

# Full Circle

for Trombone and Interactive Electronics

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written for Jeremy Berkman and Benny Sluchin

Duration: 14 minutes.  
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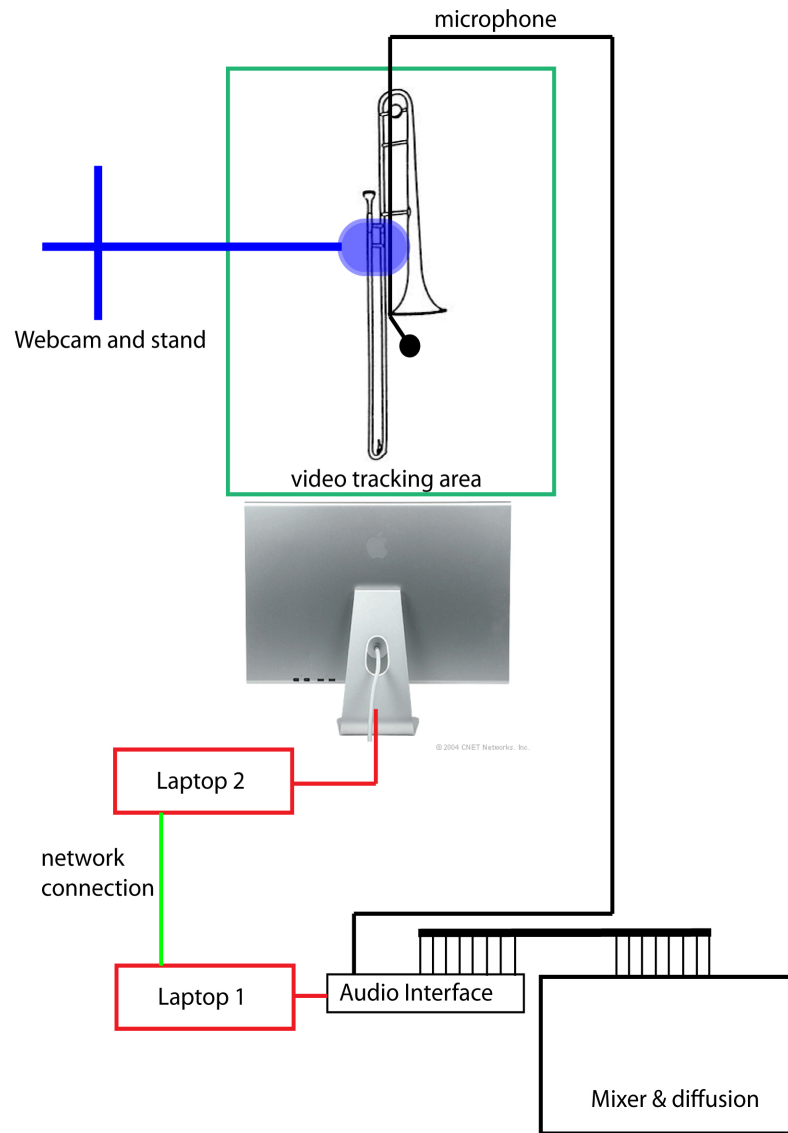
## Technical Requirements

- 2 – Macintosh laptop computers (1 for audio processing running NoteAbilityPro and MaxMSPJitter (version 6.0 or higher) and 1 running NoteAbilityPro for score display for the performer.
- 2 – large screen displays (1 for each laptop)
- 1 – audio interface – with at least 1 mic input and 4 or 8 output channels
- 1 – Webcam (Logitech C900) with spigot for connecting to microphone stand
- 1 – tall microphone boom (capable of being 4 meters above the stage floor)
- 1 – long USB cable (with internal booster)
- 1 – microphone (DPA d:vote 400T) for the trombone
- 1 – mixer (with at least 8 input channels and 8 discrete output channels)
- 8 channel audio system (with speakers positioned around the hall). Optionally, 4 speakers may be used with speakers placed in the corners of the hall.
- 1 – plunger mute (other mutes can also be used in section IV of the composition)

## Technical Notes and Setup

A camera (Logitech C900 or comparable webcam) is mounted on a boom microphone stand and placed above the performer so that the performer and connected by a USB cable to the main computer. A microphone (DPA d:vote 400T or comparable mic) is attached to the bell of the trombone and positioned so that it is still possible to use a plunger mute during the performance. The microphone is connected to the input of an audio interface. The audio interface is connected to Mac laptop Computer 1 via firewire or thunderbolt. Computer 1 is running NoteAbilityPro and MaxMSP. All MaxMSP controls are embedded in NoteAbilityPro score which is running during the performance. Computer 2 is connected to Computer 1 through a closed wireless network and the performer's score is displayed in NoteAbilityPro on Computer 2. One of the large screen displays is placed in front of the performer and the performer reads the score from this screen. The pages on the performer's score are automatically turned by network messages sent from Computer 1.

# Technical Setup Schemata



## Score Notes

R  
M  
L

rotate trombone **R**

breath (exhale)  
(one long breath)

breath (inhale)  
(almost a gasp)

hissing  
(with plunger mute)

*mp*

lip gliss.....

*pp*

move slide silently

(motionless) (move slide silently) (motionless)

The second staff in the score represents rotations of the trombone slide from the center positions (M) to the right (clockwise) and to the Left (counterclockwise.) Rotations to the right and left trigger electroacoustic events

Symbols denoting audible exhale and inhale - the duration of the breath is determined by the length of the line - no specific pitch is required.

Produce an audible hissing sound and change the position of the plunger mute at the same time. The sound should be constantly modulating.

Produce a glissando by altering lip pressure.

Move the slide silently without blowing into the trombone - slide motions will be tracked and produce electroacoustic events

Move the slide as if you are playing the approximate pitches indicated in the rhythm indicated. Electroacoustic sounds will be generated when the slide is moving.

$\text{♩} = 60$   
 breath [exhale] (one long breath)  
 breath [inhale] (almost a gasp)

**Tbn.**  $\frac{2}{4}$

*ppp* *p* *pp* *mp*

**R M L**  $\frac{2}{4}$  rotate trombone

**Max1**  $\frac{2}{4}$

**Max2**  $\frac{2}{4}$

0.250  
 harmPreset 1;  
 sogsVolL 145 2000;  
 matrixPreset 1;  
 loadSamples 1;  
 whichArp 1;  
 samplerMode 1;  
 pitchData 0 3 5 7 9 10 00  
 arpMetro 165;  
 gatherMode 1;  
 spDelayMax 500;  
 sideTrigger 1;

0.708  
 sogsControl 1

1.171  
 arpeggiatorSpan 24;  
 arpeggiatorBase 48;  
 arpeggiatorTime 1500;

page 1

1.093  
 triggerRight 1

1.212  
 triggerLeft 1

**Tbn.** 7  
 hissing (with plunger mute)

*pp*

breath [exhale] plunger: closed → open

*p* *mf*

**R M L**

**Max1**

**Max2**

1.699  
 samplerMode 2

0.333  
 triggerRight 1

0.691  
 triggerLeft 1

12

Tbn. hissing (with plunger mute) , lip gliss....

*mp* *pp*

R M L

Max1

Max2

17

Tbn. , move slide silently

R M L

Max1

Max2

22

Tbn.

pp < p > < ppp > < pp >

move slide silently

breath (exhale)

R  
M  
L

Max1

Max2

1.816 trackSlide 1

1.269 trackSlide 0

27

Tbn.

breath (inhale)

slowly close and open plunger mute...

ppp [vary dynamics ppp to mp].....

R  
M  
L

Max1

Max2

0.477 samplerMode 1; loadSamples 3;

1.291 triggerLeft bang

0.235 triggerRight bang


1.066 sogsControl 0

# MUTE DOWN

32

(breathy tone)  
[quasi gliss]

move slide silently

vib: 

*pp* *pp* *mp* *pp*

R  
M  
L

Max1

Max2

1.970  
trackSlide 1;  
samplerMode 3;

0.113  
trackSlide 0

1.639  
octaveShift 12

37

lightly

*pp* *ppp* *p*

R  
M  
L

Max1

Max2

HARM ON

0.000  
matrixPreset 2

0.077  
triggerRight bang

1.500  
page 3

42

Tbn.

*pp* *mp* *ppp* *p*

R M L

Max1

1.000 trackSlide 1

1.891 trackSlide 0

Max2

0.282 harmToPreset 3

47

Tbn.

(smooth transition to and from flutter)

*pp* *mfpp* *mp* *pp* *p* *ppp*

R M L

Max1

1.309 pitchData 0 1 2 4 7 8 10

Max2

0.250 triggerRight bang

1.000 triggerLeft bang

52

Tbn.

lip gliss.....

*pp*

*ppp*

*p*

R  
M  
L

Max1

1.000  
sideTrigger 0;

1.500  
matrixPreset 3

Max2

57

Tbn.

*mp*

*pp*

*mp*

*pp*

*p*

*mp*

*p*

R  
M  
L

Max1

0.284  
trackSlide 1

Max2

1.500  
page 4

62

Tbn.

*mp* *pp* *mp* *pp* *mp*

R  
M  
L

Max1

Max2

1.158 trackSlide 0

1.435 harmToPreset 4

1.750 octaveShift 0

67

Tbn.

*mp* *mf* *p* *mp* *mf* *p*

R  
M  
L

Max1

Max2

72

Tbn.

*mf* *p* *mf* *mf* *ppp* *pp*

(move slide silently...)

6 6 6 6 6 6

R  
M  
L

Max1

1.817  
loadSamples 4;  
pitchData 0 3 5 7 9 10;

0.897  
whichArp 2;  
samplerMode 3

0.603  
trackSlide 1

1.060  
trackSlide 0

Max2

1.941  
matrixPreset 5

77

Tbn.

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

(smooth transition to and from flutter)

R  
M  
L

Max1

0.679  
sideTrigger 1;

0.750  
loadSamples 5

0.240  
triggerLeft bang

1.267  
triggerRight bang

Max2

1.500  
page 5

82

Tbn. *f* (move slide) *mp* *fp* *mf* *pp*

R  
M  
L

Max1 1.793 samplerMode 2; trackSlide 1 0.134 trackSlide 0

Max2 1.750 sideTrigger 0;

87

Tbn. *p* *pp* *mp* *p* *mp* *pp* *f*

R  
M  
L

Max1 1.000 matrixPreset 4; segsControl 1; harmToPreset 1;

Max2 keep harmonizer on...

plunger mute in

gradually open and close plunger mute

92

Tbn.

R  
M  
L

Max1

Max2

*pp* *mf* *fp* *mf* *pp*

0.639  
sideTrigger 1;

97

Tbn.

R  
M  
L

Max1

Max2

hissing  
(with plunger mute)

*mp* [vary dynamic level]

R

L

breath (inhale)  
(almost a gasp)

0.126  
loadSamples 6;  
samplerMode 3

1.959  
triggerRight bang

0.025  
triggerLeft bang

0.750  
sideTrigger 0;

0.418  
sogsControl 0;  
sogsVolL 0 5000;

1.747  
page 6

4/4

4/4

4/4

4/4



110

Tbn.  $\frac{3}{4}$   $\frac{5}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

R M L  $\frac{3}{4}$   $\frac{5}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

Max1  $\frac{3}{4}$   $\frac{5}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

Max2  $\frac{3}{4}$   $\frac{5}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

*ffp* *mp* *f* *pp*

114

Tbn.  $\frac{4}{4}$   $\frac{5}{4}$   $\frac{5}{8}$   $\frac{3}{4}$   $\frac{5}{8}$

R M L  $\frac{4}{4}$   $\frac{5}{4}$   $\frac{5}{8}$   $\frac{3}{4}$   $\frac{5}{8}$

Max1  $\frac{4}{4}$   $\frac{5}{4}$   $\frac{5}{8}$   $\frac{3}{4}$   $\frac{5}{8}$

Max2  $\frac{4}{4}$   $\frac{5}{4}$   $\frac{5}{8}$   $\frac{3}{4}$   $\frac{5}{8}$

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

BELLS SAMPLES

1.796  
loadSamples 7;  
samplerMode 1;

2.000  
triggerLeft bang

0.583  
loadSamples 12;  
samplerMode 2;

1.086  
sideTrigger 1;

2.000  
page 2;

0.019  
arpeggiatorTime 2000;  
arpeggiatorBase 36;

118

Tbn. *ff* *p* *mp* *pp* *vib:*

R M L

Max1

Max2

2.798 triggerRight bang

0.000 triggerLeft bang

0.097 triggerRight bang

0.570 sideTrigger 0;

1.427 arpeggiatorTime 3000;

0.439 bankPreset 3; pafPreset 10;

124

Tbn. *p* *mf* *p* *mf* *f*

R M L

Max1

Max2

127

Tbn. (motionless) (move slide silently) (motionless)

R M L

Max1

Max2

TROMBONE SAMPLES

1.281  
loadSamples 13;  
samplerMode 3;

2.092  
arpeggiatorBase 60;  
arpeggiatorSpan 24;

3.362  
trackSlide 1;  
sideTrigger 0;

0.373  
trackSlide 0;  
sideTrigger 1;

131

Tbn. (motionless) (move slide silently) (motionless)

R M L

Max1

Max2

GLISS SAMPLES

NEW BELL SAMPLES

2.250  
loadSamples 12;  
samplerMode 2;

1.250  
triggerLeft bang

0.580  
pitchData 4 5 6 7 8 10

1.843  
loadSamples 14;  
samplerMode 1;

2.625  
trackSlide 1;  
sideTrigger 0;

3.625  
trackSlide

*ff* *p* *ffp* *f* *mp* *f*

135

Tbn. *f* *mp* *mf* *pp*

R M L

Max1

Max2

3.500 sideTrigger 1;

1.251 arpeggiatorBase 48; arpeggiatorSpan 24;

0.004 loadSamples 15; samplerMode 3; arpeggiatorTime 2500

0.000 triggerRight bang

PLUNGER SAMPLES

4.000 page 8

139

Tbn. *f* *ff* *f* *ffmp*

R M L

Max1

Max2

0.000 sideTrigger 0;

change to Bb

143

Tbn. *f* *fp*

R  
M  
L

Max1

Max2

0.000  
bankPreset 5;  
pafPreset 11;

146

Tbn. *ff* *mf* *ff* *f*

(motionless) (move slide silently) (motionless)

R  
M  
L

Max1

Max2

0.500  
loadSamples 13;  
samplerMode 3;

0.750  
pitchData 0 1 5 7 8 9

2.967  
trackSlide 1;  
sideTrigger 0;

0.698  
trackSlide 0;

TBN SAMPLES

150

Tbn.

R M L

Max1

Max2

*mf* *ff* *ffp* *ff* *ffp* *f*

1.344 arpeggiatorTime 2000;

1.001 triggerRight bang

1.500 triggerLeft bang

2.561 triggerRight bang

0.000 sideTrigger 1;

5.000 page 9

155

Tbn.

R M L

Max1

Max2

*mp* *ff mp* *ff* *mf*

0.318 matrixPreset 52;

2.500 sideTrigger 0;

158

Tbn. *ff* *mp* *ff p*

R M L

Max1

Max2

1.823

matrixPreset 51;  
loadSamples 11;  
arpeggiatorTime 2000;  
samplerMode 3;

1.750

sideTrigger 1;

161

Tbn. *f* *pp* *p* *quasi gliss...*

R M L

Max1

Max2

0.000

triggerRight bang

3.015

triggerLeft bang

2.340

sideTrigger 0

164

quasi gliss...

Tbn. *mp* *p* *p* *ppp*

R M L  $\frac{4}{4}$   $\frac{5}{4}$

Max1  $\frac{4}{4}$   $\frac{5}{4}$  0.000 matrixPreset 52; 2.057 trackSlide 1

Max2  $\frac{4}{4}$   $\frac{5}{4}$  0.721 loadSamples 17;

167

quasi gliss...

Tbn. *mf* *p* *mp* *pp*

R M L  $\frac{5}{4}$   $\frac{4}{4}$   $\frac{6}{8}$

Max1  $\frac{5}{4}$   $\frac{4}{4}$   $\frac{6}{8}$  0.044 trackSlide 0

Max2  $\frac{5}{4}$   $\frac{4}{4}$   $\frac{6}{8}$  3.000 page 10

170

Tbn. *f* *mp* *f* *pp* *p* quasi gliss...

R M L

Max1 2.500 matrixPreset 53;

Max2

175 [ plunger mute in ] gradually close and open.... open..... closed

Tbn. *mf* *f* *p*

R M L

Max1

Max2

179

gradually open and close plunger mute...      closed      . . . . . open      . . . . . clos

Tbn. *pp* *mp* *pp* *pp* *mp*

R M L

Max1

Max2

184

breath (exhale)  
(one long breath)

gradually open and close plunger mute...

Tbn. *ppp* *ppp* *mp* *pp* *mp* *pp*

R M L

Max1

Max2

0.000  
loadSamples 1;  
samplerMod 3;

0.207  
sideTrigger 1

0.039  
matrixPreset 54;

3.000  
triggerRight bang

1.267  
triggerLeft bang

189

Tbn. *plunger closed . . . . . open* , [ plunger mute down ]

R M L

Max1

Max2

0.088 sideTrigger 0

1.916 arpeggia Base 48

1.512 arpeggia Span 24

page 11

2.019 auRecallPreset\_2 k

auRecallPreset\_1 k

auRecallPreset kh

# III ♩ = 72

194

Tbn.

R M L

Max1

Max2

0.000

matrixPreset 75;  
gatherMode 5;  
whichSpectrum 1;  
trackSlide 1;  
samplerMode 3;  
loadSamples 11;  
arpMetro 1600;  
harmToPreset 3;  
randomToggle1\_1 1;  
spDelayMax 500;  
sideTrigger 0;

198 *espressivo*

Tbn. *p* *p* *pp*<sup>5</sup> *mp* *pp*<sup>5</sup> *mp*

R M L

Max1 0.177  
matrixPreset 76;

Max2

3/4 3/4 3/4



33 60

202

Tbn. *p* *mp* *pp* *p* *mp* *pp*

R M L

Max1 3.060  
gatherMode 5;  
whichSpectrum 2;  
3.237  
matrixPreset 77

Max2

3/4 4/4 6/4 4/4



206

Tbn.  $\frac{4}{4}$

R M L  $\frac{4}{4}$

Max1  $\frac{4}{4}$

Max2  $\frac{4}{4}$

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

210

Tbn.  $\frac{3}{4}$   $\frac{4}{4}$

R M L  $\frac{3}{4}$   $\frac{4}{4}$

Max1  $\frac{3}{4}$   $\frac{4}{4}$

Max2  $\frac{3}{4}$   $\frac{4}{4}$

*mf* *mp* *mf* *p*

213

Tbn.

R M L

Max1

Max2

0.387  
gatherMode 5;  
whichSpectrum 3;

0.296  
harmToPreset 2;

0.287  
matrixPreset 78

5.467  
page 12

*pp* *mp*

217

Tbn.

R M L

Max1

Max2

29 60

0.000  
gatherMode 5;  
whichSpectrum 4;

*mf* *p* *mp* *p* *mp*



222

Tbn.

R M L

Max1

Max2

*pp* *p* *mf* *p* *pp*

3

4/4 5/4

227

Tbn.

R M L

Max1

Max2

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

5

5/4 3/4 4/4 5/4

0.000  
gatherMode 5;  
whichSpectrum 5;

0.059  
matrixPreset 79

3.458  
harmToPreset 5;

231

Tbn. *mf* *f* *mp* *p* *mp*

R M L

Max1 0.500  
harmToPreset 2;

Max2

235

Tbn. *p*

R M L

Max1 0.000  
gatherMode 5;  
whichSpectrum 6;

Max2 2.858  
cameraStop bang;

2.286  
trackSlide 0

3.204  
clearOmax bang;  
resetOmax bang;

# IV

♩ = 90

[omax]

with a steady pulse

239

Tbn.  $\frac{4}{4}$

R M L  $\frac{4}{4}$

Max1  $\frac{4}{4}$

Max2  $\frac{4}{4}$

0.000

```
matrixPreset 100;  
gatherMode 1;  
harmPreset 2;  
arpMetro 165;  
auRecallPreset_1 khBlur2;  
omaxLearn 1;  
trackSlide 0;  
randomToggle1_1 0;  
rotateToggle1_1 1;  
omaxFade 0;  
sideTrigger1 250;  
processGate 1;
```

mf

page 13

243

Tbn.  $\frac{3}{4}$

R M L  $\frac{3}{4}$

Max1  $\frac{3}{4}$

Max2  $\frac{3}{4}$

0.027

```
omaxImprov 1;  
omaxFade 1
```

247

Tbn.

R M L

Max1

Max2

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

$\frac{3}{4}$   $\frac{4}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

$\frac{3}{4}$   $\frac{4}{4}$   $\frac{3}{4}$   $\frac{4}{4}$

251

Tbn.

R M L

Max1

Max2

(improvise against OMax) (circa 2 minutes)

*f* *mf*

0.104 matrixPreset 101;

1.765 matrixPreset 102

1.679 matrixPreset 103

1.979 omaxLearn 0

3.794 page 14

256

Tbn.

*p*

R  
M  
L

Max1

Max2

0.812  
rotateToggle1\_1 0;

2.887  
homeToggle1\_1 1

260

Tbn.

*mp* *f* *fmp* *ff* *p* wide vibrato

R  
M  
L

Max1

Max2

0.000  
omaxImprov 0;  
processGate 0;

0.000  
cameraStart bang;

2/4

2/4

2/4

V<sub>J</sub> = 60

264

Musical score for measures 264-267. The score is divided into four systems: Tbn., R M L, Max1, and Max2. Each system has a 2/4 time signature. The Tbn. staff shows a long note with a dynamic marking of *ppp* and a crescendo to *p*. The R M L staff shows a sequence of notes with dynamic markings *ppp* and *p*, and a red 'L' marking. The Max1 staff shows a sequence of notes with dynamic markings *ppp* and *p*, and a red 'R' marking. The Max2 staff shows a sequence of notes with dynamic markings *ppp* and *p*. A box in the Max1 staff contains the following text: `matrixPreset 125;`, `trackSlide 0;`, `loadSamples 1;`, `samplerMode 3;`, `sogsVolL 143 2000;`, `sogsControl 1;`, `sideTrigger 1;`. A box in the Max1 staff contains the value `1.896` and the text `triggerLeft bang`. A box in the Max1 staff contains the value `0.209` and the text `triggerRight bang`. A box in the Max2 staff contains the value `0.532` and the text `trackSlide 1`.

268

Musical score for measures 268-271. The score is divided into four systems: Tbn., R M L, Max1, and Max2. Each system has a 3/4 time signature. The Tbn. staff shows a long note with a dynamic marking of *ppp* and a crescendo to *p*. The R M L staff shows a sequence of notes with dynamic markings *ppp* and *p*, and a red 'L' marking. The Max1 staff shows a sequence of notes with dynamic markings *ppp* and *p*. The Max2 staff shows a sequence of notes with dynamic markings *ppp* and *p*. A box in the Max1 staff contains the value `0.757` and the text `triggerLeft bang`. A box in the Max2 staff contains the value `0.000` and the text `trackSlide 0`.

271

The musical score consists of two staves: a bass staff (bottom) and a piano staff (top). Both staves are in 2/4 time. The bass staff begins with a whole rest in the first measure, followed by a 4/4 time signature change. It contains several triplet notes, some with accents, and a fermata over a note in the second measure. The piano staff also begins with a whole rest, followed by a 4/4 time signature change. It contains several triplet notes, some with accents, and a fermata over a note in the second measure. A box containing the text "0.249" is positioned above the piano staff in the third measure, with an arrow pointing down to the staff. Below the piano staff, there is a section labeled "Max2" with a 2/4 time signature, followed by a 4/4 time signature change and a bass clef.