

Saxono-vibramatriphonics

Trio for a saxophonist, a vibraphonist, and the
Sonomatrix

Rob Waring

2001

duration: 23 min.

Commissioned by NICEM with support from
Det Norske Komponistfond

The first performance was given by Rolf Erik Nystrøm and
Rob Waring on the 7th of October, 2002 at Parkteatret in Oslo, Norway
during the Ultima International Festival for Contemporary Music

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Notes About the Score

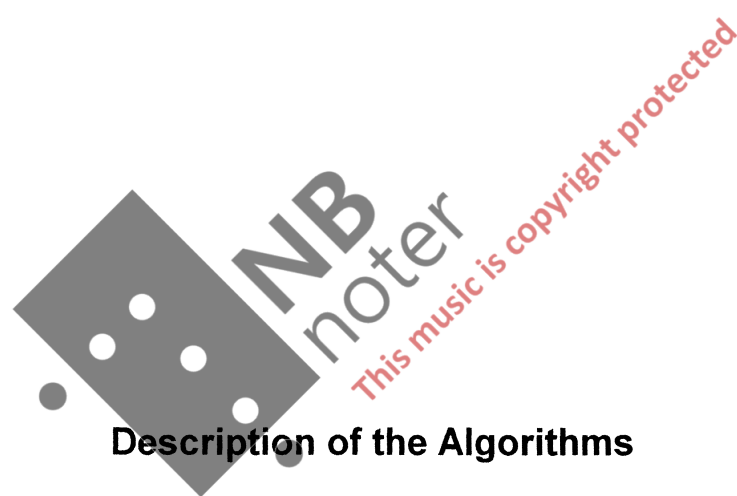
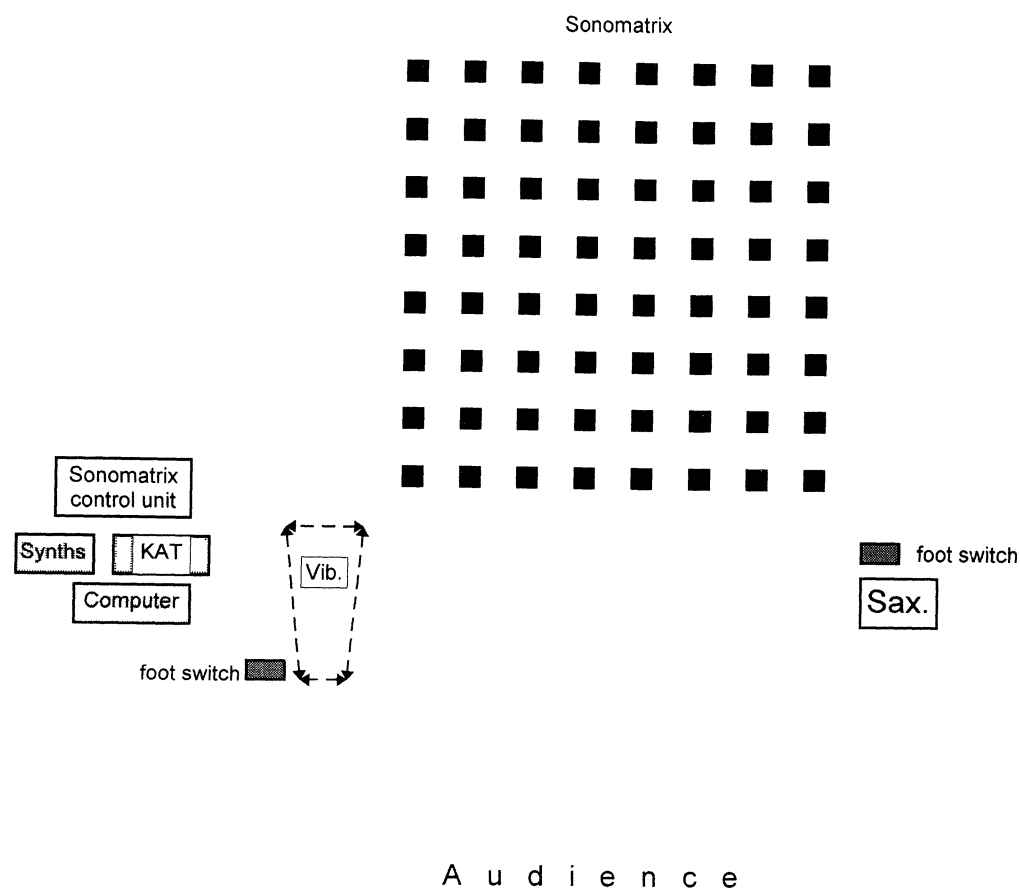
- Accidentals apply for 1 whole measure in the octave in which they occur.
- The saxophonist plays baritone, alto, and soprano saxophones. The score is transposed.
- The piece is divided into 6 parts. In the score, the role of the Sonomatrix is indicated in different ways in each part:
 - In **Part I**, the Sonomatrix generates irregular repetitions of the notes played by the vibraphone. This is indicated graphically in the score. In the transition to Part II, a soundfile, triggered by the vibraphonist, is diffused by the Sonomatrix. This is also indicated graphically.
 - In **Part II**, the 2 musicians play independently of each other. There are 2 scores here: Sax/Sonomatrix and Vib./Sonomatrix. At specific places in their respective parts, each musician triggers the Sonomatrix, which generates a rapid stream of notes that race through the matrix. This is shown in the score. Each time the Sonomatrix is triggered, it interrupts the previous stream of notes. (This is not shown in the score.)
 - In **Part III**, the 2 musicians play independently of each other. There are separate scores for the Sax and the Vib. which have no rhythmic correlation. The vibraphone plays in time to the Sonomatrix, which uses a «bouncing ball» algorithm to generate a rhythmic accompaniment. *The Sonomatrix is not indicated in the score in Part III*, but the «bouncing ball» algorithm is described below. (See **Description of the Algorithms**.)
 - In **Part IV**, the Sonomatrix diffuses a 2-channel soundfile. *The Sonomatrix is not indicated in the score in Part IV*. The vibraphone part is notated without note stems. The timing and phrasing is left up to the performer.
 - In **Part V**, the Sonomatrix acts as one of three voices in a canon. This is indicated with traditional notation until bar 133. From that point on, the rhythmic structure is indicated only graphically.
 - In **Part VI**, the Sonomatrix uses an algorithm to generate the timing and pitches of strummed chords. A visual impression of this is notated in the score as an example, but the actual pitches and timing will be different with every performance.



Performance Notes

- The Sonomatrix is a sound installation which consists of 64 loudspeakers that either lie on the floor or are suspended vertically in an 8x8 matrix. Each speaker has a 3-color LED. Computer-controlled diffusion of sound through the system enables the creation of musical structures involving ever-changing patterns of motion. The Sonomatrix accepts 2 channels of sound. At any moment, each speaker can play channel 1, channel 2, both, or neither. When a speaker plays channel 1, its LED lights red. When it plays channel 2, its LED lights green. When it plays both, its LED lights yellow.
- The sounds that are diffused by the Sonomatrix come from 2 synthesizers, a sampler, and 2 soundfiles on the computer harddisk. The Sonomatrix controls the synthesizers and sampler via MIDI.
- The musicians send signals to the Sonomatrix via MIDI. For this purpose, the vibraphone is equipped with a K&K MIDI Master, and each musician has a foot switch connected to a KAT MIDI controller. A PC running Visual Basic and Infinity controls the flow and manipulation of MIDI signals between the performers, the synthesizers, and the Sonomatrix. (See **MIDI Setup**.) A separate protocol for diffusion is sent from the PC's printer port to the Sonomatrix control unit.
- In the setup illustrated below, the Sonomatrix is hung vertically. The audience sits facing the wall of speakers, and the two musicians stand just below it, on either side of the matrix. An alternative to this is to lay the Sonomatrix on the floor in an amphitheater, with the musicians standing on either side and the audience sitting all around, looking down on the stage. In either case, the room must be dark for the LEDs on the speakers to be visible.

Stage Setup



Description of the Algorithms

- In **Part I**, the computer receives MIDI Note ON messages from the vibraphone on channel 1. The «Irregular Repeat» algorithm generates irregular repetitions of each pitch played by the vibraphone. Both the timing and the dynamics of the repetitions are controlled by random number operations, and will therefore be different with each performance. Each pitch is assigned a MIDI channel and triggers a particular synthesizer patch through all of its repetitions. The vibraphone pedal must be depressed for this process to take place, and all repetitions are turned off when the pedal is released. Each pitch has a counter which stops it from repeating after a particular number of times, if the pedal is not released first.

The Sonomatrix uses a preordained mapping of pitch to position, and turns on speakers in the matrix according to the pitches played. In the **transition to Part II**, the vibraphonist triggers a soundfile, which starts on the same pitch as the one held by the saxophone, then gradually evolves into a complex timbre. During this evolution, the speakers are switched on, one by one, in a spiral motion starting from the lower left-hand corner and moving clockwise in towards the center. When all 64 speakers are playing, the Sonomatrix granulates the sound by rapidly switching speakers on and off, gradually allowing fewer and fewer to be switched on again, until the sound disappears altogether.

- In **Part II**, the saxophonist's foot switch and the vibraphone's highest 5 notes (C# - F) trigger the «Rapid Run» algorithm to generate a stream of pitches. Each pitch in a run is played through one speaker. With each new pitch, a new speaker is turned on. The sound moves by randomly changing direction, while always moving to adjacent speakers. The runs triggered by the saxophonist have a distinctive timbre and the speakers are lit green, and those of the vibraphonist have a different timbre and the speakers are lit red. Each run starts loudly and makes a gradual diminuendo. If one of the musicians triggers a run before a previous run is finished, the earlier run is aborted. Occasionally, a run begins by repeating one note for a while. This happens unpredictably.

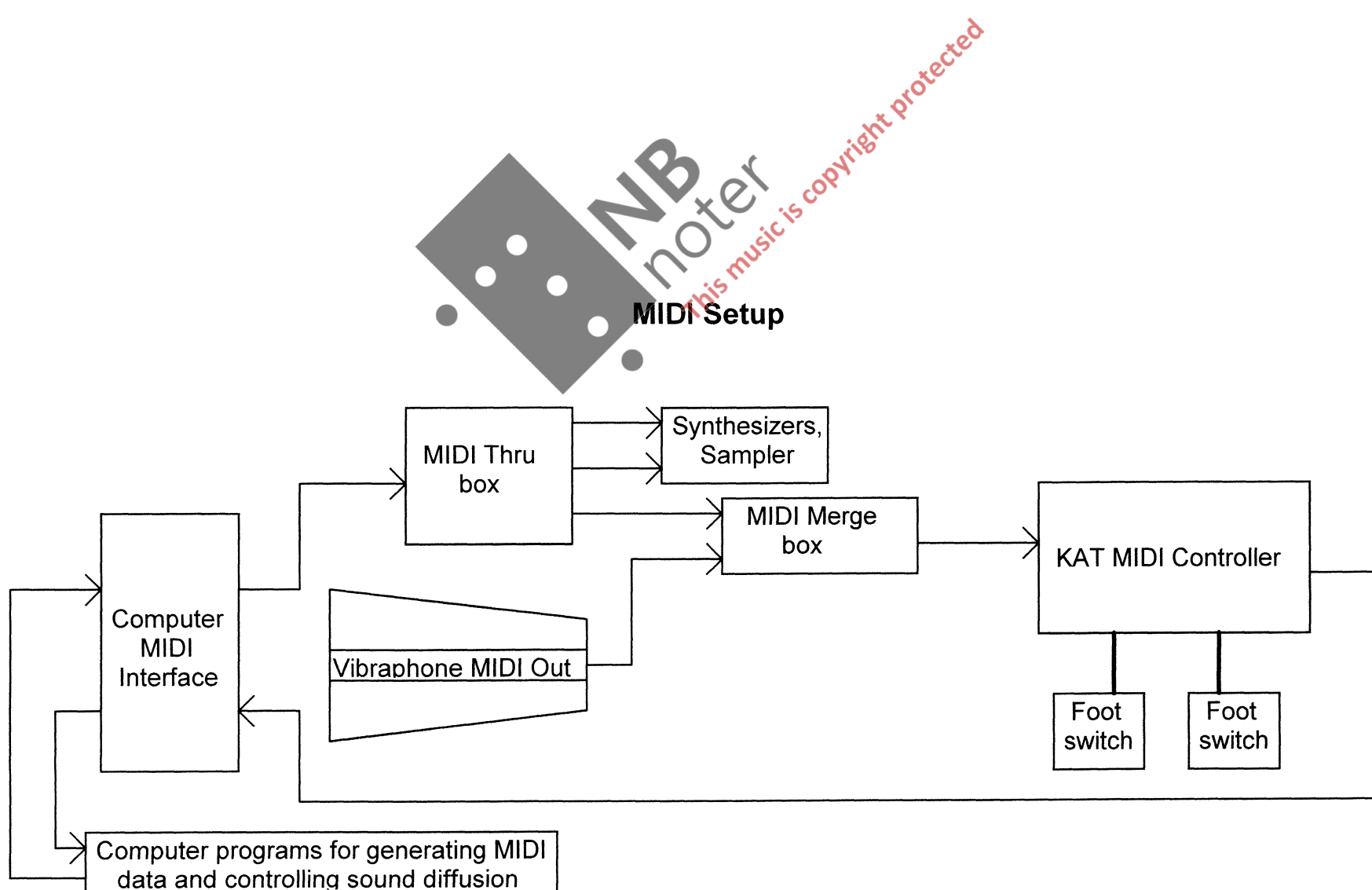
- In **Part III**, the «Bouncing Ball» algorithm creates a rhythmic accompaniment. The program sets a virtual ball in motion through the matrix, sending a MIDI note at each position. When the ball reaches one of the outer rows of the matrix (top, bottom, left and right), it bounces and starts off in a new direction. Random operations vary the ball's speed, and decide which way it bounces, which in turn creates rhythmic and melodic variations. The sounds triggered on the outer rows of the matrix are clearly accentuated.

When the saxophonist's foot switch is depressed, the «Bouncing Ball» algorithm is paused. When it is released, the algorithm resumes.

- In **Part IV**, the Sonomatrix diffuses a 2-channel soundfile. Each channel plays a unique timbre whose frequency components vary dynamically over time. The diffusion takes the form of two snakes (channel one is red, channel 2 is green) which move freely through the matrix, changing length and speed. When the 2 snakes overlap, the LEDs light yellow. The fact that the length (i.e., number of speakers) of the snakes changes means that their amplitudes change in relation to one another.

The 2 timbres are unique, but together they constitute a third timbre which has a different character than either of the 2 alone.

- In **Part V**, the «Strum» algorithm generates the timing and pitches of strummed chords, which, due to random factors, will be different with every performance. Each chord has 8 notes and each note activates one speaker in each column of the matrix. Thus, a trail of LEDs streaks across the matrix with each strum. The algorithm generates the pitches of each chord, decides how long it is held, and how long a pause there will be until the next strum.



In Part I, the Sonomatrix generates irregular repetitions of the notes played by the vibraphone. Due to random factors in this algorithm, the timing will be different with every performance. The score attempts only to give a visual impression.

Part I

Rob Waring

♩ = 50

Sopranino Sax.

Vibraphone

Sonomatrix

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Spn. sax.

Vib.

Sono.

Transition to Part II

Spn. sax.

Vib.

Sono.

Adagio *molto accelerando a* ----- ♩ = 69

[Trigger sndfile #1]

ff *Ped.* 9

pf *senza ped.* 9 *vary speed ad. lib.* -----

Spn. sax.

Vib.

Sono.

[Change to Baritone Sax.] (♩ = 138)

various speed ad. lib. -----

9 4 5 6 7

senza ped. -----

Vib.

Sono.

[The Bari. Sax begins Part II independantly]

In Part II, the saxophone and vibraphone each have a list of phrases which they play independently of each other. The phrases can be chosen in any order. On the last note of each phrase, the Sonomatrix is triggered and plays a rapid stream of notes. The musicians continue choosing phrases and triggering the Sonomatrix until the saxophonist gives a signal to end Part II as follows:

There are 3 saxophone phrases that end on the note Ab (phrases 7, 8, and 9). The saxophonist uses these to signal that Part II is nearing its conclusion. For the final cue, the Ab is held while the vibraphonist triggers the Sonomatrix to begin Part III.

There are 2 scores for Part II: Sax./Sonomatrix and Vib./Sonomatrix. Each follows its own progression in time. They are not coordinated.

Part II (A)

Phrase 1

Baritone Saxophone $\text{♩} = c.96$

f

B. Sx. rep. ad lib.

Sono. *

[alternative to measure 4, ad lib. except last time]:

B. Sx.

Phrase 2

B. Sx.

B. Sx. rep. ad lib.

* The actual pitches are generated by the Sonomatrix in real time. See the performance notes.

B. Sx. 8

Sono.

Phrase 3

B. Sx.

Sono.

Phrase 4

B. Sx.

6 rep. ad lib.

B. Sx.

Sono.

Phrase 5

B. Sx.

Sono.

Phrase 6

B. Sx.

Sono.

Phrase 7

B. Sx.

Phrase 8

B. Sx.

Phrase 9

B. Sx.

The saxophonist uses phrases 7, 8, and 9 to signal that Part II is nearing its conclusion. He gives the cue to go on to Part III by holding an Ab after playing one of these phrases. The Sonomatrix plays the "bouncing ball" algorithm, creating a rhythmic accompaniment. The vibraphonist plays in time with the Sonomatrix, but the saxophonist is rhythmically independent and plays his part ad libitum.

The saxophonist has a pedal that pauses the "bouncing ball" algorithm. He can use this ad lib. in addition to the 2 places that are indicated in the score. On the last note, the pedal pauses the "bouncing ball" while the vibraphonist triggers the start of Part IV.

The score for Part III is divided into III(A) for baritone saxophone and III(B) for vibraphone. There is no rhythmic correlation between them, except for 2 saxophone cues in the vibraphone part. The Sonomatrix generates its own part in real time. It is therefore not notated, but the principles governing the "bouncing ball" algorithm are explained in the performance notes.

Part II (B)

Phrase 1

Vib.

$\text{♩} = c.132$

f

3 rep ad lib. 3 3 3

rep. ad lib. bars 1 to 4

3

Vib.

Sono.

* The actual pitches are generated by the Sonomatrix in real time. See the performance notes.

Phrase 2

Vib.

4 rep. ad lib.

Vib.

Sono.

Phrase 3

Vib.

Vib.

Sono.

Phrase 4

Vib.

Vib.

Sono.

Phrase 5

Vib.

Vib.

Sono.

Phrase 6

Vib.

Sono.



Phrase 7

Phrase 8

The saxophonist uses phrases 7, 8, and 9 to signal that Part II is nearing its conclusion. He gives the cue to go on to Part III by holding an Ab after playing one of these phrases. The Sonomatrix plays the "bouncing ball" algorithm, creating a rhythmic accompaniment. The vibraphonist plays in time with the Sonomatrix, but the saxophonist is rhythmically independent and plays his part ad libitum.

The saxophonist has a pedal that pauses the "bouncing ball" algorithm. He can use this ad lib. in addition to the 2 places that are indicated in the score. On the last note, the pedal pauses the "bouncing ball" while the vibraphonist triggers the start of Part IV.

The score for Part III is divided into III(A) for baritone saxophone and III(B) for vibraphone. There is no rhythmic correlation between them, except for 2 saxophone cues in the vibraphone part. The Sonomatrix generates its own part in real time. It is therefore not notated, but the principles governing the "bouncing ball" algorithm are explained in the performance notes.

[Performance note: The long F notes are played in different ways ad lib.: with/without vibrato, with alternate fingerings, with multiphonics, with circular breathing, with voice, etc. The saxophonist uses a foot pedal to pause the Sonomatrix' "bouncing ball" algorithm. This can be used ad lib. in addition to the 2 places indicated in the score.]

Part III(A)

Rhythm and dynamics ad libitum

a c c e l e r a n d o - - - -

B. Sax.

Ad libitum

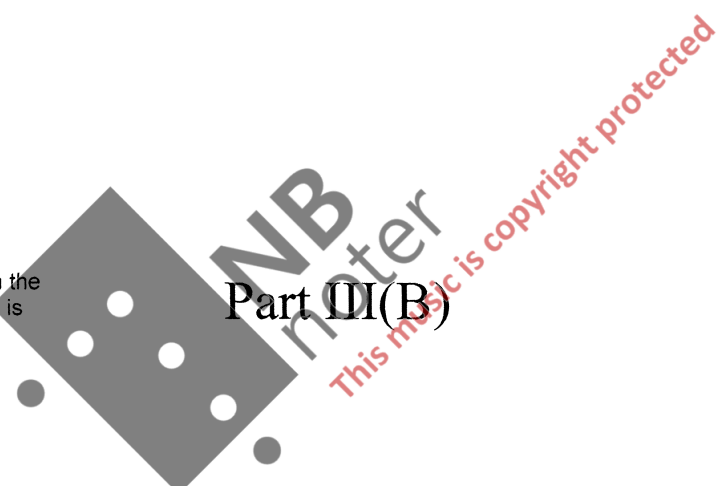
B. Sax.

B. Sax.

B. Sax.

[Performance note: The vibraphonist plays in time with the Sonomatrix "bouncing ball" algorithm. The saxophonist is rhythmically independent.]

Part III(B)



Baritone Sax.

Vibraphone

Vib.

Vib.

Cue:

a c c e l e r a n d o - - - -

B. Sx. 

Vib. 

Vib. 

Vib. 

[Ending: The saxophonist pauses "bouncing ball" and holds the last note while the vibraphonist triggers soundfile to start Part IV.]

Part IV "Spirals"

Rhythm and dynamics ad libitum *

Vibraphone 

Vib. 

Vib. 

Vib. 

* [The vibraphone begins playing after the swell in the soundfile at 35". The soundfile lasts for 3'09". The vibraphone continues playing after the soundfile is finished and the Sonomatrix has started playing Part V. The vibraphone stops ad libitum somewhere before bar 21 in Part V.]

V. "Canon"

$\text{♩} = 150$

Sonmatrix

mp

A. Sax.

mp

Sono.

A. Sax.

mp

Vib.

Sono.

A. Sax.

mp

Vib.

Sono.

A. Sax.

mp

Vib.

Sono.

45

A. Sax.

Vib.

Sono.

54

A. Sax.

Vib.

Sono.

mf

62

A. Sax.

Vib.

Sono.

mf

67

A. Sax.

Vib.

Sono.

mf

72

A. Sax.

Vib.

Sono.

76

A. Sax.

Vib.

Sono.

80

A. Sax.

Vib.

Sono.

84

A. Sax.

Vib.

Sono.

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88

A. Sax.

Vib.

Sono.

92

A. Sax.

Vib.

Sono.

96

A. Sax.

Vib.

Sono.

100

A. Sax.

Vib.

Sono.

104

A. Sax.

Vib.

Sono.

f

108

A. Sax.

Vib.

Sono.

f

8va

112

A. Sax.

Vib.

Sono.

8va

116

A. Sax.

Vib.

Sono.

f

8va

8va

120

A. Sax.

Vib.

Sono.

8va

124

A. Sax.

Vib.

Sono.

8va

128

A. Sax.

Vib.

Sono.

8va

132

A. Sax.

Vib.

Sono.

b

136

A. Sax. *8va*

Vib. *f* *mf* *f*

Sono.

140

A. Sax. *8va*

Vib. *mf*

Sono.

145

A. Sax. *8va*

Vib.

Sono.

147

A. Sax. *8va*

Vib.

Sono.

150 *gva-*

A. Sax.

Vib.

Sono.

152 *gva-*

A. Sax.

Vib.

Sono.

154 *gva-*

A. Sax.

Vib.

Sono.

156 *gva-*

A. Sax.

Vib.

Sono.

8va

158

A. Sax.

Vib.

Sono.

8va

160

A. Sax.

Vib.

Sono.

8va

162

A. Sax.

Vib.

Sono.

8va

164

A. Sax.

Vib.

Sono.

8va

166

A. Sax.

Vib.

Sono.

168

A. Sax.

Vib.

Sono.

The Sonomatrix generates its part in real time according to the "strum" algorithm (described in the performance notes). Due to random factors in the algorithm, the pitches and timing will be different with every performance. The Sonomatrix part shown here is only meant to give a visual impression. The musicians play independently of the Sonomatrix.

Part VI "Strum"

♩ = c.54

Sopranino Sax

Vibraphone

Sonomatrix

5

S. Sax.

Vib.

Sono.

9

S. Sx.

Vib.

Sono.

mp *crescendo* -----

mp *crescendo* -----

12

S. Sx.

Vib.

Sono.

f

f

sempre simile

15

S. Sx.

Vib.

Sono.

sempre simile

18

S. Sx.

Vib.

Sono.

mf

mf

mp *crescendo* -----

mp *crescendo* -----

sempre simile

22

S. Sx.

Vib.

Sono.

f

5

5

3

3

25

S. Sx.

Vib.

Sono.

6

3

5

6

3

5

28

S. Sx.

Vib.

Sono.

mf

mf

5

6

3

5

6

3

32

S. Sx.

Vib.

Sono.

mp *crescendo*

mp *crescendo*

ff

ff

5

5

5

5

[The vibraphonist stops the sonomatrix.]