

Technical explanation for

SprachSchlag

for percussion and live-electronics

Hans Tutschku

(2000)

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SprachSchlag

for percussion and live-electronics (2000)

duration: about 14 minutes

SprachSchlag is a rhythmic game between the instrumental part and the electroacoustic part. All rhythms are derived from speech analysis in different languages. The principal instruments are skin (grosse caisse, tom tom) and vibraphone. They are accompanied by some metal sounds (tamtam, Peking gongs, crotales)

All electroacoustic sounds are live treatments of the percussion sequences and prepared soundfiles, composed from voice and percussion sources.

The goal of the electroacoustic part is the prolongation of the gestures of the percussionist. The energy (dynamics) of the live playing is traced by the computer to decide all parameters of the electroacoustic part. Thus it is the percussionist himself controlling all possible aspects inside a certain "Event" (see technical notes "how the electroacoustic part works" for detailed explanations)

Even if the live-electronic part is controlled by the playing style of the instrumentalist, the performance needs a second musician, advancing events and controlling the amplification and mix. He has to know the percussion score to "accompany" the instrumentalist.

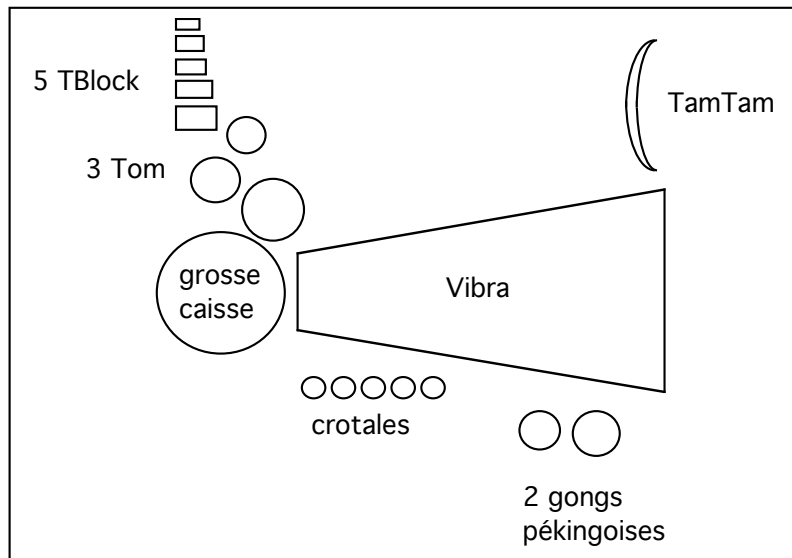
The electroacoustic part is programmed as a Max/MSP-standalone application for Macintosh (G4). The program contains all sound sequences and event handling for the live-treatment.

The events are notated as numbers (1-57). Number one serves as initialisation.

At every event the musician controlling the live-electronic part is hitting the spacebar of the Macintosh keyboard to activate the actual event.

Percussion instruments:

- 1 Vibraphone
- 3 Tom-tom (low, medium, high medium)
- 5 Tempelblocks
- 1 TamTam (100 cm)
- 2 Peking gongs (1 with glissando upwards, 1 with glissando downwards)
they are not hanging but lying on a mousse block to damp the resonances
- 5 crotales :



Technique:

Computer Macintosh G4 with CD-ROM and multichannel sound card (Korg 1212 or Digi001)

6 loudspeakers + amplification

1 one stage monitor for the percussionist

5 microphones on stands

Mixing table (5 inputs micro, 6 inputs line, 6 outputs, 2 aux-sends)

The 5 micros are used as follows:

2 for the vibraphone (which are taking at same time the sounds of the Peking gongs and the crotales)

1 for the TamTam

1 for the skin instruments

1 for the Tempelblocks

The 5 micros arriving on the mixing table and are used to amplify the sounds of the percussion instruments. At same time a monomix of the 5 microphones is sent through Aux1 to the first input of the soundcard in the Macintosh.

The 6 outputs of the soundcard arriving on the mixing table. (see scheme for routing)

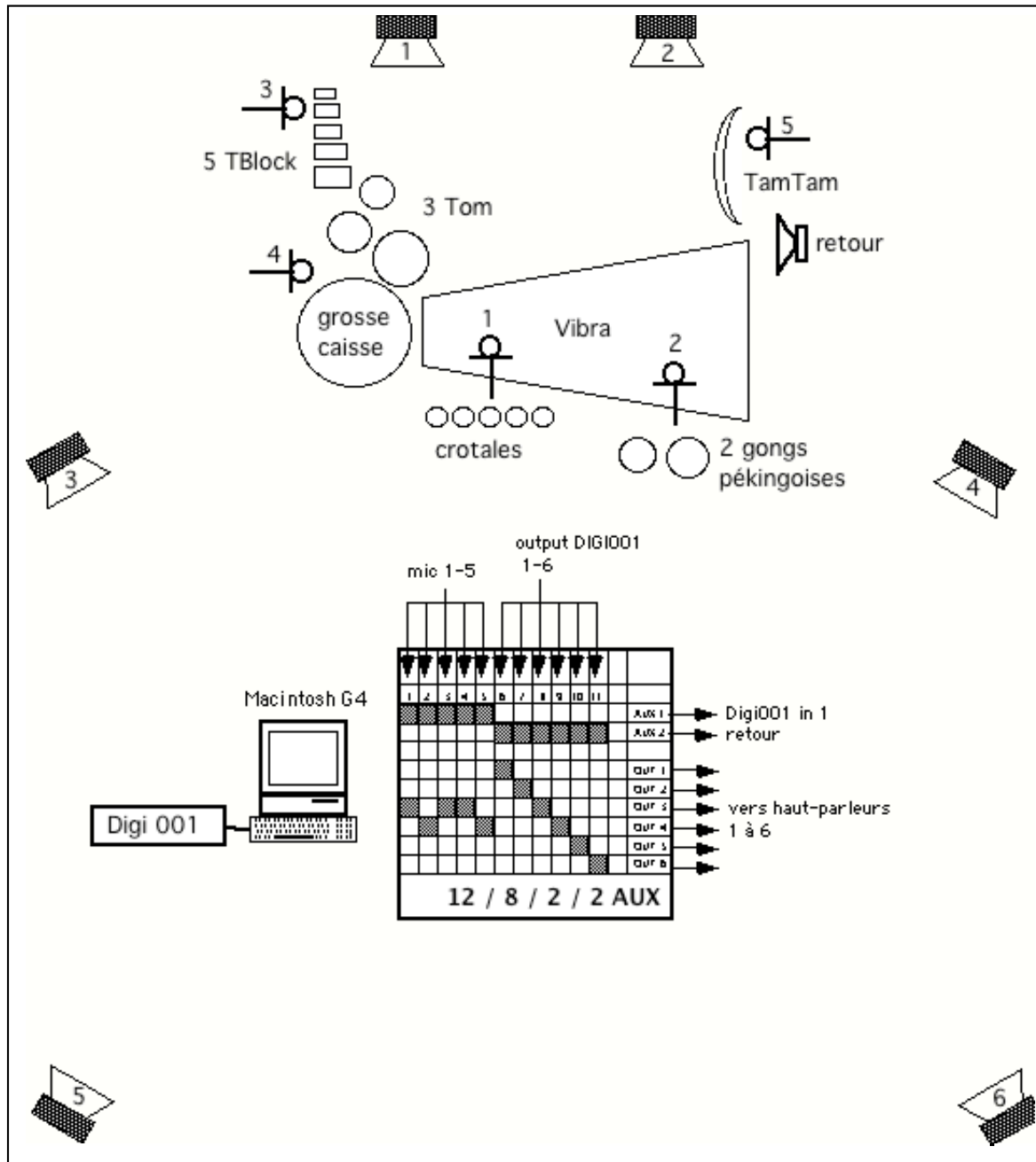
The 6 outputs of the mixing table (groups) are sent to the 6 loudspeakers. (see scheme for routing)

The amplification of the percussion instruments uses only speakers 3 and 4.

The signal of the 6 outputs of the soundcard is sent through Aux2 on the stage monitor for the percussionist.

Placement of the speakers:

1 and 2 are behind the percussion instruments. 3/4 and 5/6 are a square around the public.



How the electroacoustic part works

The electroacoustic part is realized in a Max/MSP-patch, which was compiled into an application. It runs autonomously on a G3 or G4 with a multichannel soundcard (Korg 1212, Digi 001 etc.)

The events figuring in the score are corresponding to parameter settings (Events) in the Max/MSP-patch. At every number the musician controlling the electroacoustic part is advancing the patch by hitting the spacebar of the Macintosh keyboard.

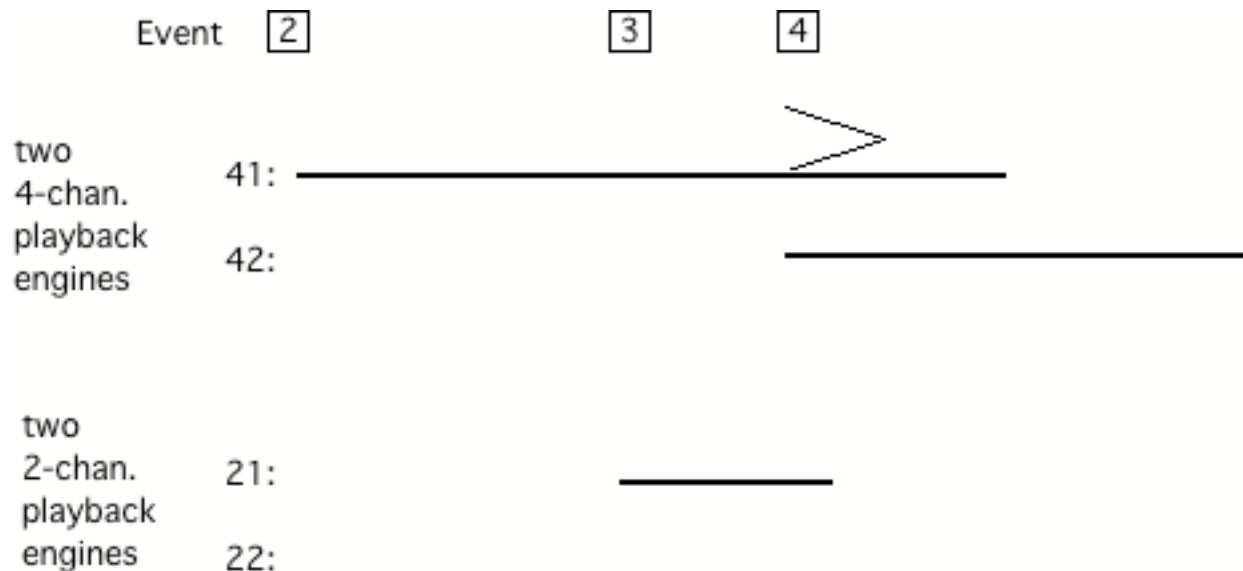
The following explications are just to describe the internal functions of the patch. Their understanding is not required to perform the piece, but they give nevertheless some insight in the complexity of the electroacoustic part.

The electroacoustic part is divided into four main layers:

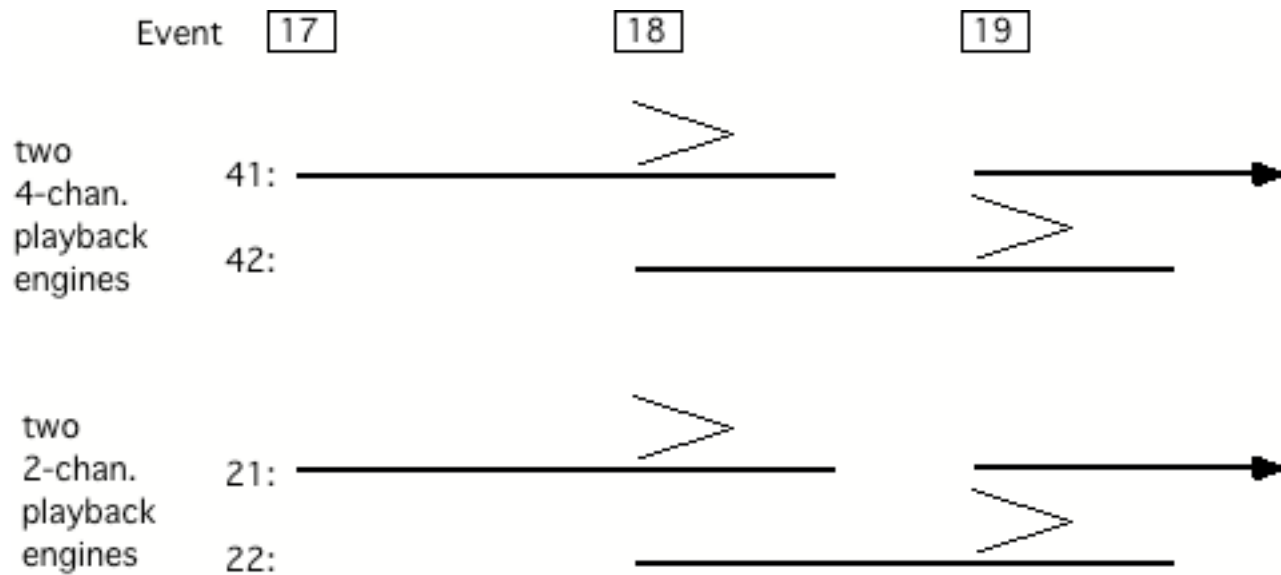
- playing prepared sound sequences in two different "spaces"
- tracing the amplitude of the percussion to trigger small samples
- tracing the amplitude of the percussion to change playback parameters for granular synthesis
- treating the incoming sounds from the percussion instruments

- playing prepared sound sequences in two different "spaces"

The 6 speakers are used to create two different sound spaces, one with four speakers around the public, another with two speakers behind the percussion instruments. The latter is melting as most as possible with the original percussion sounds. There are very strong relationships between single percussion notes and stereosoundfiles coming from these two speakers. All important sound movements happen in the quadraphonic space around the public. I programmed four playback engines (2 for the stereofiles, 2 for the fourchannel files). Having two of each allows us to superimpose two soundfiles of the same space to make continuous playback. At Event 2 the first fourchannel file starts playing. At Event 4 a second fourchannel file starts while the first one fades out and stops. The first file is longer then normally needed. If ever the percussionist takes a slower tempo the start of Event 4 would be slightly later. But still would be there a continuous overlap with the second fourchannel file. Event 3 starts a shorter twochannel file, which ends automatically if the soundfile is over. All playback engines together allows a simultaneous playback of



In some parts of the piece, both playback spaces are linked to create a 6-channel space. For example: Event 17 starts playback of a fourchannel and a stereofile simultaneously. Event 18 start a second pair and fades out the first one (again to create a smooth, continuous playback which adapts to the playing tempo of the percussionist).



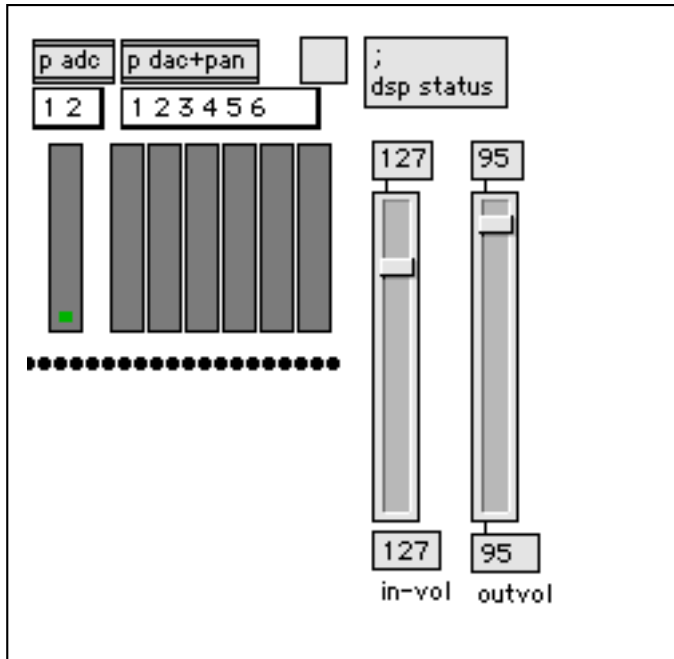
SPRACHSCHLAG

SprachSchlag for percussion and live-electronics Hans Tutschku 2000

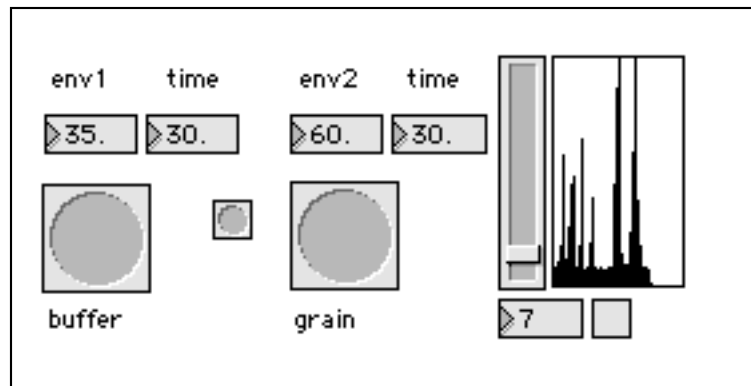
The interface is divided into several sections:

- Top Left:** Controls for 'env1' and 'env2' with 'time' parameters and 'buffer'/'grain' visual indicators.
- Top Center:** 'p adc' (1 2) and 'p dac+pan' (1 2 3 4 5 6) parameters, along with 'dsp status'.
- Top Right:** 'store' (bar005 1), 'write' (coll presets), and 'p mpresets' with an 'update' button.
- Middle Left:** 'bufferonoff', 'bufferspeed', 'bufferrand', 'RandRand', 'RandRandbase', 'RandRand', 'buffervol', 'Klangfamilie' (bufferviolent), 'loadbuffer', and 'Buf-Nr' (0).
- Middle Center:** 'p REST' and 'p EVENTS' buttons, and 'in-vol' (127) and 'outvol' (95) sliders.
- Middle Right:** A list of 20 bars: bar005, bar022, bar025, bar049, bar071, bar084, bar104, bar108, bar142, bar146, bar152, bar157, bar168, bar193, bar197, bar228, bar233, bar247, bar253, bar272.
- Bottom Left:** 'grainonoff', 'grainVol', 'GDur', 'GDurRand', 'GDur.line', 'GDur.l.rand', 'GDurSinus', 'GDurSinusMul', 'pitch', 'pitchrand', 'PosRand', 'PosRandLine', 'grainpitchrand', 'grainbuff' (granrec1), 'hinherVol', and 's scaled-grainvol'.
- Bottom Center:** 'p GrainDuration', 'p GrainPosition', 'p BasePitch', 'panspeed 1-4', 'init', and a large pink 'STOP-ALL' button.
- Bottom Right:** 'next Event' (2) and a large '0' display.

The Interface is divided into several parts, each one controlling a certain aspect of the patch.

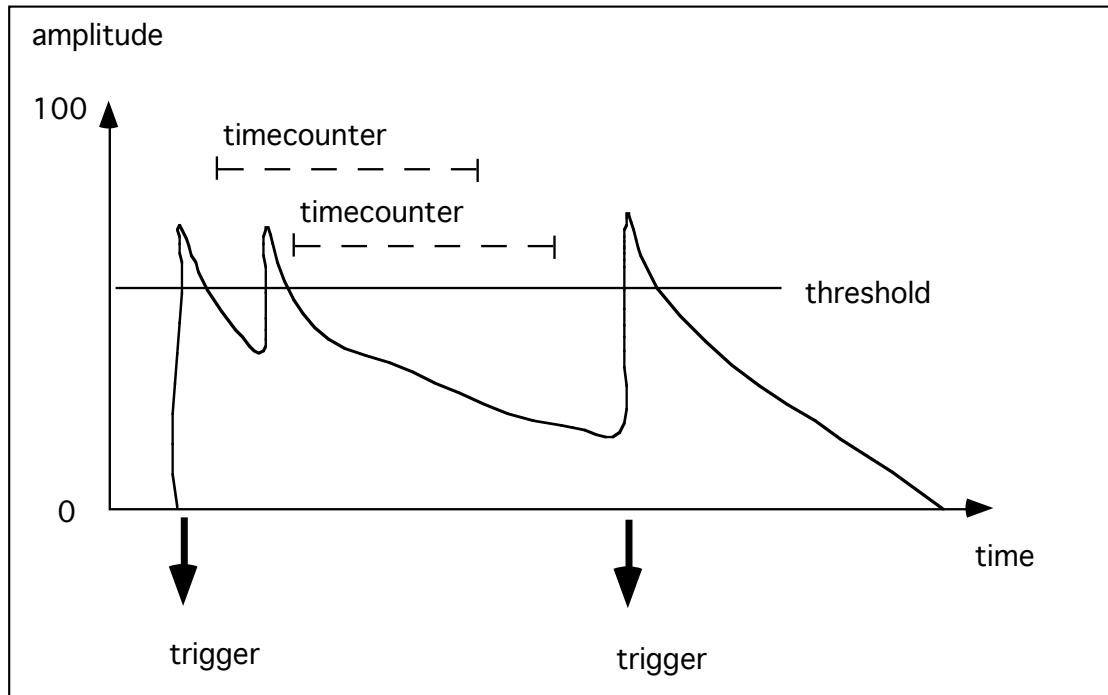


On the top, in the centre we see control for in- and output levels and level meters. Here we decide also the routing assignments, depending on the soundcard used.



on the left side we see the envelope-follower

The amplitude of the incoming sounds from the 5 microphones are traces.

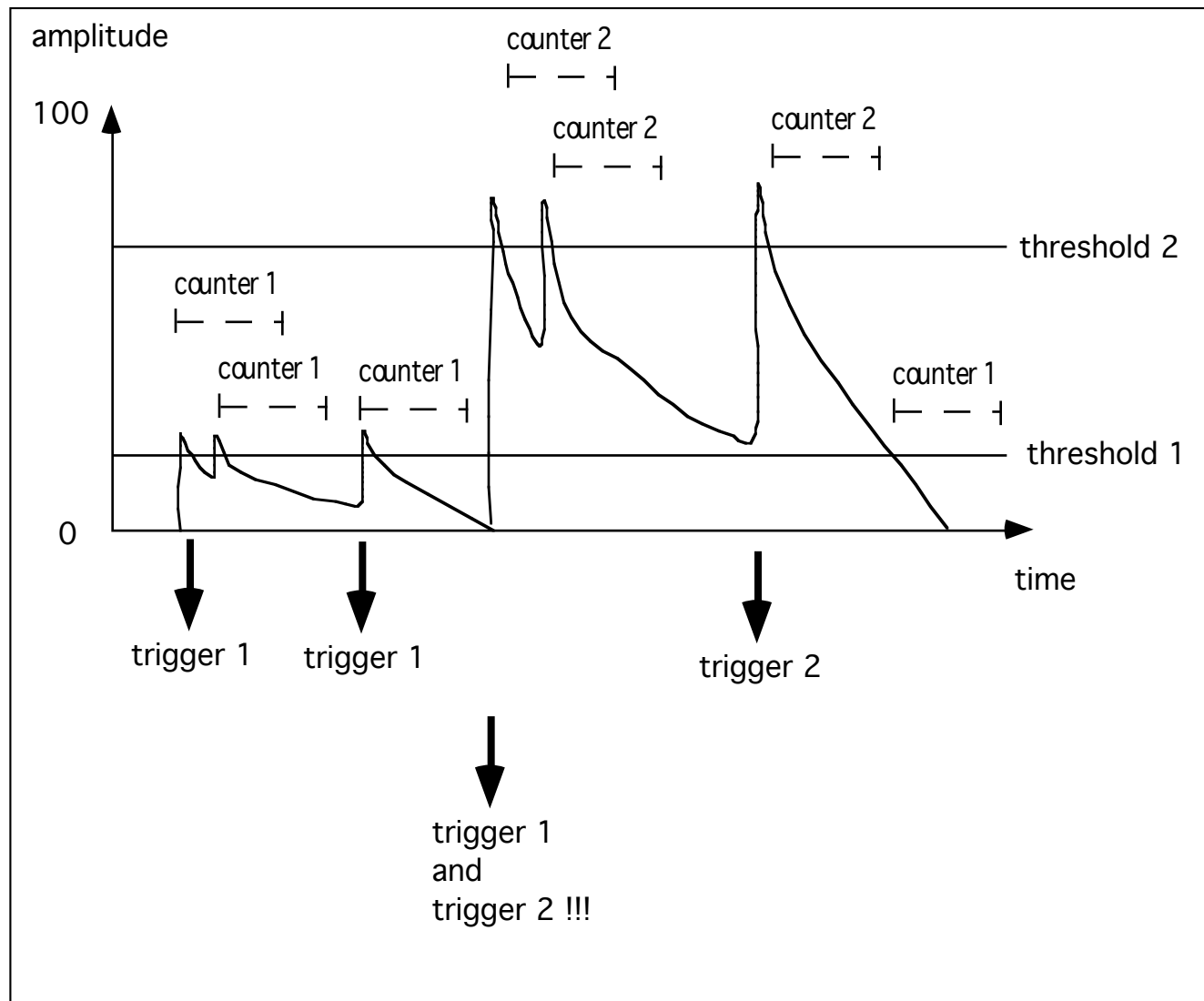


I'm using a threshold on this amplitude to detect attacks. If the incoming signal raises over that threshold, a trigger signal will be generated. From the moment, where the signal falls below the threshold, a timecounter starts. The signal has to remain below the threshold for a specified time before the next attack would be taken into account. In the example at the left, the second attack would not cause a trigger, because he falls inside the timecounter. The third attack will cause a trigger, because he arrives after the timecounter.

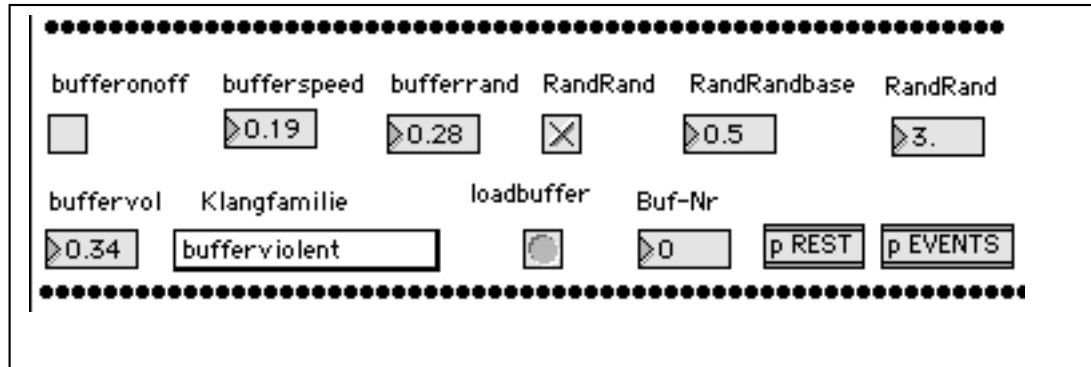
With these two parameters (thresholdlevel between 0 and 100;

timecounter in milliseconds) a fine control over the attack tracing can be achieved, depending on the written dynamics.

This mechanism can be used as a compositional tool, by just picking up attacks at greater distances (using a long timecounter) or as a sort of security to not triggering a lot of events if the signal is oscillating around the threshold.



- tracing the amplitude of the percussion to trigger small samples



short percussive soundfiles are organized in groups

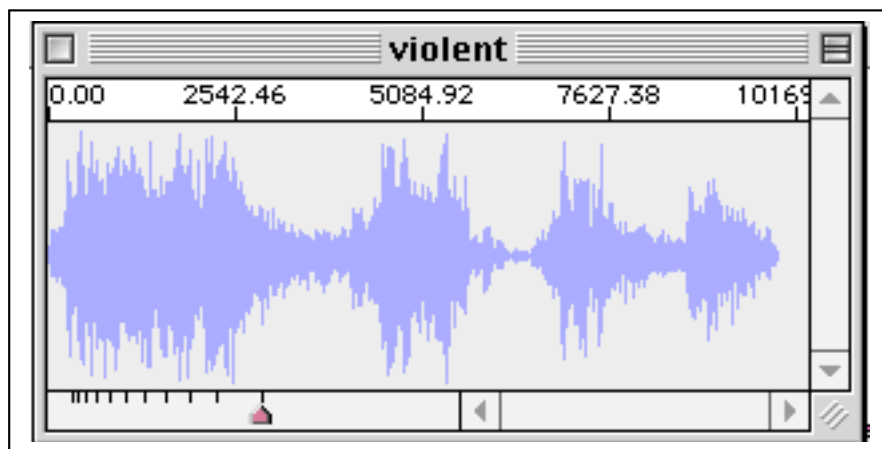
each time a trigger from the envelopefollower is received, one of these samples will be played

the parameters for playback are pitch and volume

- tracing the amplitude of the percussion to change playbackparameters for granular synthesis

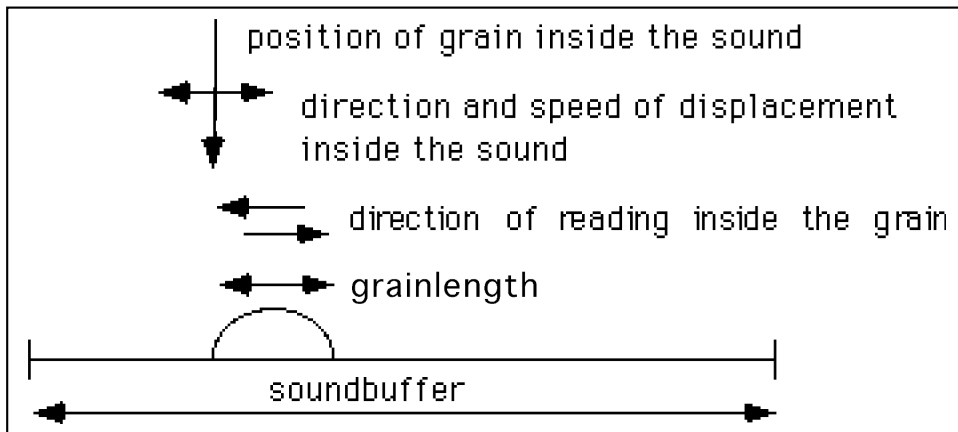
this is the most complex part of the live-electronic part

Granular synthesis works on soundbuffers by playing short extracts (grains) from the sound in the buffer.



At the left is an example of a soundsample.

The sample will not be played "normally" but just very short grains will be picked up.



The most important parameters for one grain are

- position
- direction of displacement
- reading direction
- grainduration

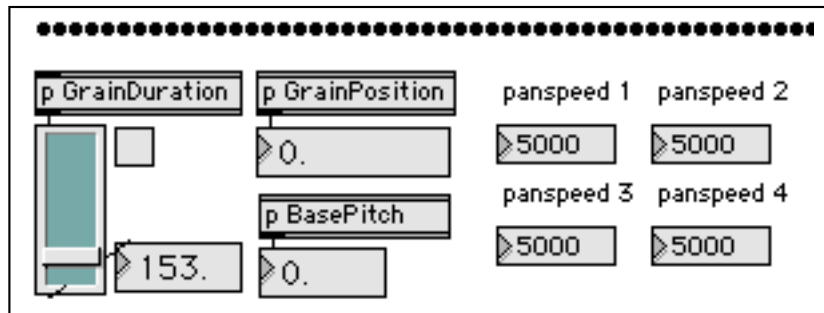
All these parameters and thus the way of playback are controlled by the envelopefoller. Thus the percussionist is acting directly on the playback of the granular synthesis.

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grainonoff	grainVol	GDur	GDurRand	GDur.line	GDur.l.rand	GDurSinus	GDurSinusMul
<input checked="" type="checkbox"/>	▶110	▶50	▶73	▶57	▶76	▶0.002	▶100
pitch	pitchrand	PosRand	PosRandLine			<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	▶500	▶0	<input checked="" type="checkbox"/>	▶5000	<input checked="" type="checkbox"/>	▶0	
grainpitchrand	grainbuff			hinerVol		<input checked="" type="checkbox"/>	
▶0.	violent			▶0		§ scaled-grainvol	

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these are parametersettings for one section, giving limits for all parameters in between the amplitude of the incoming microphones will control the actual parameters for granular synthesis



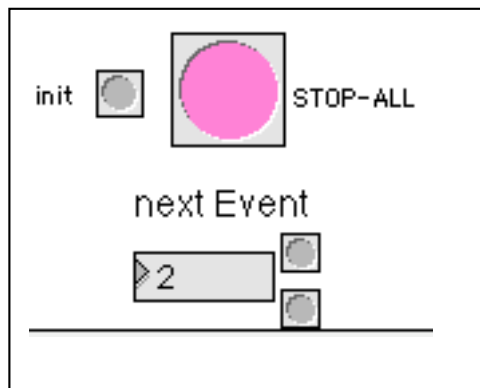
all buffersounds and the result of the granular synthesis are passing by four independent spatialisations

the maximal speed between two speakers is given. The movements of sound are depending on the envelopefollower (thus on the incoming signal from the microphones)

- treating the incoming sounds from the percussion instruments

the incoming sounds are sometimes recorded and then played back in reordered smaller phrases (hinher).

general control



buttons to initialize, stop playback and to jump to specific events during rehearsal

store

write

update

1	bar005
2	bar022
3	bar025
4	bar049
5	bar071
6	bar084
7	bar104
8	bar108
9	bar142
10	bar146
11	bar152
12	bar157
13	bar168
14	bar193
15	bar197
16	bar228
17	bar233
18	bar247
19	bar253
20	bar272

all above parameters are organized in EVENTS

these are the events for sound treatment, bufferplayback and granular synthesis

If you need further instructions, please contact: hans@tutschku.com

Hans Tutschku

SprachSchlag

pour un percussionniste et électronique en temps-réel

(2000)

SprachSchlag

pour un percussionniste et sons électroacoustiques (2000)

durée : environs 14 minutes

SprachSchlag est un jeu rythmique entre la partie instrumentale et des sons électroacoustiques. Tous les rythmes viennent de l'analyse de la parole dans différents langues. Les instruments principaux sont le vibraphone et des peaux, accompagnées de quelques métaux.

Les sons électroacoustiques sont les traitements en temps réel des séquences jouées par l'instrumentiste auquel s'ajoutent des séquences sons composés, qui utilisent comment sources des enregistrements de percussion et de la parole.

L'enjeu de la partie électroacoustique est le prolongement du geste du musicien par les moyens de la lutherie électronique. Les allées - retours de l'énergie du geste du musicien et leurs traitements se réalisent en simultanéité. C'est le percussionniste, qui contrôle avec son jeu une grande partie des aspects sonores de la partie électronique.

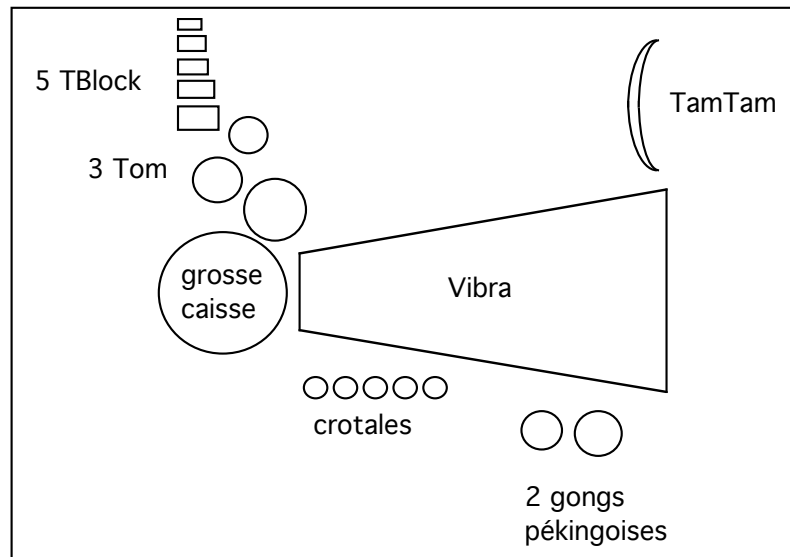
La composition "SprachSchlag" est pour percussion et électronique en temps réel. Cela veut dire, qu'il y a deux interprètes. Un qui joue la percussion, l'autre, qui suit la partition, contrôle les paramètres de l'électronique, déclenche des séquences sons etc.

Toute la partie électronique est programmée sous forme de patch Max/MSP pour ordinateur Macintosh. Il contient à la fois les séquences sons et les traitements en temps réel.

Les événements pour l'électronique sont marqués avec des chiffres (1-57). Le numéro 1 sert pour l'initialisation du système. À chaque événement l'interprète de la partie électronique appuie sur la touche "espace" du clavier de l'ordinateur pour faire avancer le programme. Il contrôle également les niveaux sonores entrant dans l'ordinateur et la sonorisation de la percussion.

liste des instruments de percussion :

- 1 Vibraphone
- 3 Tom-tom (grave, médium, médium-aigue)
- 5 Tempelblocks
- 1 TamTam (100 cm)
- 2 gongs pékinois (1 avec glissando vers aiguë, 1 avec glissando vers le grave)
- 5 crotales :



technique:

ordinateur Macintosh avec carte son multipiste
6 haut-parleurs + amplification
1 haut-parleur retour pour le percussionniste
5 micros condensateurs sur pieds
table de mixage (5 entrées micro, 6 entrées ligne, 6 sorties, 2 aux-send)

Les 5 Micros sont utilisés de la manière suivante :

2 pour le vibraphone (qui captent en même temps les crotales et les gongs pékinois)
1 pour le TamTam
1 pour les peaux
1 pour les Tempelblocks

Les 5 micros arrivent sur la table de mixage et sont envoyés par un AUX dans l'entrée numéro 1 de la carte son.

Les 6 sortie ligne de la carte son arrivent également sur la table de mixage.

Les 6 sorties de la table (groupes) envoient directement sur les haut-parleurs 1-6 (voir schéma).

L'amplification de la percussion se fait uniquement par les haut-parleurs 3 et 4.

Le signal de l'électronique est envoyé par un autre AUX sur le moniteur-retour à côté de l'instrumentiste.

Placement des haut-parleurs :

les HP 1 et 2 se trouvent derrière les instruments. Les HP 3 et 4 forment avec les HP 5 et 6 un carré autour du public.

Le déclenchement des séquences se fera par le compositeur ou un autre musicien directement sur l'ordinateur, qui sera placé à côté de la table de mixage.

