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# ZAMAK

(2016)

For Sensor Augmented Bass Clarinet Research,  
Live Electronics and Video



Edgar Barroso

# ZAMAK

For Sensor Augmented Bass Clarinet (SABRe), Live Video and Electronics

To Matthias Müller

Edgar Barroso  
January 02, 2015 - Dec 31 2015  
Zurich, Switzerland

9.1"  
0.0"

**♩ = 60**

**♩ = Ad libitum**  
*As hectic and erratic as possible*  
Only Key Clicks (sensors).  
Play notes with normal fingering.

2

Repeated interval \*

3

\*

9:8

4

Bass Clarinet in B $\flat$

Gesture should match the sonic and visual outcome dynamic

Prepare Event

Key clicks sensors

1

Trigger

Every note is mapped with a dynamic buffer sound.  
Every time you press a certain fingering, different sounds should be heard.  
Expect hectic/erratic sounds.

Sound Processes / Electronics

Every note is mapped with a dynamic video file and speed variation.  
Every time you press a certain fingering, different video/images will appear.  
Expect hectic/erratic images.

Video

**f**

22.3"

5

6

B. Cl.

Key clicks / Triggers

5

Different sets of sounds.

Sound Processes / Electronics

Different sets of Videos.

Video

**f**



♩ = 55 (aprox)  
1'00.2" Stay as long as you feel comfortable

B. Cl. *mf* *f* *f* *mf* *f* *mp* *mf*

*p* *p* *p* *p* *p* *p* *p*

Sensors Trigger

15 17

Very quiet low pedal (under water)  
SF player attached to the amplitude of the clarinet

Sound Processes / Electronics

*mf* *f* *f* *mf* *f* *mp* *mf*

*p* *p* *p* *p* *p* *p* *p*

Interactive / Generative video controlled by the amplitude of the clarinet

Video

*mf* *f* *mp* *mf*

*p* *p* *p* *p* *p* *p* *p*

Key clicks only 7:4

Key clicks 7:4

Key clicks triggers audio buffers 7:4

Key clicks triggers video buffers 7:4

*f* *mp*

*f* *mp*

*f* *mp*

*f* *mp*

Random  
\* Key clicks, no air involved

1'16.6"

B. Cl. *mp* *ff* *mp* *ff* *mp* *ff* *mf* *ff*

Key clicks / Pressure

Sensors Triggers

19

[Process] Key clicks will be amplified and will have enhance high frequencies. A slight reverb will be added and random delays will fill give audio content to the video particles.

Sound Processes / Electronics

[Generative] Key clicks control the appearence of random particles and pressure sensor controls radius of concentration (density)

\* The air pressure will distored the video in random ways (speed, color, deformation)

Video

Ordinary Playing

Ordinary Playing

Ordinary Playing

Ordinary Playing

1'27.7" only Key Clicks

Bass Clar. *f mp f p mf f*

Sensors Triggers

Sound Processes / Electronics

Video

23 [Reactive-Control] Change the behaviour and type of the particles

25 All process off

\* The air pressure sensor will distorted the video in random ways (speed, color, deformation)

1'39.5" only K.C.

Bass Clar. *f*

Sensors Triggers

Sound Processes / Electronics

Video

26 [Reactive-Control] Change set of sound files in buffer. Conotinue the same dynamic than in bar 23 and 24.

[Fix media] Tape layer.

[Generative-Fixed Visual Media] Change the behaviour and type of the particles. Add a layer of fixed video. Switch back and forth between the opacity ofrom the two types of visual material.

Air pressure sensor will distorted the video in random ways (speed, color, deformation, opacity)

27 only K.C.

28

1'49.4"

B. Cl. *mp* *f* *ff* *mp* *p < ff* *pp*

5:4 9:8 5:4 5:4 5:4 6:4

29 30

Sensors Trigger *(SP) Clarinet with a small reverb / Random repetitions of short fragments of the material .* *(SF Play) Background Texture*

Sound Processes / Electronics

Video *No video*

*(BS) Tigger dynamic buffer samples*

T1 T2

2'02.0"

B. Cl. *pp* *f* *pp* *f* *pp* *f*

7:4 3:2 5:4 7:4 4:6 4:6 5:4

31 32

Sensors Trigger *(BS) Tigger dynamic buffer samples*

Sound Processes / Electronics *(SP) Clarinet with a small reverb / Random repetitions of short fragments of the material .* *(SF Play) Background Texture*

Video *No video*

*(BS) Tigger dynamic buffer samples*

*Low Pedal*

Mix of air and pitch

2'11.8"

B. Cl. 33

Sensors Trigger

Sound Processes / Electronics

Video

34

5:4

9:8

9:8

ppp

mf

mf

ff

4:6

4:6

mf

ff

5/4

4/4

4/4

2/4

5/4

4/4

4/4

2/4

5/4

4/4

4/4

2/4

Mix of air and pitch

2'22.7"

B. Cl. 35

Sensors Trigger

Sound Processes / Electronics

Video

36

9:8

9:8

ppp

mf

pp

mf

ff

4:6

4:6

mp

pp

f

pp

f

f

37

38

2/4

3/4

2/4

3/4

2/4

3/4

2/4

3/4

2/4

3/4

pp

f

pp

f

f

(GV) The amplitude of the clarinet controls de density of the particle's behaviour

2'32.5"

7:4 7:4 7:4 4:6 4:6 5:4 5:4 7

B. Cl. *pp* *f* *pp* *f* *f* *pp* *f* *pp* *f* *f* *pp* *f* *mp* *mp* *mf* *mp*

Sensors Trigger 39

Clarinet Reverb / Random (Abrupt / Scarce)  
Electronic sounds

Sound Processes / Electronics 39

Video 39

2'40.1"

6:4

B. Cl. *p* < *f* *pp* < *ff* > *ppp* *ff* *f* *pp* *pp* *pp* *pp* *pp* *pp* *pp* *f*

*subito*

Airy Sound → Sound

Sensors Trigger X 43  
(SF Player)  
(SP) Only Reverb  
Synthethizer Harmonizer

Sound Processes / Electronics 43

Video 43



2'50.0"

B. Cl. 44

*mf* *f* *p* *f* *p* *f* *p* *f* *ff*

Sensors Trigger

44a T1

44b X

44c X

T2

(BP) Short random playback features (velocity, back and forth, etc.)

45a X

45b X

T2

(BP) Short random playback features (velocity, back and forth, etc.)

Sound Processes / Electronics

(SF) Player (SP) Reverb

*f*

(VP) Very short snippets of video

*f*

(BP) Short random playback features (velocity, back and forth, etc.)

*ff*

Video

*f*

(VP) Stream of random snippets of video with diverse playback features (velocity, back and forth, etc.)

2'58.7"

B. Cl. 46

*pp* *f* *p* *f* *p* *f* *p* *f* *f*

Vary speed

Sensors Trigger

46 X

49 X

(SP) A poliphonic "synthetizer" controlled by the movement sensor. Movement affects mainly frequency and timbre parameters.

Sound Processes / Electronics

(SF) Player

(VP) Stream of random snippets of video with diverse playback features (velocity, back and forth, etc.) Opacity will be controlled by X and Y axis of the movement sensor

(SF) Player

Video

3'10.7"

B. Cl. 50

Electronics 50

Sound Processes / Electronics 50

Video 50

*pp* *f* *pp* *f* *ff* *pp* *subito* *ff*

(SF Player)  
(SP) A poliphonic "synthetizer" controlled by all the axis of the movement sensor. Movement affects mainly frequency and timbre parameters.

(Off) Subito

(Off) Subito

3'21.6"

B. Cl. 53

Electronics 53a 53b 54a 54b 54c 54d

Sound Processes / Electronics 53a 53b 54a 54b 54c 54d

Video 53a 53b 54a 54b 54c 54d

*pp* *subito* *p* *ff* *mp* *f* *ff* *pp* *f* *ff*

As hectic and erratic as possible

Repeated interval

(SF Player)  
(SP) A poliphonic "synthetizer" controlled by all the axis of the movement sensor. Movement affects mainly frequency and timbre parameters. Volume is controlled with clarinet's amplitude

(VP) Stream of running of video with diverse playback features (velocity, back and forth, etc.) Opacity will be controlled by amplitude of the clarinet

Only Key Clicks (sensors).

Every note is mapped with a dynamic buffer sound. Every time you press a certain fingering, diferent sounds should be heard. Expect hectic/erratic sounds.

Every note is mapped with a dynamic video file and speed variation. Every time you press a certain fingering, diferent video/images will appear. Expect hectic/erratic images.

(Off) Subito

(Off) Subito

3'29.3"

B. Cl. 55 56 57

Electronics 55 56a 56b 57a 57b

Electronics Soft white noise (SF player) Trigger for discrete individual sounds

Video Coming back and forth from one stream of video to random individual snippets

Key Keys & Mov. Sensor Air Pressure Sens.



3'42.5"

B. Cl. 58 59 60

Sensors / Triggers. 58 59 60a 60b 60c

Electronics Clarinet amplitude/pressure controls volume of the electronics (SF player) Trigger for discrete individual sounds Pressure controls volume of (SF player) Keys trigger snippets of video

Video Clarinet amplitude/pressure controls opacity in stream of video Keys trigger snippets of video

Air Pressure Sens. Key Sensors Pressure Sens.

3'53.0"

B. Cl. 61 62 63 11

Sensors / Triggers. 61 62a 62b 63

Electronics. (SF player) Amplitude of Clarinet controls SF player amplitude. (SF player) Amplitude of Clarinet controls VP opacity. Low deep frequency pedal. The video's opacity will fade in gradually. Everytime a the key sensors are pressed, a video will appear be visible. No Key clicks, means, video is off.

Video

4'02.8"

B. Cl. 64 65 66 67

Sensors / Triggers. 2/4 3/4 2/4

Electronics. Low deep frequency pedal

Video 2/4 3/4 2/4

4'13.7"

68 / Pressure Sensor / No sound

B.C.I.

68 69 70 71

*f* *pp* *pp* *f* *pp* *f* *pp* *pp* *pp* *f* *pp*

*mf*

/ Pressure Sensor / Key Clicks / Trigger  
The movement sensor

/ Pressure Sensor / Key Clicks / Movement / Trigger

Sensors / Triggers.

68 / Pressure Sensor / No sound

70

Electronics

*f* *pp* *f* *pp* *f* *pp* *pp* *pp* *f* *pp*

Video

4'24.7" *mf*



72 73 74 75

*mf* *f* *mf* *f* *mf*

Ord. + Key Clicks Key Clicks Ord. + Keyclicks Key Clicks

Sensors / Triggers.

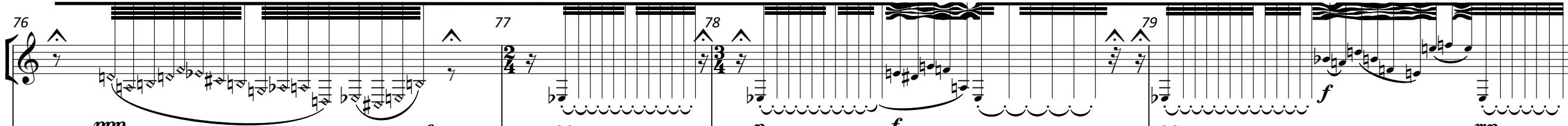
72

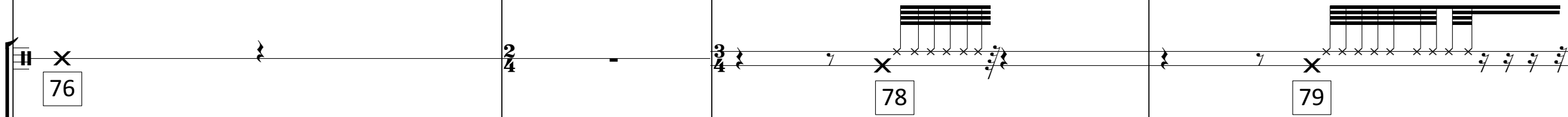
Electronics

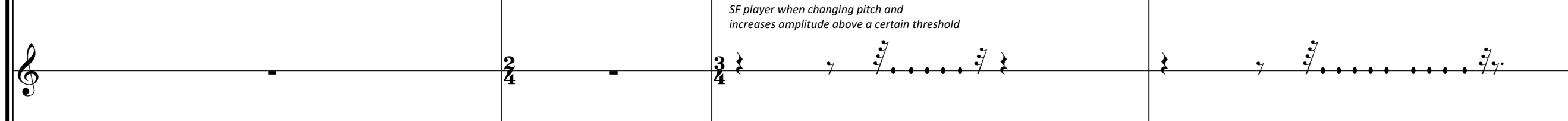
Ord. + Key Clicks Key Clicks Ord. + Keyclicks Key Clicks

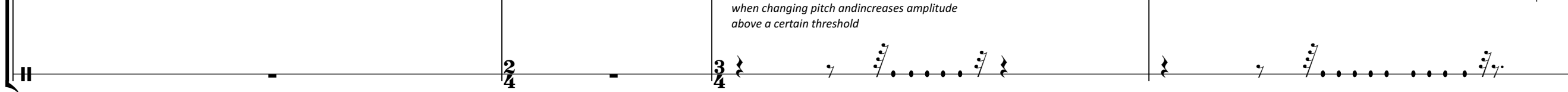
Video

*mf*

B. Cl. 

Sensors / Triggers. 

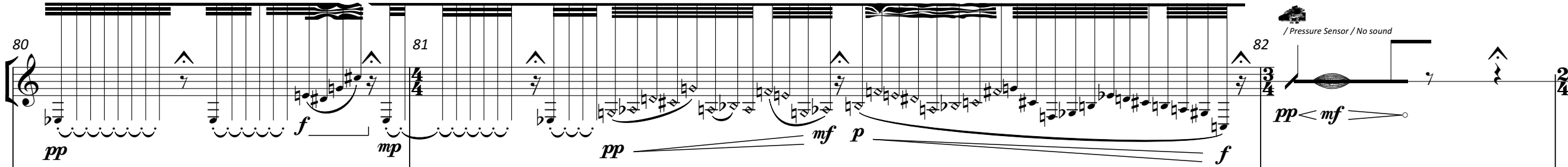
Electronics. 

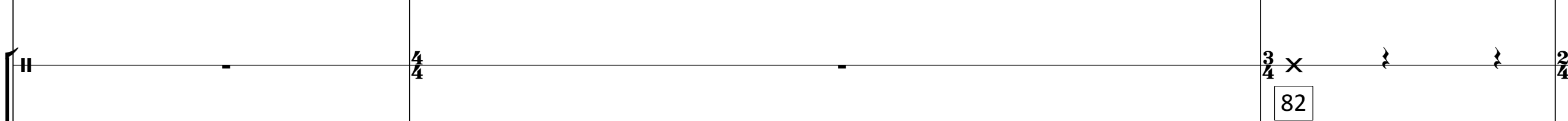
Video 

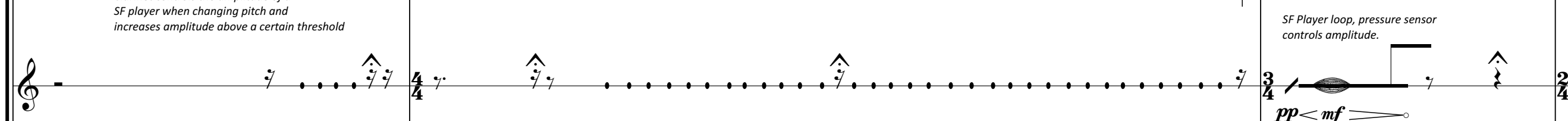
Clarinet controls the amplitude of a SF player when changing pitch and increases amplitude above a certain threshold

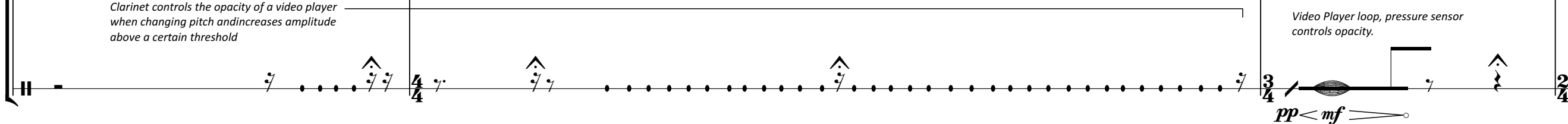
Clarinet controls the opacity of a video player when changing pitch and increases amplitude above a certain threshold



B. Cl. 

Sensors / Triggers. 

Electronics. 

Video 

Clarinet controls the amplitude of a SF player when changing pitch and increases amplitude above a certain threshold

Clarinet controls the opacity of a video player when changing pitch and increases amplitude above a certain threshold

Pressure Sensor / No sound

SF Player loop, pressure sensor controls amplitude.

Video Player loop, pressure sensor controls opacity.

4'56.5" / Pressure Sensor / No sound

83 84 85 86 87

B.C.I. *pp* < *mp* >

Sensors / Triggers

B.C.I. *p* < *f* > *pp* *pp* < *mp* >

Video *p* < *f* > *f* *pp* < *mp* > *pp* < *f* >

*SF Player loop, pressure sensor controls amplitude.*

*Video Player loop, pressure sensor controls opacity.*

*pp SF player independent file, dynamic pedal like sound.*



5'15.5"

88 89 90 91 92 93

B.C.I. *pp* *p* *p* *pp* *pp* < *f* > *pp* *pp* < *f* > *pp*

Sensors / Triggers

88 Change set of sounds

91a Synth + Noise

91b Change set of sounds

91c Change set of sounds

92 Everything off

Electronics *pp* *p* *p* *pp* *pp* < *f* > *pp*

Video *pp* *p* *p* *pp* *pp* < *f* > *pp*

Keyclicks

Pressure Sensor

Ord.

5'44.2" 15

B. Cl. *pp* *f* *pp* *f* *fp* *ff* *p* *mf*

Sensors / Triggers. 94 95a 95b 96

Electronics. *fp* *ff* *p* *mf*

Video *pp* *f* *pp* *fp* *ff* *p* *mf*

Key clicks.

Ord.

*sudden*

Air sound

3:2

Amplitude of the clarinet will control the amplitude of the a fix tape sequence. This section will have a noise-soft texture separated from the audio of the video. A soft fade in-out will be added to the tape

Amplitude of the clarinet will control the opacity and sound volume of the a fix tape sequence. This video will have their own sound to be accompanied by the texture in the tape and the clarinet notes. Expect sudden gestures and sharp sounds, but in a soft volume. A soft fade in-out will be added to the tape and visual (opacity) part.

Connect amplitude of clarinet with video opacity.



6'01.4"

B. Cl. *pp* *f* *mf* *mf* *f* *pp* *mp* *f*

Sensors / Triggers. 100

Electronics. *pp* *f* *mf* *mf* *No electronics*

Video *pp* *f* *mf* *No video, only audio* *f* *pp* *mp* *f*

Random multiphonic glissando

Air sound

Ord.

3:2

No electronics

No video, only audio





7'02.2"  $\text{♩} = 60$

B. Cl. 109 110 Ord. 111 112 113

Sensors / Triggers. 110 111 113

Electronics. mp pp f

Video mp pp f

Clarinet's amplitude is inversely attached to audio's amplitude

Clarinet's amplitude is inversely attached to videos's opacity.

Counterpoint with the audio

Counterpoint with the visuals

Video Opacity (Image) - Sound coming independently from video.

Block visual texture. No soound.

Random multiphonic glissando



7'32.2"

B. Cl. 114 115 116 117 118 119 120

Sensors / Triggers. 114a 114b 115 116 117 118 120a 120b

Electronics. mp f p f mp ff sfz sfz

Video mp f

Inverse Amplitude

Inverse Opacity

No video, only audio

Block sound

Slap Tongue

7'51.6" Subtone.

B. Cl. 121 122 123 124

Sensors / Triggers. 121 122 123

Electronics.

Video

Clarinet Amplitude controls  
Electronics Amplitude

Ord. 3:2

Slap Tongue

Counterpoint with the three inversed voices.

Inverse voices.

Pedal

Original Sound from Video

*mf f mf f mp f mp f p mf P mf P mf P mf P mf*

*mf f mf f pp mp f pp*

*pp mp f pp*

*p mf P mf P mf P mf P mf*



8'12.1" ♩ = 45

B. Cl. 125 126 127

Sensors / Triggers. 125 126a 126b

Electronics.

Video

*ff f*

*mf ff*

*mf ff ff f*

*mf P ff*

5:4 9:8 5:4 5:4

4:6

8'30.9"

128 129 130 131 19

B. Cl. *mp* *f* *pp* *pp* *f* *pp* *f*

Sensors / Triggers. 128 129 130 131a 131b

Electronics. *ff* Link frequency and amplitude to clarinet. Frequency (color) / Amplitude (opacity). Sound Block SF player linked to frequency and amplitude to clarinet. Texture Block

Video *mp* *f*



8'46.3"

132 133 134 135

B. Cl. *p* *ff* *f* *ff* *f* *f* *f* *f* *p* *fff*

Sensors / Triggers. 132 133a 133b 135

Electronics. Texture Block Video linked opacity to clarinet's amplitude. Sound Block SF player linked amplitude to clarinet. SF player linked amplitude and frequency to SABRe. Link frequency and amplitude to clarinet. Frequency (color) / Amplitude (opacity).

Video *ff* *f* *ff* *f* *ff* *f* *ff* *p* *fff*

B. Cl. 136 *ff*

Sensors / Triggers. 5/4

Electronics. 5/4 *ff*

Video 5/4 *ff*

136 5:4 9:8 4:6 9:8 4:6

Lights of the room

137 10/4 *pp mf pp mf pp mf pp mf*

138 5/4

To B. Cl.

Total silence and darkness

137

The idea is that SABRe controls the light of the room, getting total darkness when silence and bring light when playing. Light intensity should be linked to SABRe's amplitude.

139

Using one key-click as a volume controller of the sound of the aelectronics. Use the bell sensor to spatialize the sound in the direction of the arrows.

139 Trigger should stay press to bring sound.

stay in x

*f*

*pp* *pp* *f*

*mp*

*f*

*pp* *pp* *f*

*mp*



Sensors / Triggers. 6/4

Electronics. 6/4

143

Stay in

Vary the speed

*f* *pp* *pp* *ff* *mp* *f* *pp* *p*

143 144 5/4

*p* *mf* *p* *mf*

Vary speed

Stay in

*p* *mf* *p* *mf*

10'43.7"

145 146 147 21

B. Cl. *p* *mf* *pp* *mf* *pp* *f* *p* *f* *p* *f* *p* *mf*

Sensors / Triggers. *mf* *f* *mf* *f* *mp*

Electronics. *mf* *f* *mf* *f* *mp*

Video. *p* *mf* *pp* *mf* *pp* *f* *p* *f* *p* *mf*

Vary speed



11'09.7"

148 149 150 151

B. Cl. *mp*

Sensors / Triggers. *f*

Electronics. Low frequency pedal

Video. *mp* *f*

Trigger sensor becomes the on/off "TV control"

Key-clicks becomes triggers that change the videos

Video with independent audio from tape.

Key-clicks becomes triggers that change the videos

$\text{♩} = 60$

11'32.0"

152

B. Cl.

*f*

5:4

4:6

9:8

5:4

153

Free Improvisation

Suggested pitches to improvise

*mp*

Vary speed

Sensors / Triggers.

152

153a

153b

Electronics.

Video.

11'44.5"

154

B. Cl.

*f*

6/4

155

Free Improvisation

*p* *f*

Suggested pitches to improvise

Sensors / Triggers.

154

155a

155b

Electronics.

Video.

Ord.

11'57.8" 7:4 7:4 5:4 5:4 9:8 9:8 23

B. Cl. 156 157

Sensors / Triggers. 156

Electronics.

Video.

*f* *pp ff* *mp* *f* *mf* *ff* *mf* *ff*

4:6 4:6



Trigger sensor becomes the on/off "TV control"  
Key-clicks becomes triggers that change the videos

12'04.8" change the videos

Key-clicks becomes triggers that change the videos

158 159 160 161

B. Cl.

Sensors / Triggers. 158 TV News

Electronics. High pedal

Video.

Key-clicks becomes triggers that change the videos



12'24.3"  
♩ = 45

*As hectic and erratic as possible*  
*Only Key Clicks (sensors).*  
*Play notes with normal fingering.*

B. Cl. 162 163 164 9:8

*Repeated interval \**

*f* *Gesture should match the sonic and visual outcome dynamic*  
Key clicks sensors

Sensors / Triggers. 5/4 3/4 2/4 3/4

163

Every note is mapped with a dynamic buffer sound.  
Every time you press a certain fingering, diferent sounds should be heard.  
Expect hectic/erratic sounds.

Electronics. 5/4 3/4 2/4 3/4

*f*

Every note is mapped with a dynamic video file and speed variation.  
Every time you press a certain fingering, diferent video/images will appear.  
Expect hectic/erratic images.

Block visual texture. No sound.

Video. 5/4 3/4 2/4 3/4

*f*

12'41.2"

B. Cl. 165 166 167 9:8 7:4 7:4

*f* *pp* *mp* *pp* *f* *ff* *f* *ff* *mf*

Sensors / Triggers. 3/4 4/4 7:4 2/4

165a 165b 167a 167b

Electronics. 3/4 4/4 7:4 2/4

*pp* *ff* *mf*

Video. 3/4 4/4 7:4 2/4

*ff* *mf*

12'53.3"

B. Cl. 168 *f* *mf* *pp* *mp* *pp* 169 *ff* 170 *f* *pp* *ffmp* *f* 171 25

Sensors / Triggers. 168a 168b 169a 169b 169c 169d 169e 170

Electronics. *ff* *mf* *ff*

Video. *ff* *mf* *ff*



13'12.6"

B. Cl. 172 *pp* *ff* 173 *pp* 174 *p* *ff* 175 *pp* *ff* 176

Sensors / Triggers. 172 173 174

Electronics. *p* *f*

Video.

13'27.3"

B. Cl. *ff* *pp* *ff* *mf* *Key Clicks* 9:8

Sensors / Triggers. 177b 177a 177c 178 181a 181b 9:8

Electronics. (SF player) Soft/Grainy/Texture 9:8

Video. 5:4



13'53.6"  
13'45.4"

B. Cl. *mp* *ff* *mp* *ff* *mf* *ff* *ppp* *f* *mf* *ff* 9:8 4:6

Sensors / Triggers. 182a 182b 182c 183a 183b 183c 184a 184b 185 9:8

Electronics. *mp* *mp* *mf* *ppp* *f*

Video. 5:4

Ordinary Playing \*

14'10.5"

B. Cl. 186 *ff* *pp* *ff* 187 *ff* 188 *ff* 27

Sensors / Triggers. 5/4 Trigger 186a 186c 187 2/4

Electronics. 5/4 *pp* *ff* 186b 2/4

Video. 5/4 2/4

7:4 4:6 3:2 9:8 4:6 9:8 4:6



14'26.5"

B. Cl. 189 *pp* *ff* 190 *pp* *ff* 191 *ppp* 192 *fff*

Sensors / Triggers. 2/4 189a 189b 190a 190b 191 3/4 192 2/4

Electronics. 2/4 *pp* *pp* *ff* *ppp* *fff* 2/4

Video. 2/4 *pp* *ff* *ppp* *fff* 2/4

14'43.8" Free improvisation.

194

195

196

197

198

B. Cl.

193

Sensors / Triggers.

193

196

Electronics.

193

Video.

193

196

197

198

Random short audio "glitches".

199 14'59.8" The amplitude of the clarinet controls the intensity of the lights of the stage if possible.

201

203

Perc.

199

200

201

202

203

*p* *mp* *mf* *f* *pp* *mp* *f* *f* *p* *f* *p* *mf* *p* *f* *f* *f* *mf* *f*

Total darkness and silence.

Sensors / Triggers.

199

200

201

202

203

Random Key Clicks

Trigger

Electronics.

199

200

201

202

203

*mf* *p* *pp*

Video.

199

200

201

202

203

Random short video "glitches".

*p*