KeyGen

(for amplified wind and strings)

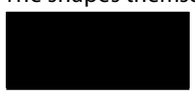
David Cecchetto, 2008

Performance Guidelines

All Instruments:

Vertical dotted lines (which are sometimes rendered in grey to preserve the clarity of the score) indicate sync points between ensemble members.

Where shapes are present, the material is unpitched. In the saxophone and tuba, these shapes alway indicate an air sound; in the violin and contrabass, the shapes should be articulated with the technique indicated. The shapes themselves are indicative of dynamics.



A rectangle, for example, indicates a steady dynamic. Dynamics should always be understood as being in quotation marks, so that a 'ff' air sound in the Tuba refers to the intensity of attack rather than an actual sound level.

indicates 'gradually change to'; for example "CLT 1/2 hair" indicates a gradual change in bowing from wood only to 1/2 hair.

→ Straight horizontal arrows should be read as 'continue until'; for example, the arrow in the electronics part on the first page of the score indicates that the initial ensemble amplification should be sustained (through the commencement of the Record command) until 'amplification off.'

Saxophone:

S.T. indicates sub-tone, and should strongly emphasize the air quality of the pitch

Unpitched air should always be blown through the saxophone with either all keys open (indicated '+') or all keys closed (indicated 'o').
Note: **in Section 6 only**, x-shaped noteheads are used to indicate air sounds

Triangle-shaped noteheads indicate a 'slap tongue' attack, where the resulting sound is more percussive than pitched in character. The technique is matched by the strings 'slap' pizzicato.

Tuba:
Text in quotations (i.e. "sh" or "p") indicates the consonant sound with which the air sound should be attacked. These attacks are always unpitched. Where "air only" is indicated, no consonant sound should be used.

Triangle-shaped noteheads indicate a 'pop' attack, achieved largely with the lips, where the resulting sound is more percussive than pitched in character. The technique is matched by the strings 'slap' pizzicato.

Strings:

Where bowing on the bridge is indicated, players may choose to 'bow diagonally' in order to ensure that the desired effect is achieved.

Instructions are given in the following order: attack technique, attack placement, string; for example, "wood only, on bridge, III" indicates that the player should play with only the wood of their bow on the bridge over the third string.

indicates that the performer should scrape the string. Where time permits, this should be done using a nickel as a plectrum, but it may also be performed with either the frog or the metal pad. The direction of the arrow indicates the direction of the scrape relative to the performer's shoulder, with an upwards arrow moving away from the shoulder. Note that, as a result, an upwards pointing arrow in the Violin will have a parallel contour to a downwards pointing arrow in the Contrabass.

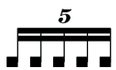
MST indicates 'molto sul tasto' and should be bowed as far from the bridge as possible (while still sounding the indicated pitch).

Unmeasured tremolos ( ) should be bowed as fast as possible.

CLT indicates *col legno tratto*, and is to be played with 100% wood.

CLB indicates *col legno battuto*, and should always be played with a ricochet technique ( )

Diamond-shaped noteheads indicate that the note is to be played as a scratch tone. The pitch indicates the note that is to be fingered; the resulting note will note be recognizably pitched.

 Square noteheads indicate that the performer should knock (with their knuckles) on the instrument; on the bottom of the violin, and on the side of the contrabass.

 Triangle-shaped noteheads in the strings indicate a slap pizzicato; the pitch should be less discernible than the percussive aspect (as in a 'Bartok pizz').

 in Section 6 only, this right-angle triangle notehead is used to indicate bowing on the bridge. As noted above, the performer may choose to bow diagonally across the bridge to avoid a discernible pitch.

Electronics:

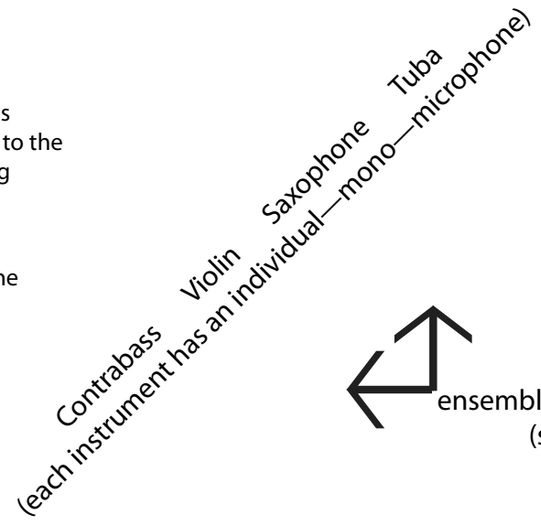
The indicated amplification levels should be understood as relative guidelines only. As a guideline, the amplified sections should not be louder than the loud acoustic sections, and should be a similar volume to the pre-recorded material.

Continuous lines indicate a change in the panning of the electronics (as in Sections 2b and 3).

Initial Performance Layout

Note 1: There should be at least 20' separating the performers and the loudspeakers; the loudspeakers themselves should be situated as close as possible to the audience, without the 'ensemble centre' pan setting sounding like two discrete channels.

Note 2: All lights in the space should be turned off, with the exception of musicians' stand lights and the audience area light.



alternate situation, Sax.
(no microphone)

ensemble microphone
(stereo)

right speaker

alternate situation, Vln.
(no microphone)

left speaker

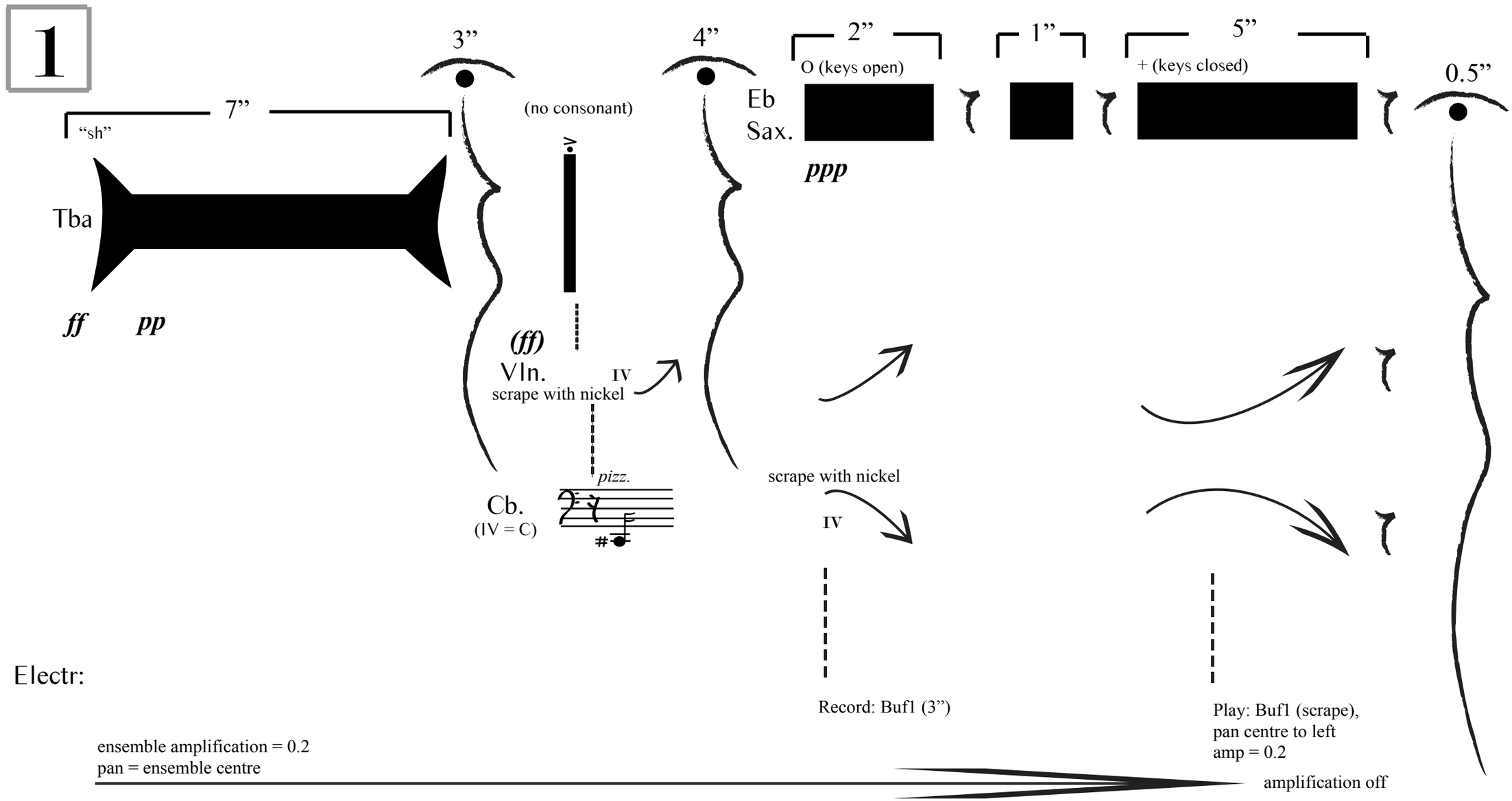
score, on music stand,
small light

seating for audience
(max. 3)

Electronics Console
(computer, and MIDI keyboard,
see appendix for computer code)

Paraphrasing Christian Bök:

“Always remember that fractal music, played backwards, sounds the same.”

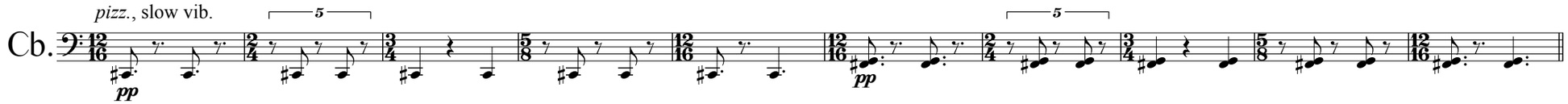


1B

attacca 2

40”

Live amplification 1
Record to Buf 2



30”

Live amplification 2

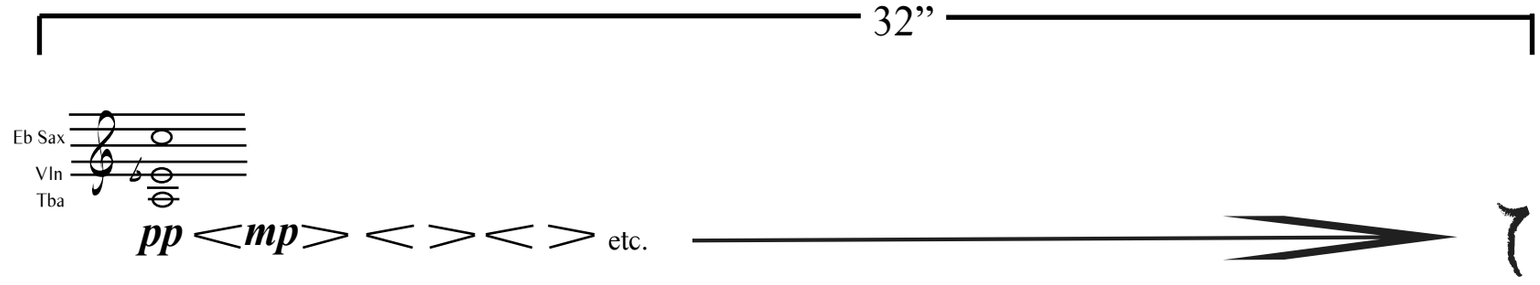
Electr: Clear Buf 1

Live amplification 1= Cb only
pan = 10 left
amp = 0.1
Live amplification 2 = trio
pan = hard right
amp = 0.3
Play sample 1 (trio):
pan = hard left
amp = 0.3

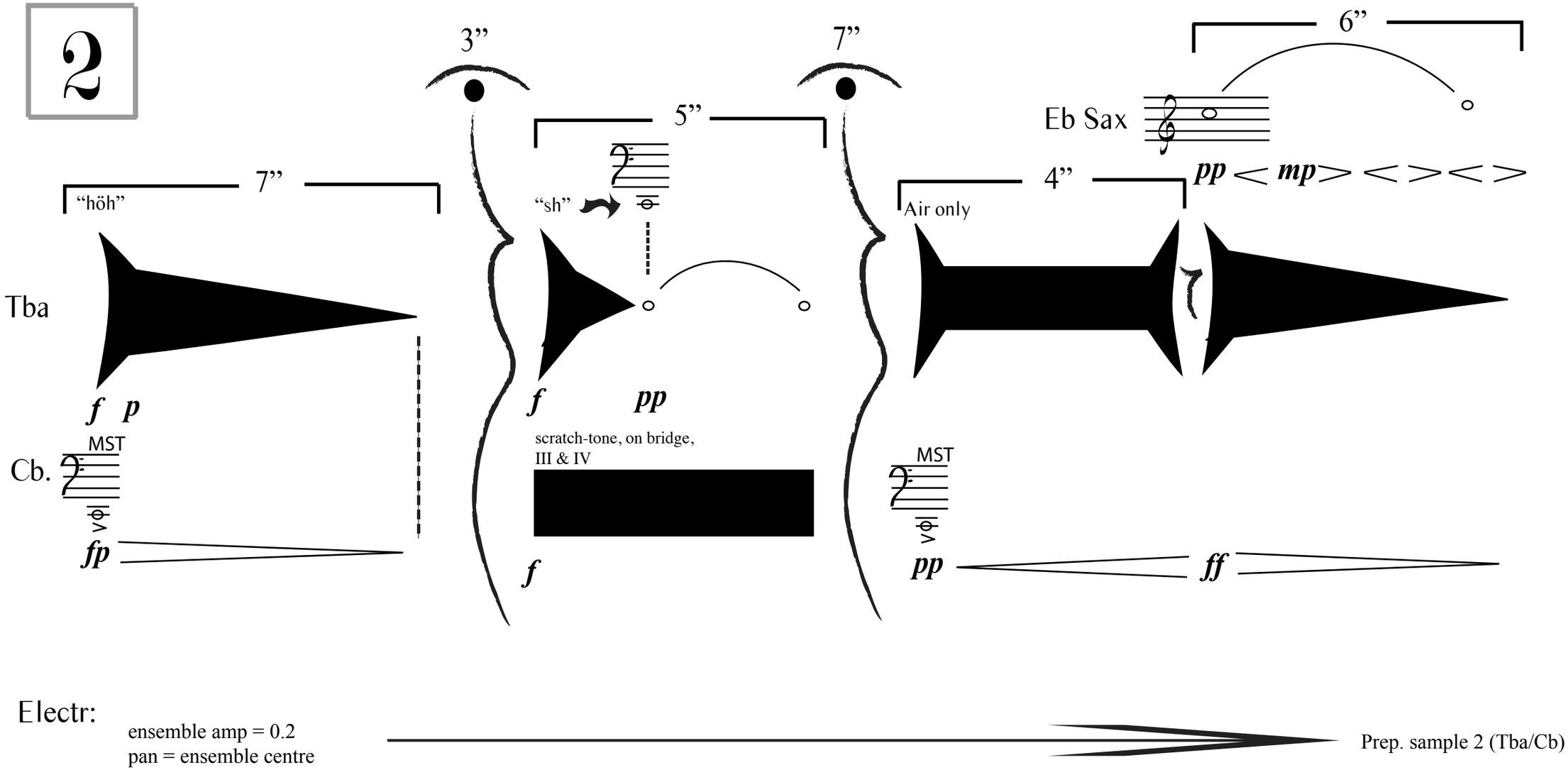
32”

4”

Pre-recorded sample 1(trio), loop off



attacca 2b



Electr:

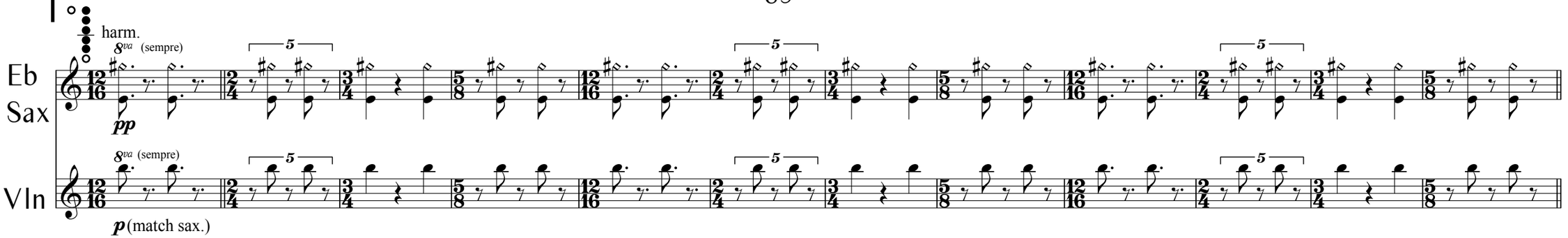
ensemble amp = 0.2
pan = ensemble centre

Prep. sample 2 (Tba/Cb)

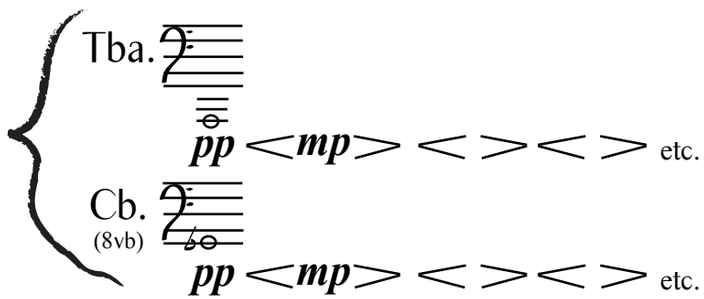
2B

attacca 3

85”



Sample 2

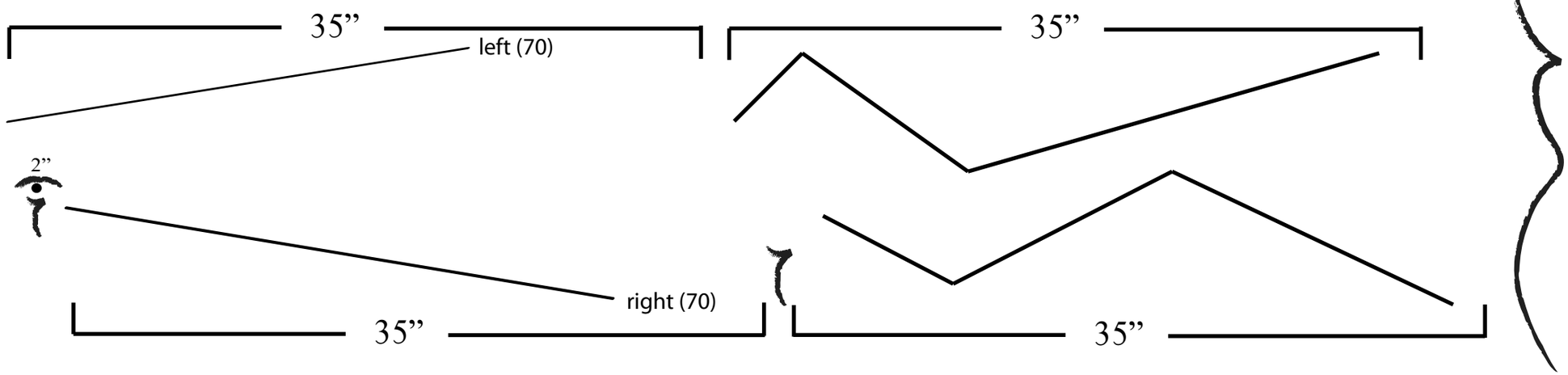


Electr:

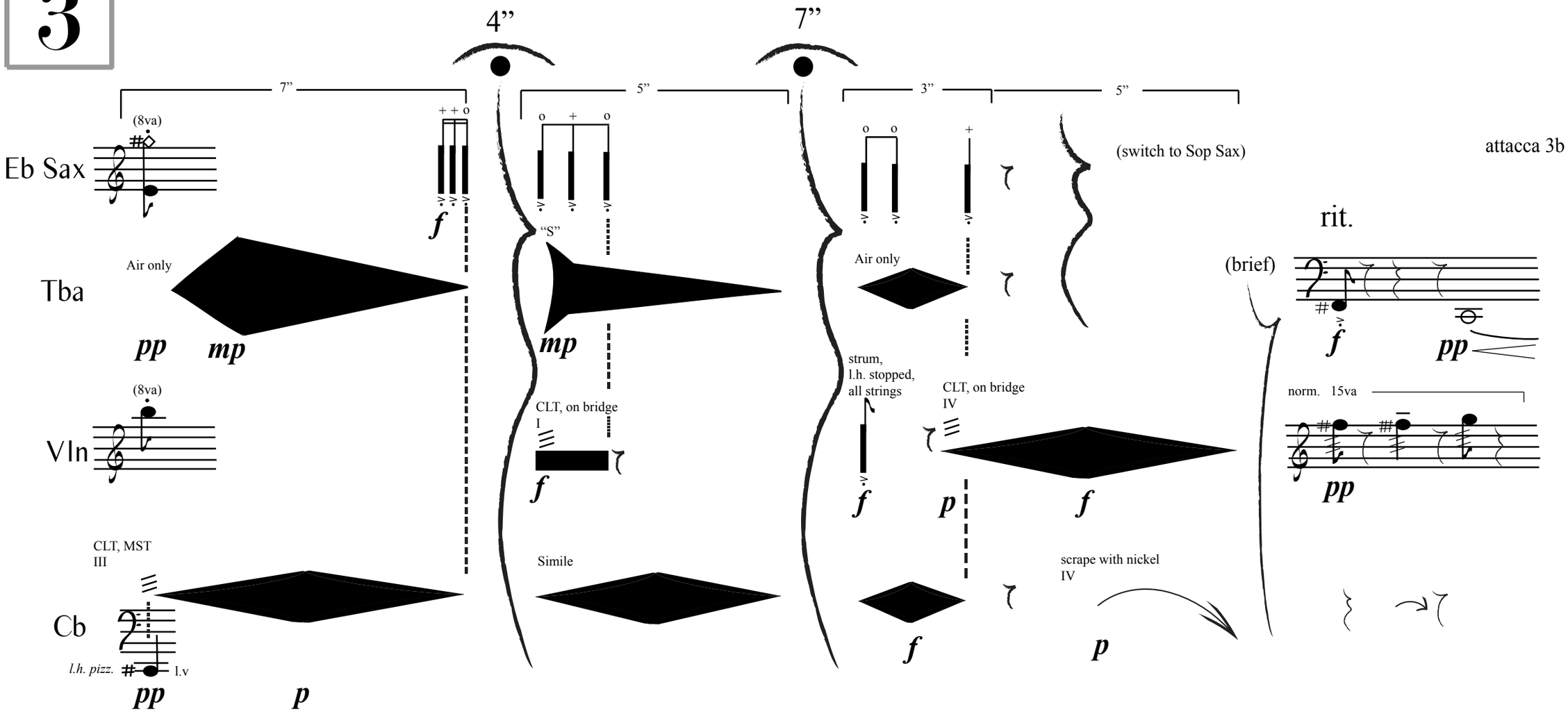
Amplification = Sax/Vln only, record to Buf 3
amp = 0.1
pan = ensemle centre

Play sample 2 (Tba/Cb),
amp = 0.3
pan = centre

Play sample 2 (Tba/Cb),
amp = 0.3
pan = centre



3



Electr:

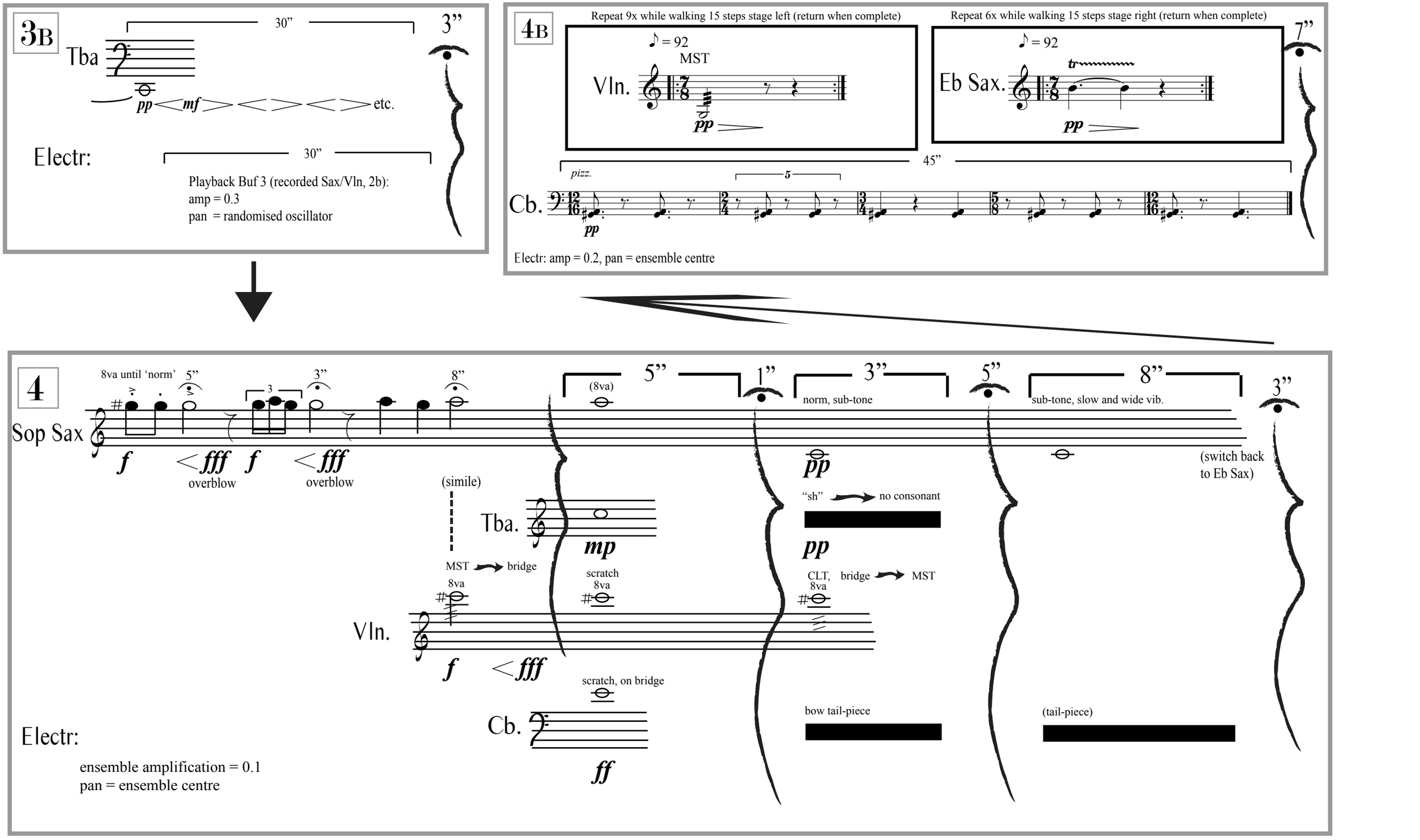
ensemble amplification = 0.2

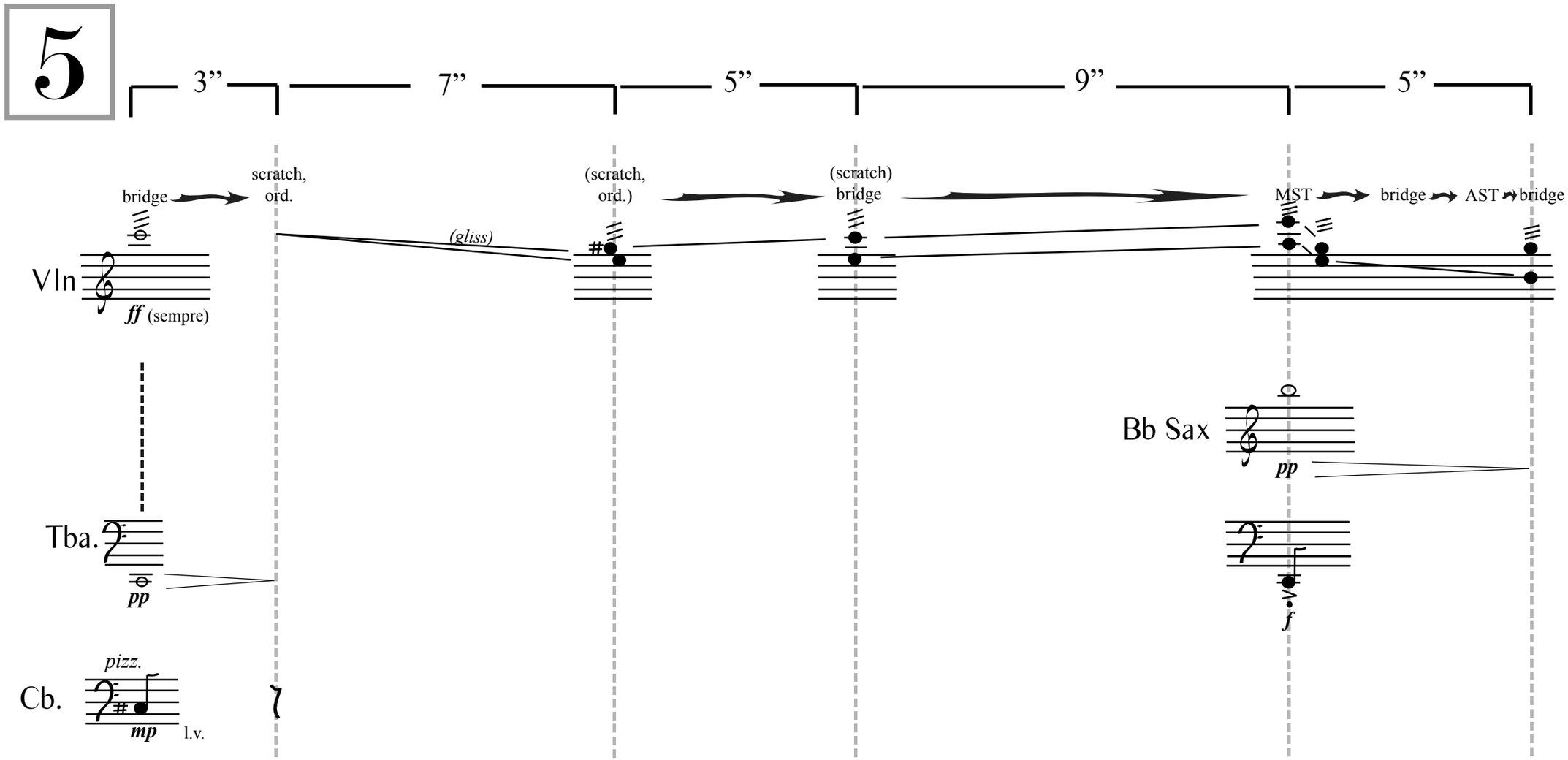
pan = ensemble centre

left (100)

right (100)

amplification off

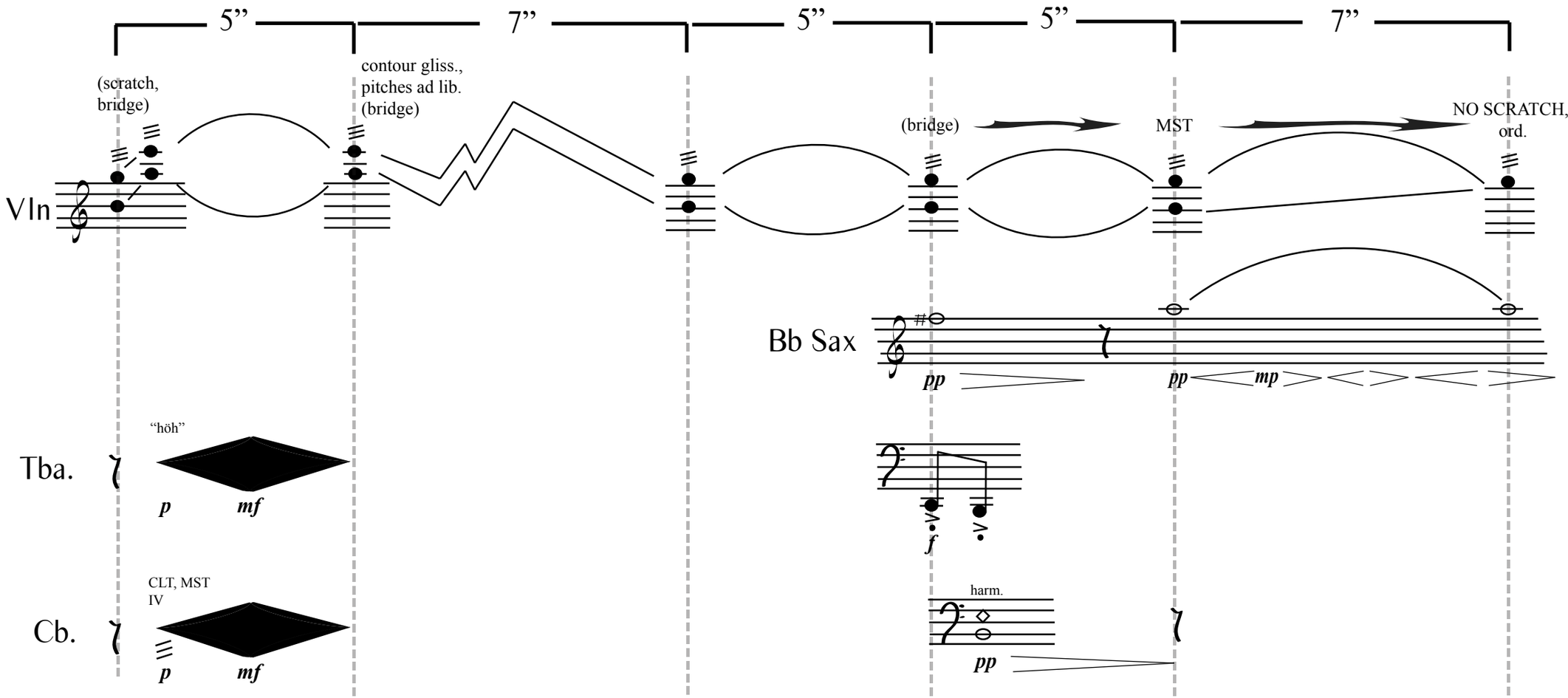

3B
30”
3”
Tba
pp
mf
etc.
Electr:
30”
Playback Buf 3 (recorded Sax/Vln, 2b):
amp = 0.3
pan = randomised oscillator
4B
Repeat 9x while walking 15 steps stage left (return when complete)
Repeat 6x while walking 15 steps stage right (return when complete)
7”
♪ = 92
MST
Vln.
pp
Eb Sax.
tr
45”
pizz.
5
Cb.
Electr: amp = 0.2, pan = ensemble centre
4
8va until ‘norm’
5”
3”
8”
5”
1”
3”
5”
8”
3”
Sop Sax
f
fff
overblow
(8va)
norm, sub-tone
sub-tone, slow and wide vib.
(switch back to Eb Sax)
(simile)
Tba.
mp
pp
“sh”
no consonant
MST
bridge
scratch
8va
CLT,
bridge
MST
Vln.
scratch, on bridge
Cb.
ff
bow tail-piece
(tail-piece)
Electr:
ensemble amplification = 0.1
pan = ensemble centre



Electr:

ensemble amplification = 0.3

pan = hard left (0.1 second delay)
hard right (0.2 second delay)

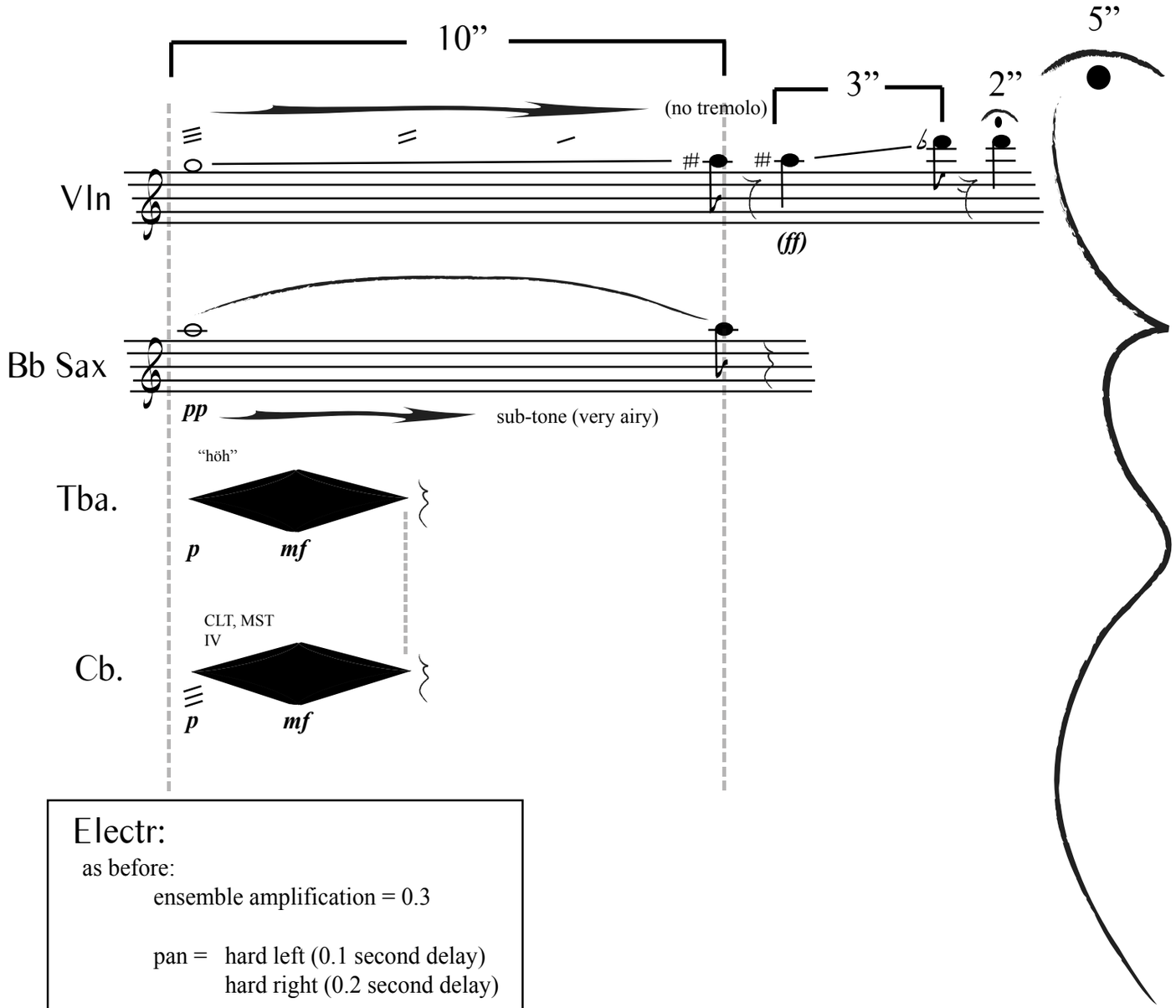


Electr:

as before:

ensemble amplification = 0.3

pan = hard left (0.1 second delay)
hard right (0.2 second delay)



Electr:

as before:

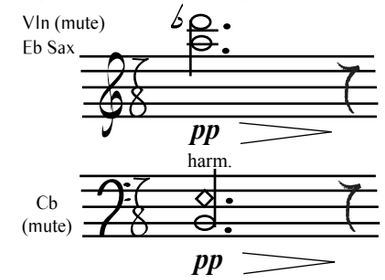
ensemble amplification = 0.3

pan = hard left (0.1 second delay)
hard right (0.2 second delay)

5B

60”

Repeat 13x, loose rhythm



5”

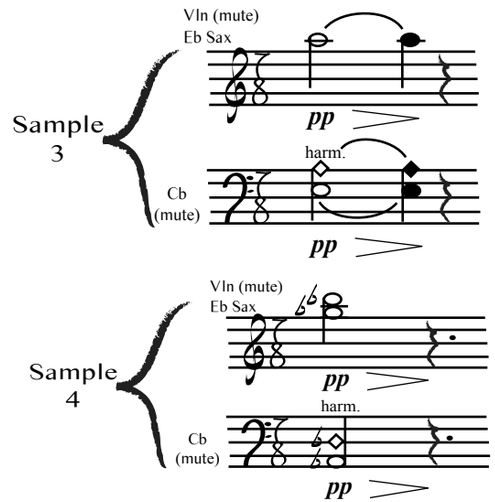
Electr:

ensemble amplification = 0.2
pan = ensemble centre

Playback Buf 2 (Cb pizz.)
amp = 0.1
pan = centre

Play sample 3
amp = 0.4
pan = left, 70
loop = on

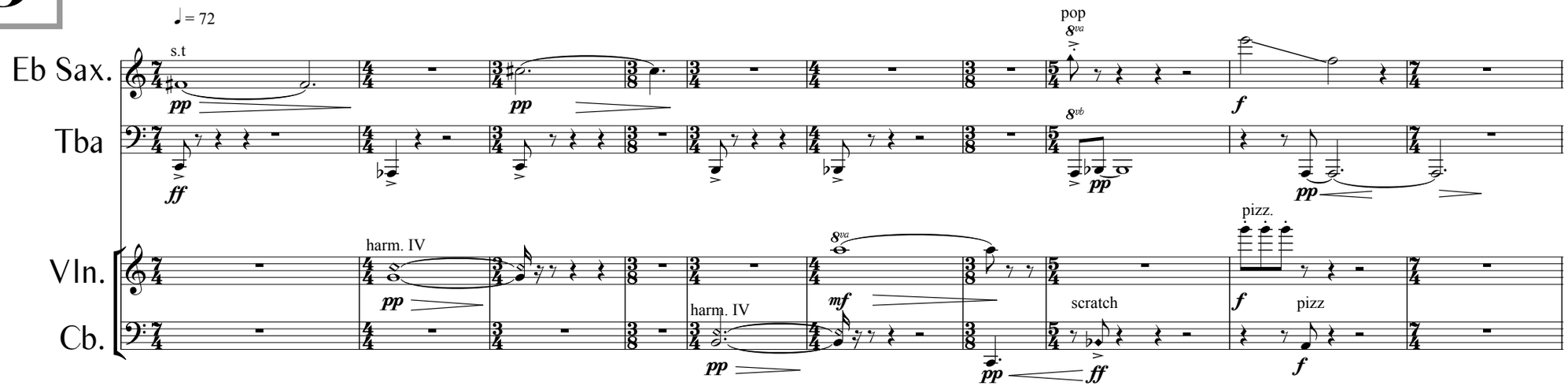
Play sample 4
amp = 0.4
pan = right, 70
loop = on



6

SEE PERFORMANCE GUIDELINES FOR NOTATIONS THAT ARE SPECIFIC TO THIS SECTION

35”

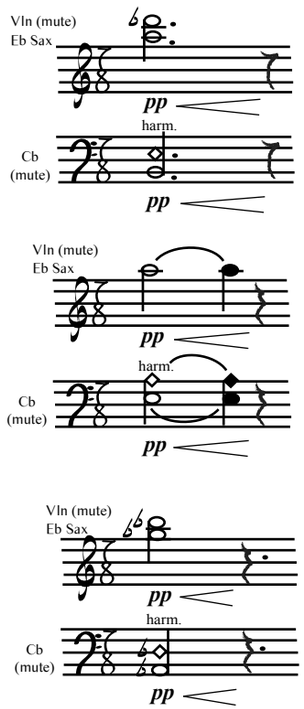


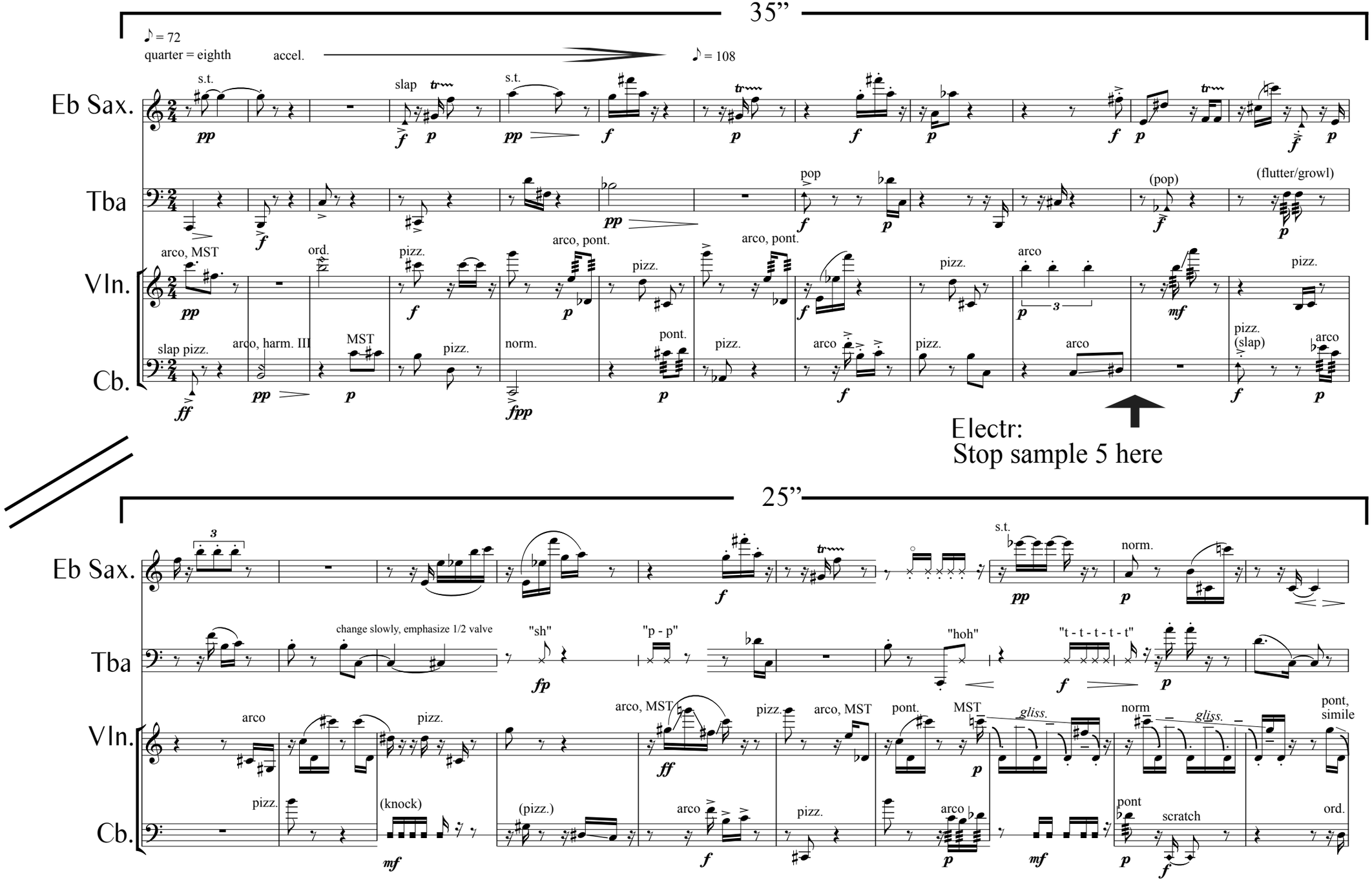
Electr:

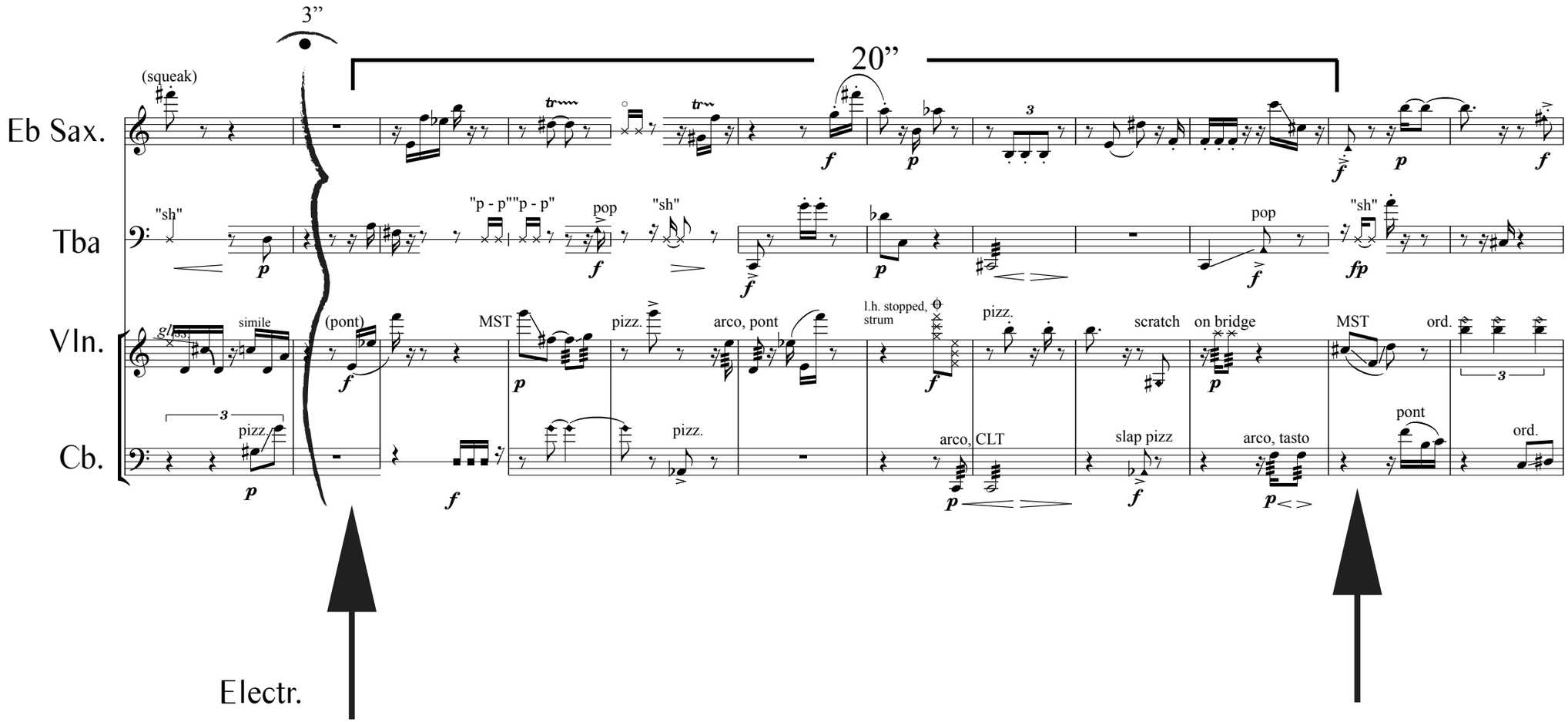
Play Sample 5 (3x trio):
pan = full stereo
amp = 0.5 (sample file contains dynamic changes)
loop = on

ensemble amplification = 0.1
pan = ensemble centre
Prepare record buffer 2

Sample 5




35”
♪ = 72
quarter = eighth
accel.
♪ = 108
Eb Sax.
Tba
Vln.
Cb.
s.t.
slap
pop
(pop)
(flutter/growl)
arco, MST
ord.
pizz.
arco, pont.
arco
mf
slap pizz.
arco, harm. III
MST
norm.
pont.
(slap)
Electr:
Stop sample 5 here
25”
change slowly, emphasize 1/2 valve
"sh"
"p - p"
"hoh"
"t - t - t - t - t"
gliss.
pont, simile
(knock)
(pizz.)
scratch
ord.



Start recording,
ensemble close-microphones,
Buffer 2

Begin playback of Buffer 2 (continue recording)
amp = 0.5
pan = centre, gradually widening to hard right and left
playback speed = 44% (no pitch shift)

continue general ensemble amplification

15”

Eb Sax.

(air) s.t. "t - t - t" (squeak)

Tba

emphasize 1/2 valve "p - p" "p - p" "t - p - t - p"

Vln.

pizz. CLB ord. MST IV 1/2 hair, pont. MST pont

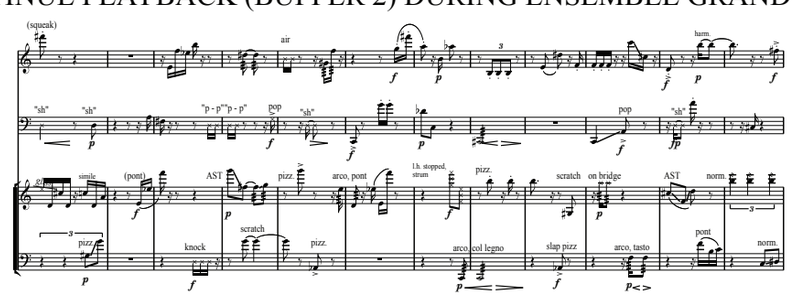
Cb.

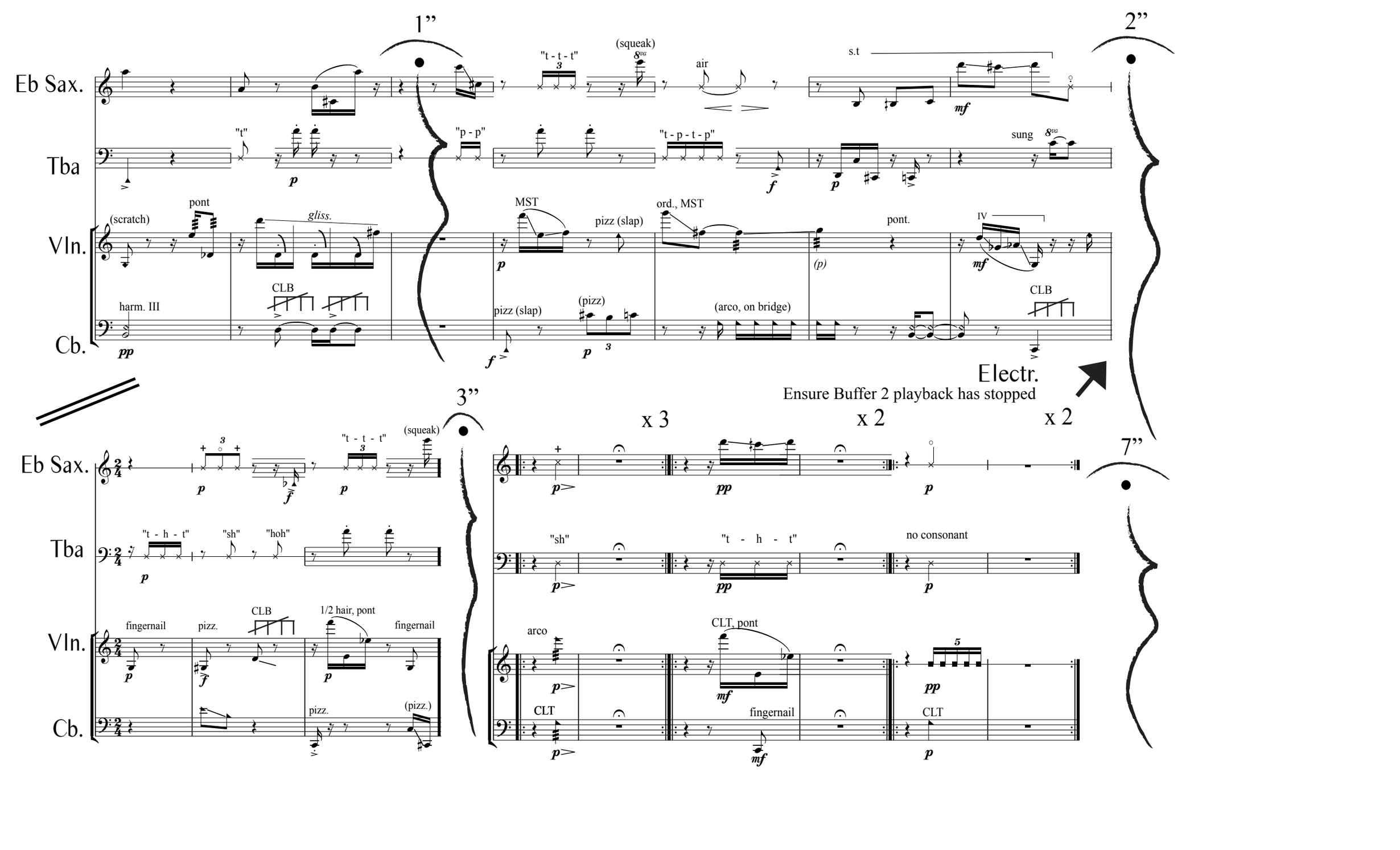
CLT ord. (scratch)

Electr.

Stop recording Buffer 2

CONTINUE PLAYBACK (BUFFER 2) DURING ENSEMBLE GRAND PAUSE




1”
2”
3”
7”
Eb Sax.
Tba
Vln.
Cb.
"t - t - t"
(squeak)
air
s.t
"t"
"p - p"
"t - p - t - p"
sung
(scratch)
pont
gliss.
MST
pizz (slap)
ord., MST
pont.
IV
harm. III
CLB
(pizz)
(arco, on bridge)
Electr.
Ensure Buffer 2 playback has stopped
x 3
x 2
x 2
"t - h - t"
"sh"
"hoh"
fingernail
pizz.
1/2 hair, pont
no consonant
arco
CLT, pont
CLT
(pizz.)

7

35”

♪ = 92

Eb Sax.

Tba.

Vln.

Cb.

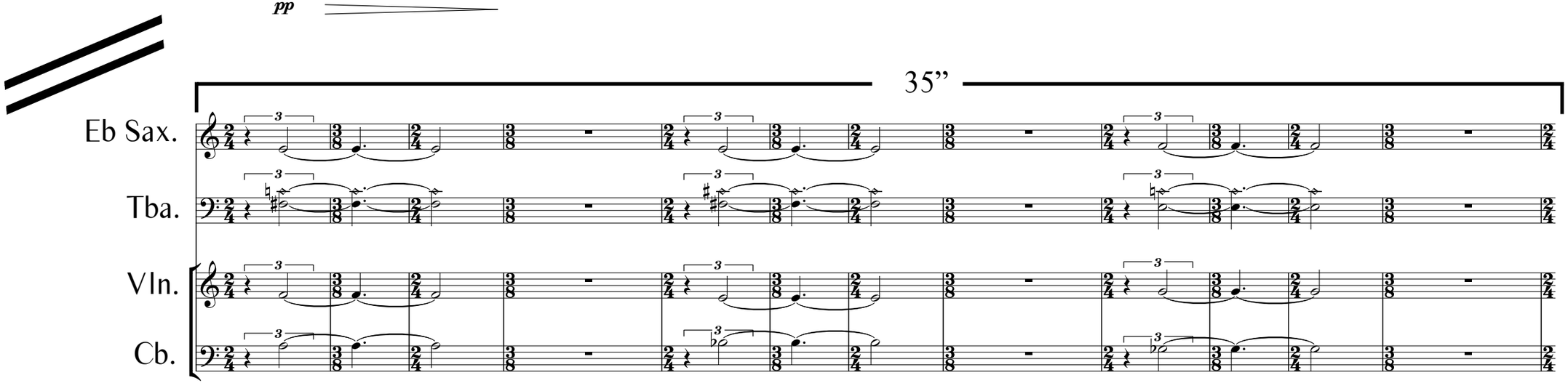
simile

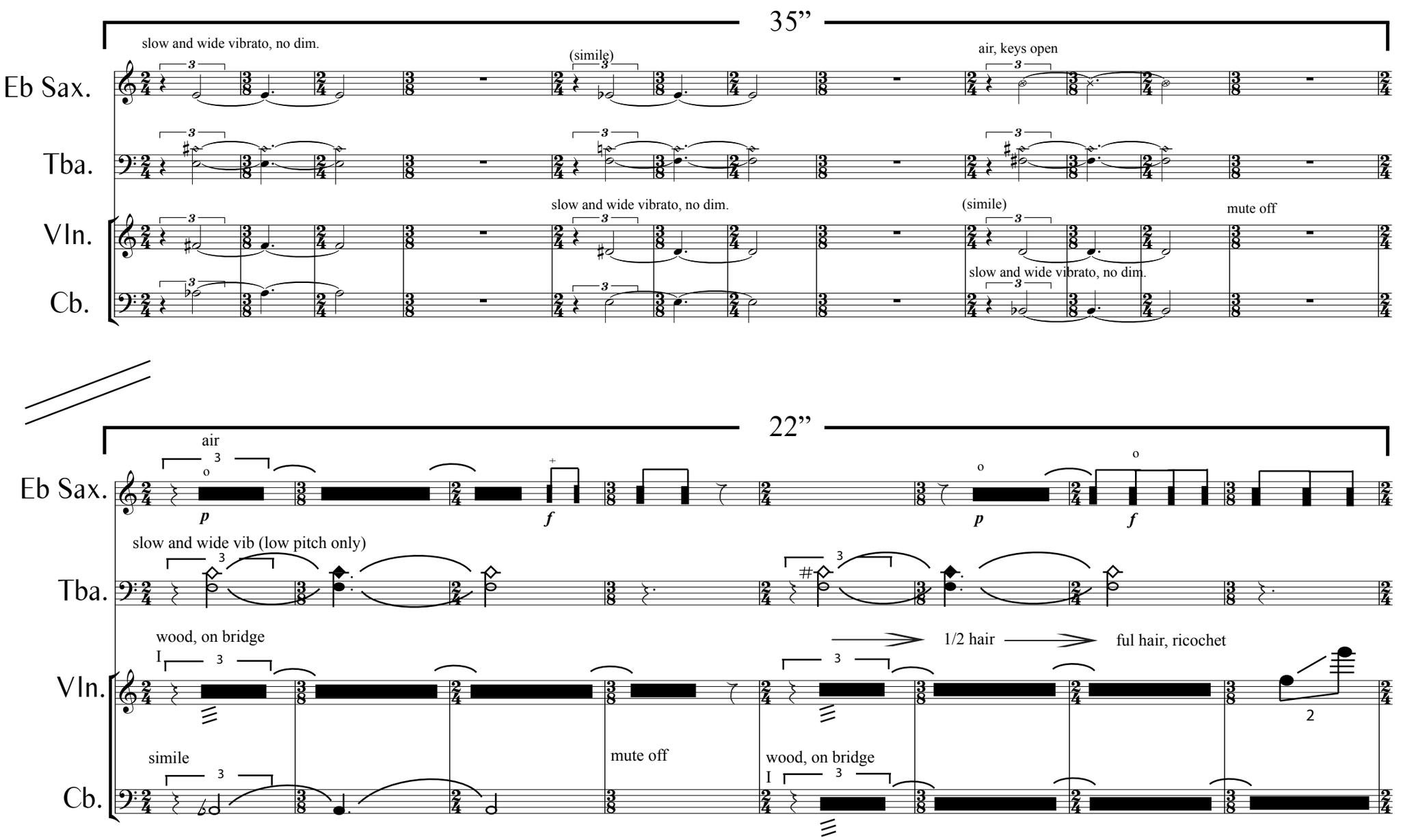
top note sung falsetto (sempre *8va*)

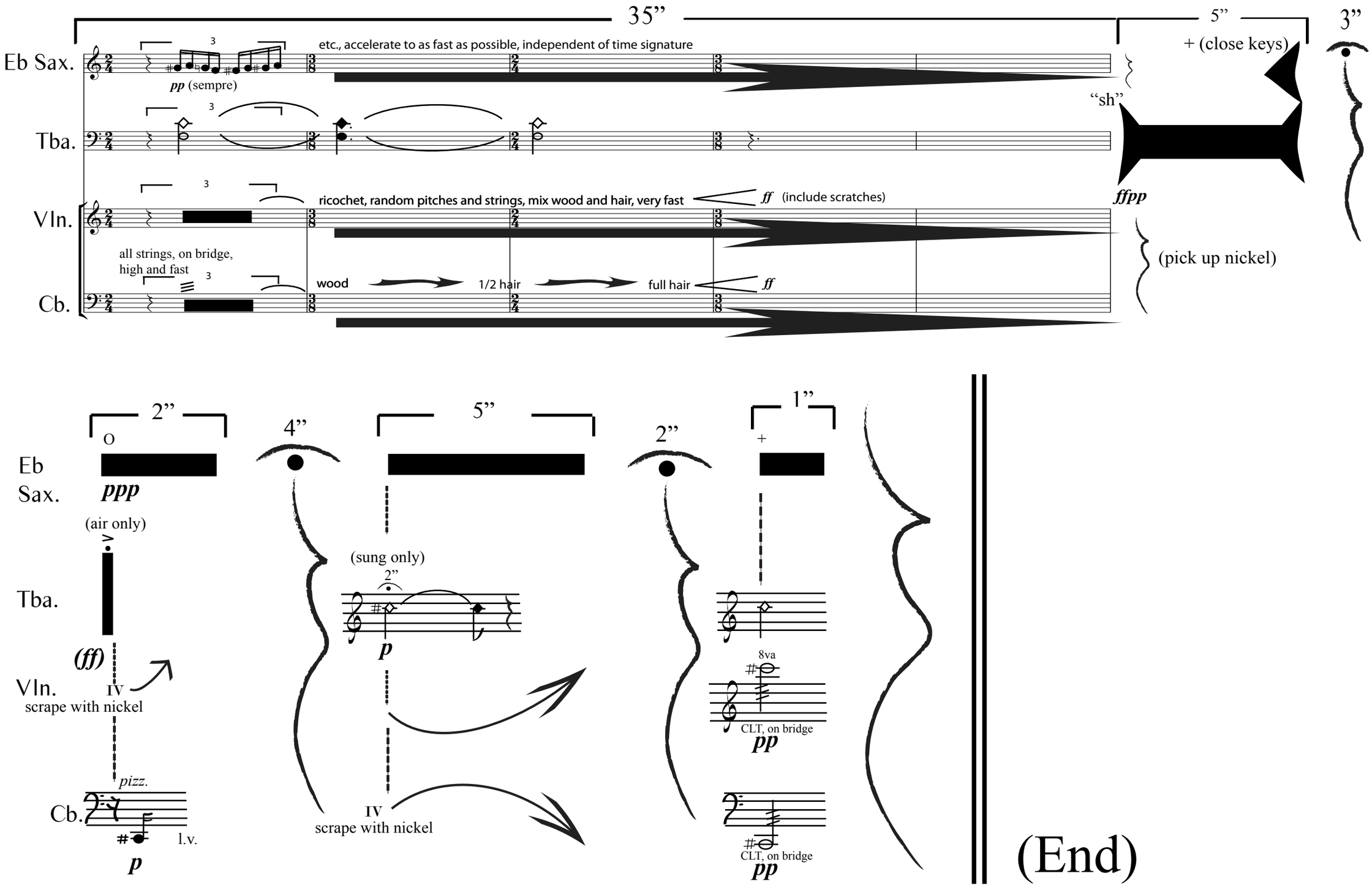
arco, with mute

pp

Electr:
ensemble amp = 0.1
pan = ensemble centre
(until end)




35”
Eb Sax.
Tba.
Vln.
Cb.
slow and wide vibrato, no dim.
(simile)
air, keys open
slow and wide vibrato, no dim.
(simile)
mute off
slow and wide vibrato, no dim.
22”
air
slow and wide vib (low pitch only)
wood, on bridge
1/2 hair
ful hair, ricochet
simile
mute off
wood, on bridge


35”
5”
3”
Eb Sax.
Tba.
Vln.
Cb.
etc., accelerate to as fast as possible, independent of time signature
pp (sempre)
+ (close keys)
“sh”
ricochet, random pitches and strings, mix wood and hair, very fast
ff (include scratches)
ffpp
all strings, on bridge, high and fast
wood
1/2 hair
full hair
ff
(pick up nickel)
2”
4”
5”
2”
1”
O
+
Eb Sax.
ppp
(air only)
(sung only)
2”
Tba.
(ff)
p
8va
Vln.
IV
scrape with nickel
CLT, on bridge
pp
pizz.
Cb.
l.v.
p
IV
scrape with nickel
CLT, on bridge
pp
(End)

KeyGen real-time procesing patch

—code is run in SuperCollider Version 2008-07-14 (Revision 7685)—

—'DewDrop' library must be installed for MIDI interface—

```
(
var buffers, paths, num_rec_buffers,
midi_controls,
live_amp_synth, live_amp_synth2, live_amp_synthCB, live_amp_synthTrio1,
live_amp_synthSaxVln,
live_amp_synthDelay2, live_amp_synthDelay,
rec_buf_synth, rec_buf_num, rec_buffer_length,
sample_synth, sample_synth2, samp_buf_num, samp_buf_num2,
control_window,
delay;


//pre-recorded samples, see score for content
paths = [
"~/SC/SC_sounds/Sample1.aif".standardizePath,
"~/SC/SC_sounds/Sample2.aif".standardizePath,
"~/SC/SC_sounds/Sample3.aif".standardizePath,
"~/SC/SC_sounds/Sample4.aif".standardizePath,
"~/SC/SC_sounds/Sample5.aif".standardizePath
].do{
	|item, i|

	buffers = buffers.add(Buffer.read(s, item));
};

// 3 record bufs
num_rec_buffers=3;
rec_buffer_length = [3.0, 40.0, 40.0]; // buffer size (in seconds)
num_rec_buffers.do{
	|item, i|
	buffers =
	buffers.add(Buffer.alloc(s, s.sampleRate * rec_buffer_length.at(i), 1));
};

control_window = SCWindow.new("Controls", Rect(400, 500, 600, 200)).front;
num_rec_buffers.do{
	|item, i|

	SCButton.new(control_window, Rect(50 + (i*50), 30, 20, 20))
	.states_([[i.asString, Color.blue, Color.white]])
	.action_{|v|
	Synth(\recorder, [\buffer, buffers[paths.size+i], \in_bus, 0, \recLevel, 1, \t_gate, 1]);
	};
};

rec_buf_num = SCNumberBox(control_window, Rect(50, 150, 25, 25));
	rec_buf_num.value = 0;
	rec_buf_num.setProperty(\align, \center);
SCButton.new(control_window, Rect(50, 100, 100, 20))
	.states_([["Play Recording", Color.white, Color.blue]])
	.action_{|v|
		rec_buf_synth = Synth(\sample_player,
			[\buffer, buffers[paths.size + rec_buf_num.value], \out_bus, 0, \mul, 1,
\pan, 0.5]);
	};

samp_buf_num = SCNumberBox(control_window, Rect(200, 150, 25, 25));
	samp_buf_num.value = 0;
	samp_buf_num.setProperty(\align, \center);
SCButton.new(control_window, Rect(200, 100, 100, 20))
	.states_([["Play Sample", Color.white, Color.blue]])
	.action_{|v|
		sample_synth = Synth(\sample_player,
			[\buffer, buffers[samp_buf_num.value], \out_bus, 0, \mul, 1, \pan,
0.5]);
	};
samp_buf_num2 = SCNumberBox(control_window, Rect(350, 150, 25, 25));
	samp_buf_num2.value = 0;
```

```
        samp_buf_num2.setProperty(\align, \center);
SCButton.new(control_window, Rect(350, 100, 100, 20))
        .states_([["Play Sample", Color.white, Color.blue]])
        .action_{|v|
                sample_synth2 = Synth(\sample_player,
                        [\buffer, buffers[samp_buf_num2.value], \out_bus, 0, \mul, 1, \pan,
0.5]);
        };

AbstractMIDIControl.syncByDefault = false;

live_amp_synth = Synth(\live_amp, [\in_bus, 0, \out_bus, 0, \mul, 0, \pan, 0.5, \delay,
0.0]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 102, {|val|
live_amp_synth.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 103, {|val|
live_amp_synth.set(\pan, val/127)}));

/*three live amps: one ensemble with pan and volume control,
two subsets with 0.1 and 0.2 second delays, panned left and right (without control);
volume for both is adjustable by a single MIDI control */
live_amp_synthDelay = Synth(\live_amp, [\in_bus, 0, \out_bus, 0, \mul, 0, \pan, 0.0,
\delay, 0.1]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 104, {|val|
live_amp_synthDelay.set(\mul, val/127)}));

live_amp_synthDelay2 = Synth(\live_amp, [\in_bus, 0, \out_bus, 0, \mul, 0, \pan, 1.0,
\delay, 0.2]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 104, {|val|
live_amp_synthDelay2.set(\mul, val/127)}));

live_amp_synthCB = Synth(\live_amp, [\in_bus, 1, \out_bus, 0, \mul, 0, \pan, 0.5]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 106, {|val|
live_amp_synthCB.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 107, {|val|
live_amp_synthCB.set(\pan, val/127)}));

live_amp_synthTrio1 = Synth(\live_amp, [\in_bus, 2, \out_bus, 0, \mul, 0, \pan, 0.5]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 108, {|val|
live_amp_synthTrio1.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 109, {|val|
live_amp_synthTrio1.set(\pan, val/127)}));

live_amp_synthSaxVln = Synth(\live_amp, [\in_bus, 3, \out_bus, 0, \mul, 0, \pan, 0.5]);
midi_controls = midi_controls.add(BasicMIDIControl(0, 110, {|val|
live_amp_synthSaxVln.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 111, {|val|
live_amp_synthSaxVln.set(\pan, val/127)}));

midi_controls = midi_controls.add(BasicMIDIControl(0, 112, {|val|
rec_buf_synth.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 113, {|val|
rec_buf_synth.set(\pan, val/127)}));

midi_controls = midi_controls.add(BasicMIDIControl(0, 114, {|val|
sample_synth.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 115, {|val|
sample_synth.set(\pan, val/127)}));

midi_controls = midi_controls.add(BasicMIDIControl(0, 116, {|val|
sample_synth2.set(\mul, val/127)}));
midi_controls = midi_controls.add(BasicMIDIControl(0, 117, {|val|
sample_synth2.set(\pan, val/127)}));

CmdPeriod.doOnce {
        buffers.do{ |item, i| item.free; };
        midi_controls.do{ |item, i| item.free; };
        control_window.close;
}

)
```

```
// the SynthDefs—must be loaded first
(
SynthDef(\live_amp, { |in_bus, out_bus, mul , pan, delay=0|
	var output, cs_mul, cs_pan;

	cs_mul = ControlSpec(0, 1, 'linear');
	cs_pan = ControlSpec(-1, 1, 'linear');

	output =
	Pan2.ar(
		SoundIn.ar(in_bus),
		cs_pan.map(pan),
		cs_mul.map(mul)
	);

	output = DelayN.ar(output, 0.3, delay);
	Out.ar(out_bus, output)

}).load(s);

SynthDef(\recorder, { |buffer, in_bus, recLevel|

	var cs_mul;
	cs_mul = ControlSpec(0, 1.0, 'linear');

	RecordBuf.ar(
		SoundIn.ar(in_bus)
		*
		EnvGen.kr(
			Env.linen(0.005, BufDur.kr(buffer) - 0.01, 0.005, 1),
			doneAction: 2
		),
		buffer,
		offset: 0,
		recLevel: cs_mul.map(recLevel),
		preLevel: 0,
		run: 1,
		loop: 0
	)

}).load(s);

SynthDef(\sample_player, { |out_bus, buffer, mul, pan|
	var output, cs_mul, cs_pan;

	cs_mul = ControlSpec(0, 1, 'linear');
	cs_pan = ControlSpec(-1, 1, 'linear');

	output =
	Pan2.ar(
		PlayBuf.ar(
			1,
			buffer,
			BufRateScale.kr(buffer)
		),
		cs_pan.map(pan),
		cs_mul.map(mul)
	)
	*
	EnvGen.kr(
		Env.linen(0.005, BufDur.kr(buffer) - 0.01, 0.005),
		doneAction: 2
	);

	Out.ar(out_bus, output);

}).load(s);
)
```