



# / Flankierende Massnahmen im Schienenersatzverkehr Accompanying arrangements at rail replacement bus service

/ hyper line tracer 87,5Mhz version

/ A robotic sound installation by olsen wolf using  
an automaton to play a composition of feedbacks

# / Abstract/Current Version

/ Accompanying arrangements at rail replacement bus service' is a sound installation performed by a robot named 'Hyper Line Tracer'. His mission is to chase/follow a trace, here a black line marked on the ground. The robot is carrying a radio transmitter & a microphone on its back.

Around the trace on the ground various radios are lined up, receiving the signal emitted from the robot – in this version on 87,5Mhz. As the microphone is transmitting the signals coming from the radio speakers back to the radio receivers, feedback noise is generated.

Hence by passing the series of radios, with their different positions & characteristics a composition of feedback noise is played by the movement of the robot.



/ hyper line tracer 87,5Mhz version

# / Installation requirements

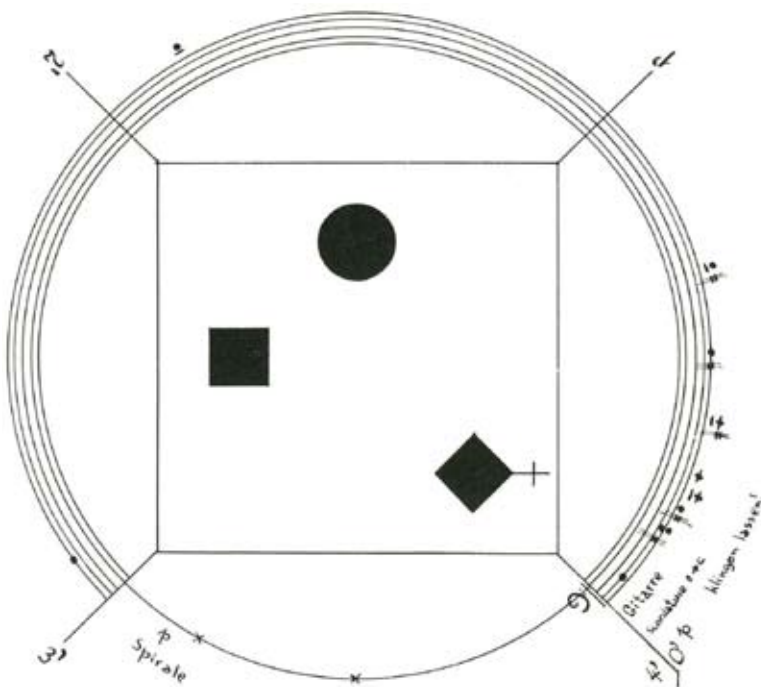
/ Minimum 5m<sup>2</sup> of plane white ground  
1-15 Radios  
Hyper Line Tracer with microphone & audio transmitter



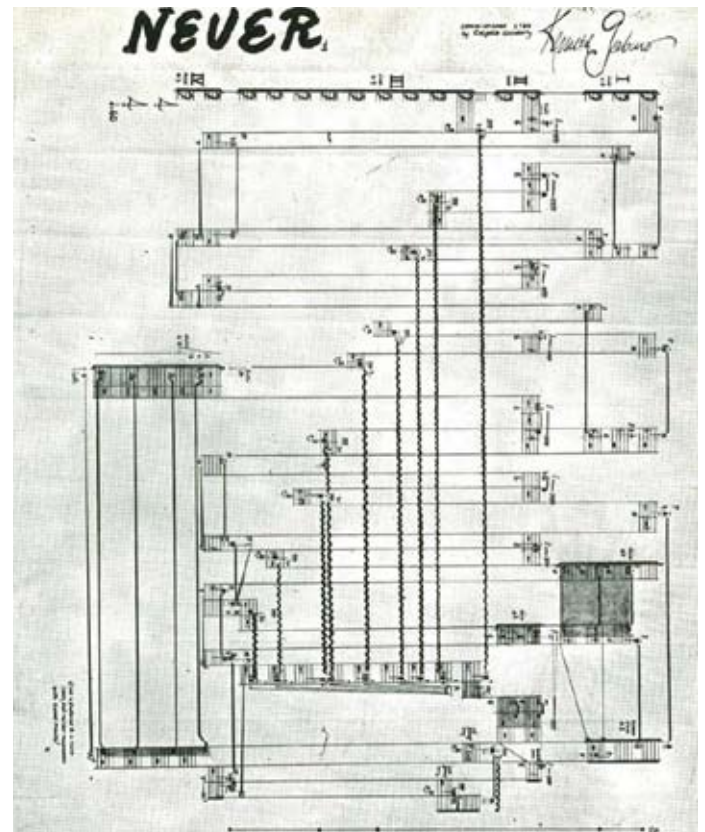
/ Installation at gallery Skaftfell Seyðisfirði Island Juli 2009

# / Context

/ The idea started to sprout visiting the exhibition 'Between Thought and Sound: Graphic Notation in Contemporary Music' <sup>1</sup> at The Kitchen NYC in September 2007. The show included experimental scores by various composers who have relinquished traditional musical notation in favor of their own invented visual systems employing graphic or pictorial elements.



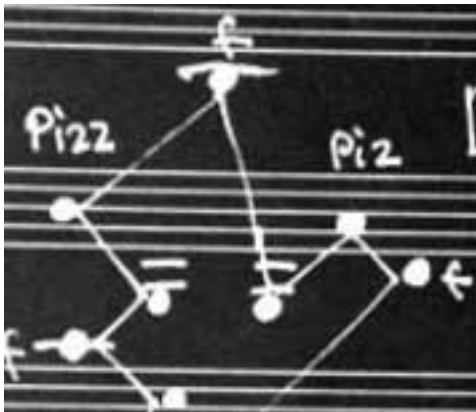
/ Rudolf Komorous *Chanson* 1965 <sup>2</sup>



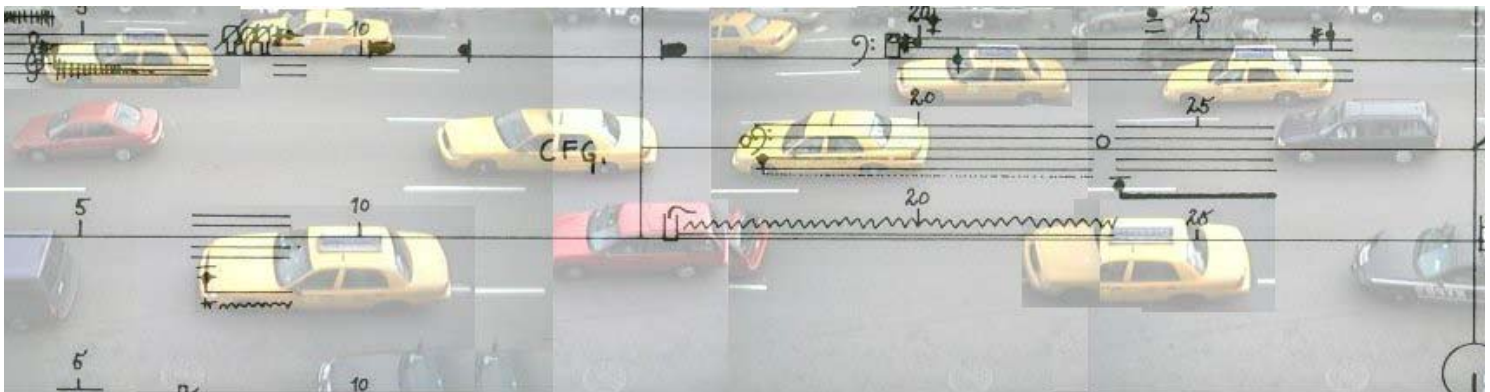
/ Kenneth Gaburo *Never* 1966 <sup>2</sup>

# / Sonification Experiments

During this time I did sonification experiments using traffic as a performer playing a score: The view of a Camera placed onto 10th Avenue is transforming the five lanes into a score. The notes on the score where given by the yellow cabs driving down the street.



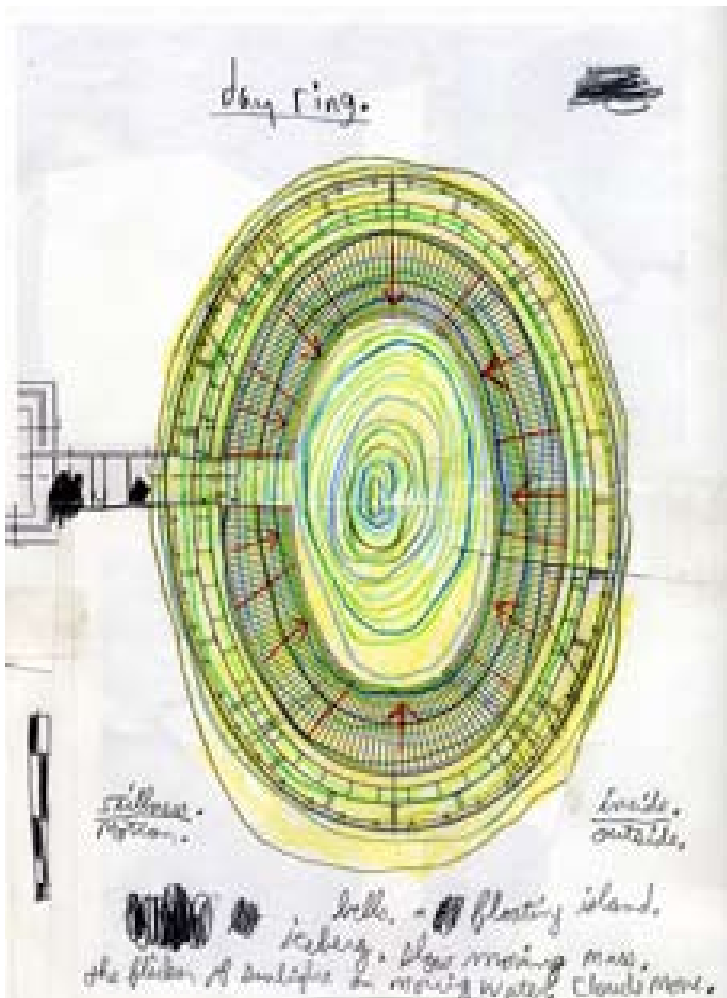
/ By using color detection to filter the cabs from the rest of the traffic they got transformed into representatives of notes played in realtime.



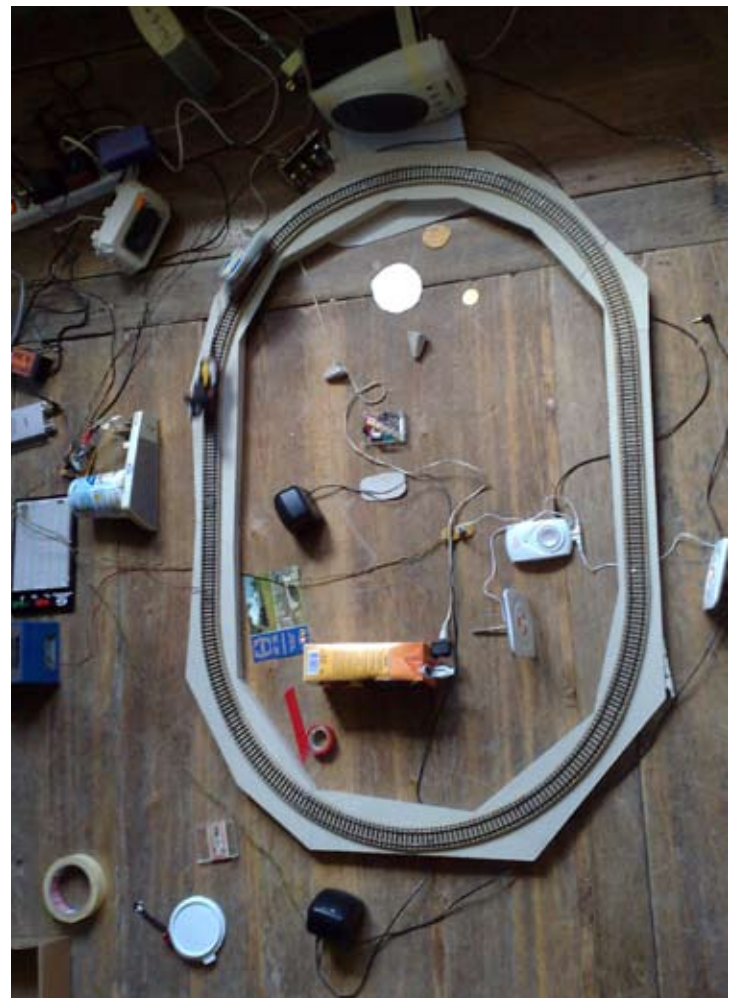
/ For video & soundexamples visit <http://hasa-labs.org/sonification>

# Experiments with Automaton playing a composition in realtime

Since the sonification experiments the process of playing sounds by automation fascinated me & with an eye on possible 'notations' that can be interpreted in real time I came across a model railway surrounded by loudspeakers:



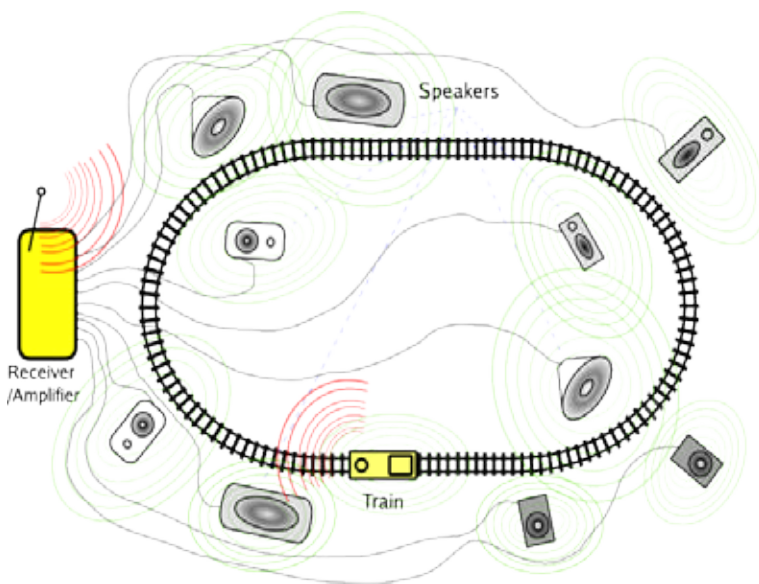
Steve Roden *Day Ring* Scetch 2007<sup>1</sup>



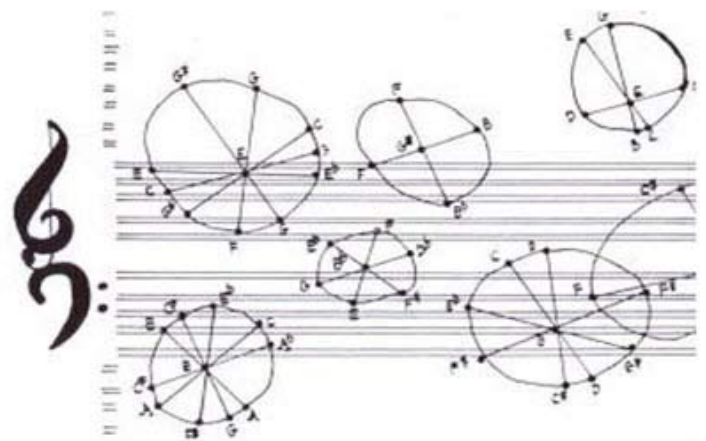
Installation at Dorkbot Romanmotier 2008

# / Märklin H0 Version

/ In this constellation a train is used as an automaton playing a composition of noise evolved by audio feedbacks. The composition consists of railroad tracks, a train, microphone, amplifier and various types of old computer speakers that are placed around an O of model railway tracks.



/ Installation Sketch 2008



/ John Cage Notation for his Variations?

/ The train itself carries a wireless microphone on its back sending the signal to a receiver through an amplifier to the speakers. Using the phenomena of audio feedback – noise that is generated by placing a microphone in front of a loudspeaker – the train generates a sequence of audio feedback by passing the speakers. Due to the variety of types of radios/speakers, its position in relation to the passing train & the speed of the train, different feedback noises are generated.

# / Deliberate use of Feedback

/ In technical terms feedback is caused by a looped signal between input & output. It occurs when the gain in the signal loop reaches “unity” (0dB gain). Feedback can occur at any frequency. Thurston Moore a ‘collector’ of feedback noises from the Ensemble Sonic Youth who explored feedback extensively for example on their album Silver Session for Jason Knuth (1998). And Robert Ashley’s The Wolfman (1964) or Steve Reich’s Pendulum Music from 1968 revealed that the phenomena includes factors like the room’s resonant frequencies, frequency response of microphone, characteristics of instruments etc.

In the installation the automaton is exploring the acoustic properties in place & characteristic of the individual apparatus/instruments surrounding the trace - playing a composition of phasing feedback tones & oscillating sounds pitching smoothly between high and low. At some parts almost in an equilibrium at others revealing elements of jarring, malfunctioning electronic sounds.

The image shows the album cover for 'Silver Session for Jason Knuth' by Sonic Youth. The text is printed in a bold, black, sans-serif font on a light gray background. The text is arranged in three lines: 'SONIC YOUTH' on the top line, 'SILVER SESSION' on the middle line, and 'FOR JASON KNUTH' on the bottom line. The text is slightly tilted to the right.

SONIC YOUTH  
SILVER SESSION  
FOR JASON KNUTH

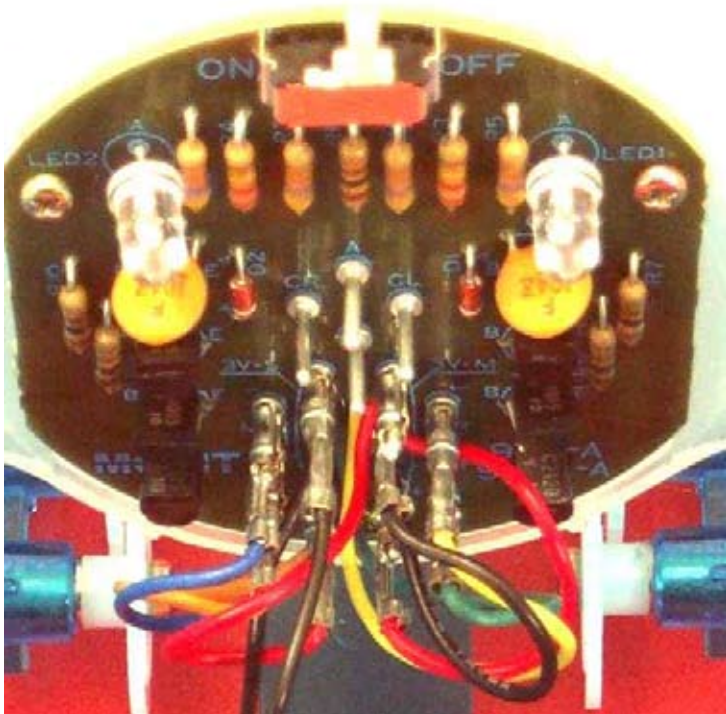
/ Silver Session for Jason Knuth (1998)

/ For sound & videoexamples visit:  
[http://hasa-labs.org/rail\\_replacement](http://hasa-labs.org/rail_replacement)

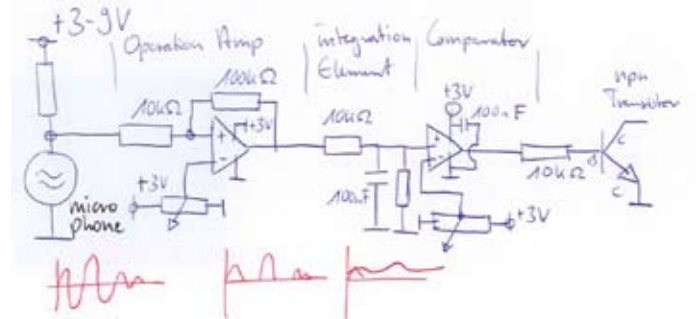


# Forthcoming Experiments

In the next version the line tracing circuit will be replaced by an electronic circuit, to equip the robot with acuesthesia: Two microphones positioned on the left & right of the robots head should enable the robot to react on the volume of the surrounding sounds.



Electronic circuit inside the robot



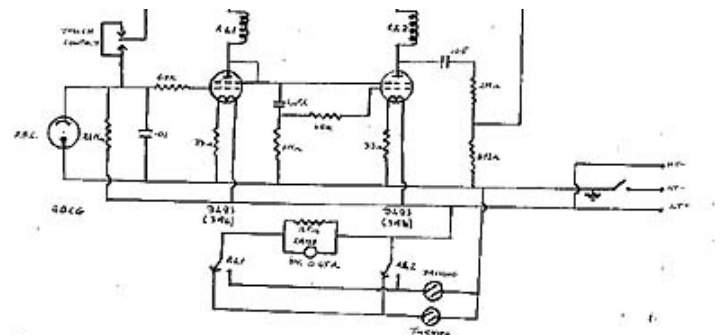
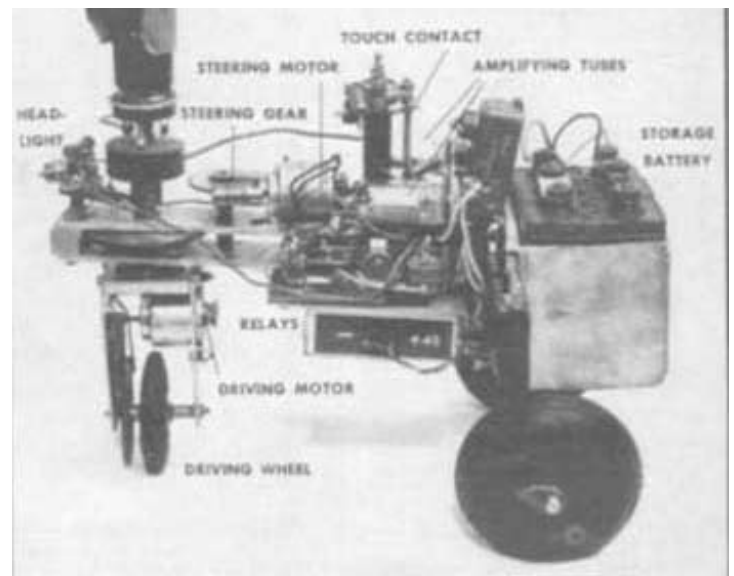
Scetch of electronic circuit for one microphone – duplicate 2 times for left & right 'ear' of the robot

# / Autonomous robots

/ With these Experiments the context of the Project expands into the field of autonomous robots, referring to Grey Walter's *Machina Speculatrix* from 1948/49: Elmer & Elsie, due to their appearance often described as tortoises, were capable of phototaxis which made them move in response to the stimulus light.



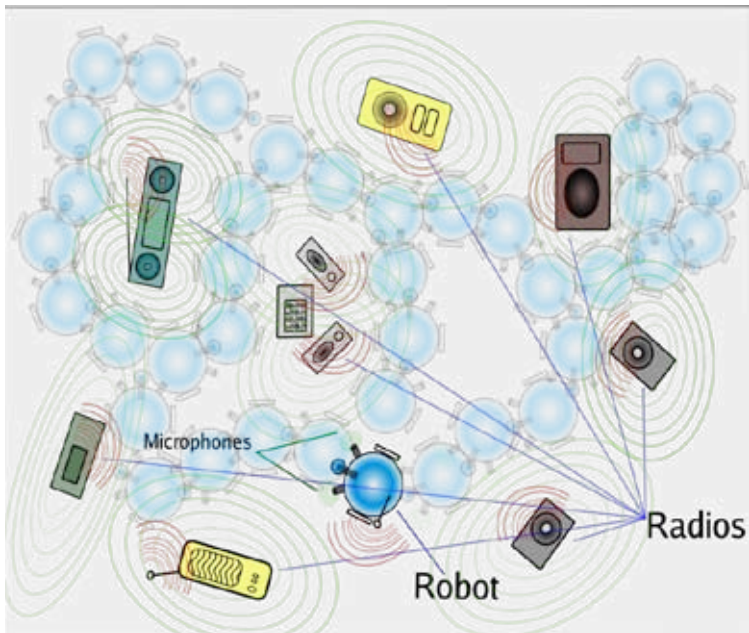
/ Light Path generate by Grey Walter's *Machina Speculatrix*<sup>3</sup>



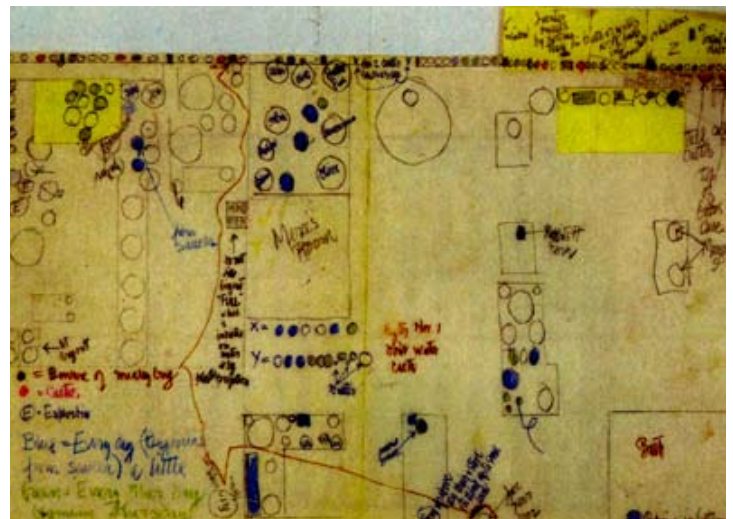
/ drawing of the electronic control (with vacuum tubes)<sup>3</sup>

# / Acousthesia upgrade

/ The robot will change its direction when the measured volume amplitude of one of the microphones reaches a given threshold. Analog to the tracer line in the current version, the robot is guided by the noise created upon its own movements. In the end the robot generates and moves within its own labyrinth of noises and feedback tones.



/ Installation schematic of forthcoming version – Robot's guided by its feedbacks



/ John Cage's plant watering scheme

# / Affordance<sup>4</sup>

/ With the acuesthesia upgrade the robot gains more autonomy & will change it's behaviour. This is attended also by changes in the generation & ascription of the machines intentions. The study of this phenomena i would like to include into my research with automatons as well as the construction of electromechanical beauty.

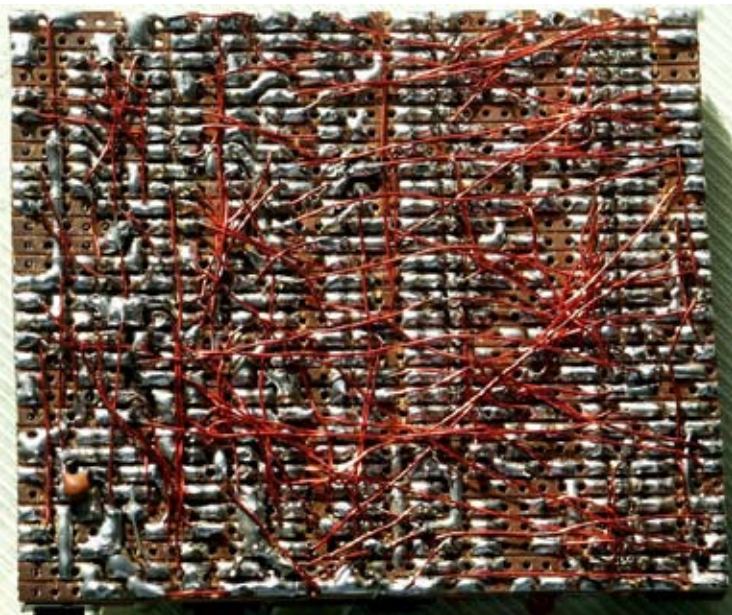


/ 2 unknowns studing electromechanical beauty

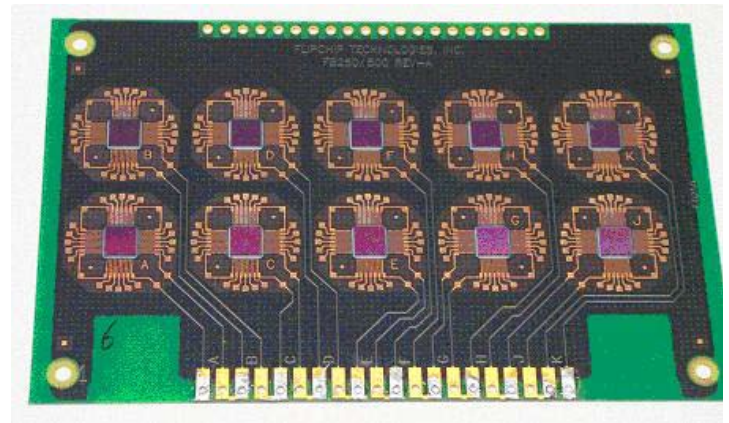
# / Schedule/ Timetable

/ **Juli 2008** - Exhibition of the installation in the current estate  
The project in the current state will be shown Juli 1-14. at the Skaftfell Gallery in Seyðisfirði Island<sup>5</sup>.

**November 2008** - Production & exhibition of first prototype  
For the acousthesia upgrade mentioned in forthcoming experiments i will collaborate with xxxxx\_micro\_research Berlin<sup>6</sup>. A residency is planned for November 2008 where i will have access to their facilities for developing & producing the electronic circuit for the acuesthesia upgrade & print it on a circuit board. The final work will be shown as an installation at xxxxx\_micro\_research Berlin at the end of the residency.



/ Prototype circuit by unknown



/ Printed circuitboard used on NASA's Mars Rover

[1]  
Between Thought and Sound: Graphic Notation in Contemporary Music  
The Kitchen NYC September 7–October 20, 2007  
Curated by Alex Waterman, Debra Singer, and Matthew Lyons  
[http://www.thekitchen.org/k04\\_calendar.html](http://www.thekitchen.org/k04_calendar.html)

[2]  
John Cage Notations originally published by the Something Else Press  
1969  
download as pdf:  
[http://ubu.wfmu.org/text/Cage-John\\_Notations.pdf](http://ubu.wfmu.org/text/Cage-John_Notations.pdf)

[3]  
The Grey Walter Picture Archive University of West England  
<http://www.ias.uwe.ac.uk/Robots/gwonline/gwarkive.html>

[4]  
Affordance defined by Donald Norman in 'The Design of Everyday Things'  
(1988, original title 'The Psychology of Everysday Things')

[5]  
Skaftfell Gallery, Seyðisfirði, Island  
[http://www.skaffell.is/\\_index.php?lang=en](http://www.skaffell.is/_index.php?lang=en)

[6]  
xxxxx micro research Berling, Germany  
[http://www.1010.co.uk/org/xxxxx\\_micro\\_research.html](http://www.1010.co.uk/org/xxxxx_micro_research.html)