

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE INTEGRATION OF THE TUBA AND LIVE ELECTRONICS:
A STUDY IN MIXED MUSIC COMPOSITION

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF MUSIC

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THE INTEGRATION OF THE TUBA AND LIVE ELECTRONICS:
A STUDY IN MIXED MUSIC COMPOSITION

A THESIS APPROVED FOR THE
SCHOOL OF MUSIC

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TABLE OF CONTENTS

Abstract	v
Technical Notes	vi
Score	viii

Abstract

Sharp (2025), for solo tuba and live electronics in Max/MSP, explores the relationship between instrumental performance and partially unpredictable electronic systems. The title derives from the colloquial meaning of *sharp* as a state of alertness and precision, referring not to a musical accidental but to the mental and performative stance required of the performer when engaging with a reactive sonic environment. This notion of sustained attentiveness serves as the conceptual foundation of the work. The piece is conceived as a continuous dialogue between tuba and electronics, understood as interdependent elements within a single musical system. Tension between control and indeterminacy shapes both the performer's experience and the listener's perception. Musically, *Sharp* operates through three interrelated layers: the acoustic tuba, a FM synthesis system governed by controlled randomness, and the interaction between the two through real-time processing. Formal articulation is achieved via presets triggered during performance, producing a fixed macro-structure with variable internal details. As a result, each performance constitutes a unique realization of the work. As the composer's first piece for solo instrument and live electronics, *Sharp* reflects a process of experimentation grounded in real-time digital signal processing. The work functions as an investigation into attention, responsiveness, and interaction, positioning the performer within a living electronic environment that demands constant awareness and adaptability.

Technical Notes

Instrumentation: Tuba and live electronics (Max/MSP)

Required Equipment

<u>Item</u>	<u>Qty.</u>	<u>Notes</u>
Large diaphragm condenser microphone	1	For tuba in sound (AKG C414 or similar)
XLR cables	5	1 for mic → interface; 2 for interface → mixer, 2 for mixer → monitor
Stage speakers (PA System)	2	Stereo output (L/R) for electronics
Mixer	1	Stereo mixing (L/R) for electronics
Laptop Computer	1	Running Max/MSP 9 or later
Headphones	1	For performer audio monitoring
MIDI Keyboard Controller (Optional)	1	MIDI with at least 6 assignable knobs

Signal Flow / Connection Route

Inputs:

Tuba Microphone → 1 × XLR cable → Audio Interface

Outputs:

Audio Interface Outputs (L/R) → 2 × XLR cables → Mixer (Stereo Input: L/R) → PA System

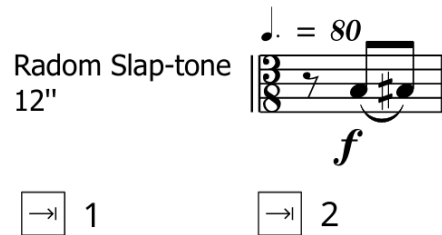
PA System Placement

The instrument and performer should be placed between and behind the speakers, creating an expanded stereo diffusion.

Score Notes

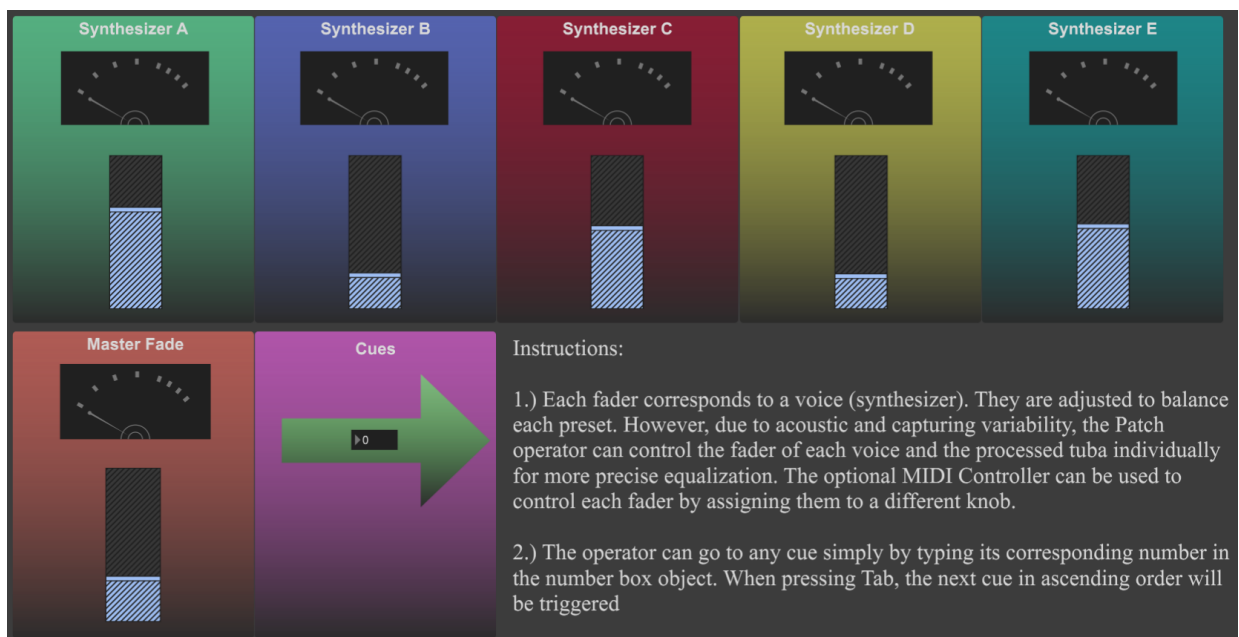
Performance Notes

The performer is required to execute slap-tongues randomly, without concern for specific parameters, as long as it's constant and varied. This should be done for twelve seconds in measures 1, 131, and 162, and for eight seconds in measures 32, 69, and 102. (see image below)



Max Patch Notes

Each preset must be triggered by pressing the Tab key on the computer keyboard, according to its position and order in the score. Below, at the beginning of measure 1, the operator should press the Tab key once to activate Cue 1; in measure 2, the Tab key should be pressed again to activate Cue 2, and so on. The Cue is always triggered at the beginning of the indicated measure. (see image below)



Sharp

for Tuba and Live Electronics

2025

André Pinto

Tuba Radom Slap-tone 12"

$\text{♩} = 80$

f *mf*

1 2

9

f *mf*

18 $\text{♩} = \text{♩}$

f *p* *sf* Flt.

21

mf $\text{♩} = 70$

26

mp

Radom Slap-tone 8"

A

3

33 $\text{♩} = 90$

f *mf* Flt.

4

Sharp

2

42

p *mf* *f*

♩ = 80

47

rall.

mf *f*

♩ = 80

52

mf *f*

60

mf *f*

♩ = 80

66

mf 3

B

69

Radom Slap-tone
8"

p

♩ = 80

→ 5

3

[illegible]

78 

81 $\text{♩} = 70$

The first system of the musical score is written on a single staff with a bass clef. It begins with a key signature of one flat (B-flat) and a common time signature. The tempo is marked as quarter note = 70. The music starts with a forte (*f*) dynamic. The melody consists of several measures, including a half note, a quarter note, and a half note, followed by a measure with a quarter note and a half note. The key signature changes to two sharps (F# and C#) for the next measure, which contains a quarter note and a half note. The key signature then changes to three sharps (F#, C#, and G#) for the final measure, which contains a quarter note and a half note. The dynamic changes to mezzo-forte (*mf*) for the final measure. The system ends with a repeat sign and a first ending bracket.

f *mf*

→ 6

89

p *f*

$\text{♩} = 90$

→ 7

98

mf

3

[illegible]

→ 8

→ 9

Sharp

4

107



→ 10

$\text{♩} = 80$

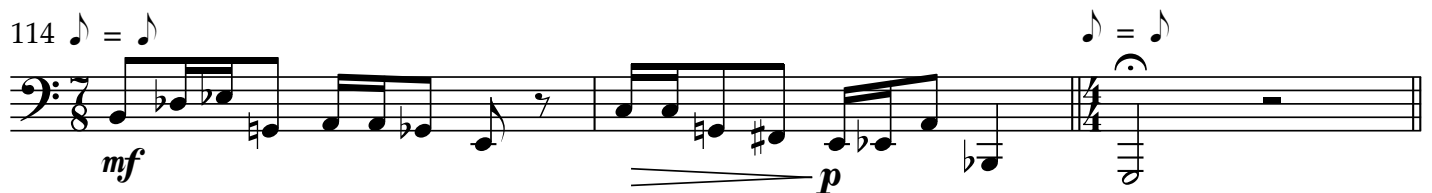
112 senza sord.



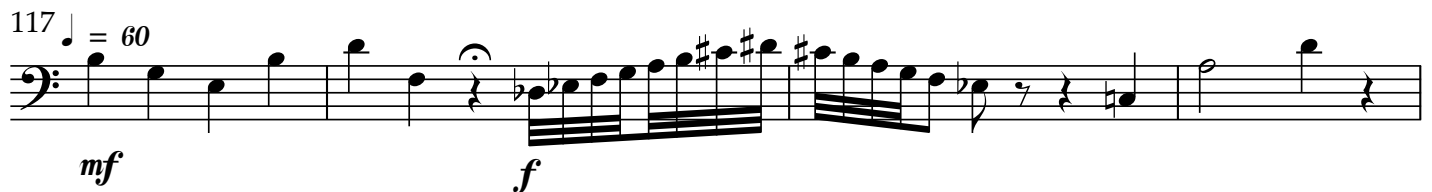
113



114 $\text{♩} = \text{♩}$

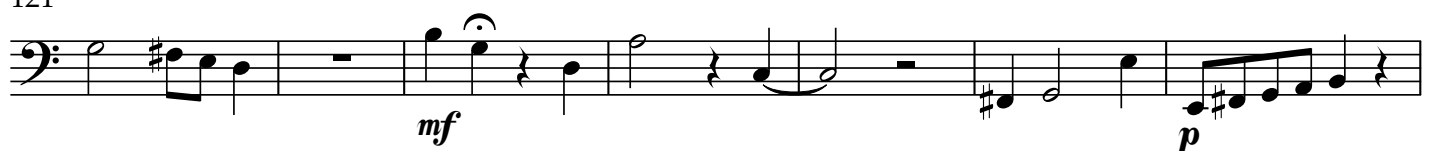


117 $\text{♩} = 60$



→ 11

121



Sharp

5

D

128



Radom Slap-tone
12"



→ 12

→ 13

133



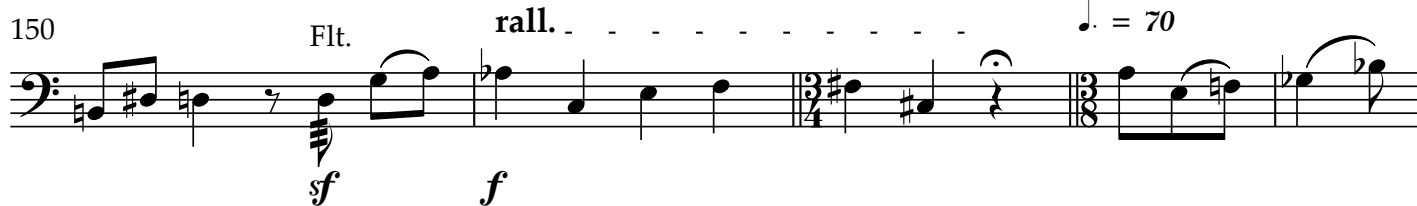
140



147



150



Flt.

rall.

♩. = 70

155



Sharp

6

E

♩. = 90

162

Radom Slap-tone
12"



→ 14

→ 15

171



rall.

♩. = 70

177



182



189



196

rall.



→ 16