a virtual string calls up a new TV channel, etc.

The sound amplification and containment systems take the form of parabolic overhead "Sound Showers", one-person isolation booths, and small theaters with stages to accommodate both players and spectators.

Except for the private booths, all sound stations are designed to incorporate several simultaneous players, automatically assigning different musical parts to different controllers. The computer can detect how many instruments are active in its area, and can adjust its program accordingly, so every station is capable of solo and ensemble behavior.

The theaters would have a Karaoke quality: one can sit in the audience and listen, but jumping up on stage connects you to the music heard over the PA.

Some sound stations could be clearly marked by the presence of a plinth or sculptural object, but other could be secret: a receiver under the floor, a sound shower above the head -- one plays by chancing upon it.

In some cases the controller might have a small built-in speaker that can receive audio transmitted wireless back from the sound station -- examples might include a Virtual Reality helmet with built-in headphones, or an mbira-like controller with a small speaker in the resonator. This feature could give some instruments a "realer", quasi-acoustic character.

At any time the visitor can drop his or her instrument into a bin and pick up a

different one. Each instrument transmits an identification number with its sensor data, so that the software in the sound stations can recognize the kind of controller and interpret it accordingly (i.e., give a guitar controller a different musical role than a xylophone controller). The bins contain connectorless inductive charging circuits, so that the batteries are automatically recharged whenever the instruments are dropped in.

Due to the complete separation of controller and sound modules, this arrangement of modules is combinatorially rich, as visitors will discover as they experiment with multiple permutations of controllers and sound stations. This makes for high density usage, with no limit on the number of participants at each sound station; curiosity about controller/sound station interaction encourages increase audience flow through the exhibition.

The most handled part, the controller, is produced in multiple. With several kinds of controller to choose from, and numerous sound stations, there is minimum down time and automatic backup in the event of any one controller or station failing. Instruments can be polled by the computers for status reports on damage. Wireless connection eliminates damage to connectors, which are usually the first part to fail. Duplicate sound modules and computers systems can be run in parallel in each sound station for redundancy and automatic changeover in the event of failure.

The Cellular Instrument scenario offers visitors a varied, rewarding, and ever-changing musical experience, with redundancy-based reliability and modest cost.

Video Music

Some possible applications of video-to-MIDI software:

- **Hotel Lobby:** This would require a medium sized room, perhaps containing overstuffed chairs and sofas, with cameras to track movement of people walking across. Software would trigger dialog and sound effects from famous film noir soundtracks -- different quotes for different locations in the "lobby." Visitors would "play" the room by moving from one place to another.
- **Stocks**. Holes are cut along a long wall at head and hand height for variously sized people. On the non-public side of the wall video cameras are focused on the openings for the heads and hands. Visitors stick through their head and hands and hear a reaction to every twitch, grimace and gesture. Different holes are programmed to produce different sonic results.
- **Virtual Maze**. Visitors make their way through an invisible virtual maze demarcated only by sound: a warning sound for a wall, a pleasing sound for "all clear ahead."
- **Imaginary Landscap**e. Similar to the maze, here you walk through an imaginary landscape and the computer provides the appropriate sound cues (babbling brook, heavy traffic, growling bear, etc.) along the way.

Vocal Music

An exhibition organized around the "untrained" human voice, with various systems for transforming speech and other vocal sound into music. These could include:

- **Digital Signal Processing.** A variety of programs would be available for transforming the voice (pitch shift, echo, reverb, resonators, etc.)
- **Pitch-to-MIDI conversion**. Speaking into a microphone could trigger

percussion samples, control synthesized music, whack metal junk with solenoids, play a MIDI Player Piano, and so on.

- **Virtual Conversation.** The voice is sampled and replayed, after a pause, with computer-controlled pitch variation and editing, for a virtual conversation.

The Lab: A Build-your-own-controller Room
A workshop where visitors can quickly design and build a new controller using a Lego-like mechanical and electronic modules. They could be connected to a number of different sound stations in the Lab, or carried out into the Cellular Instrument exhibition space.

Recording Options
All the musical activity taking place in exhibition is streamed to a hard disk recording system, and held for an hour or so. Visitors are given the option of "toasting" a CD (for a price) with his or her own experiments on leaving. Recorded tracks would be tagged with the ID number of the wireless controller used; at any point the visitor could take the controller to a station that reads the ID number and writes the corresponding tracks to a CD.