Yongwoo Lee

Permeation

for clarinet and
Modalys clarinet

2023

PRAGRAM NOTE

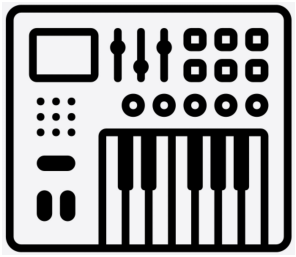
Permeation is a composition written for solo clarinet and live performance or tape version of the clarinet created using Modalys, a coding language of Physical Modeling Synthesis developed by IRCAM. It explores a variety of sounds by manipulating the pipe radius and pipe length, which are parameters of the closed-open tube representing the reed and the clarinet body in the Modalys script. When the radius decreases, the size of the air passage decreases, resulting in a sharp sound with increased air pressure and tension, and the pitch changes according to the length. Especially, I incorporated wind sounds generated by manipulating the air pressure through a small hole in the pipe. I also utilized the physical sound resulting from rapid changes in the pipe's radius while injecting air, emphasizing the connection to the principles of physics. This piece specifically examines the diverse musical applications of Modalys coding as an instrument, drawing a parallel to how contemporary music utilizes extended playing methods with traditional instruments.

The performance is controlled and played using Max and a MIDI keyboard, synchronized with the actual clarinet player, and incorporates elements of accidental randomness. The piece expresses the intertwining permeation of these two clarinets as a duet. The composition is divided into two methods of performance: real-time performance by two players, including the clarinet player and a MIDI keyboard player, and a tape part using fixed media with only one clarinet player. This score is written for the real-time performer version.

The tape part of the composition is created solely using the manipulated Modalys Clarinet sound. This unique sound source is processed using sound editing techniques and algorithms within MAX/MSP. Additionally, it is possible to incorporate reverb and delay effects during the live performance on stage.

MAX PATCH

The max objects below set as default, can replacable to the other faders or knobs. And It should be open the attached *.mlys file which is export from ModaLisp script to run this max patch.



bendin 1 (pitch bend) / for pitch bend

ctlin 1 (modulation wheel) / for air-pressure (breath)

ctlin 11 (expression) / for radius size (radius)

NOTATION

The score is written in transposed including Modayls clarinet and live electronics. Electronics (E in Bb) indicates notes created in live situations, and Radius for radius size for the modalys clarinet. And also Max cues controled by pedaling (ctlin 64) include various informations which are breath, effects, pitch etc.

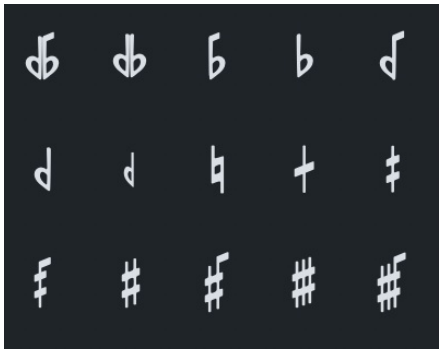
6 Faders are basically marks to distinguish uncontrolled notes from Max cues, meaning the position of the modulation wheel. The higher the fader mark, the higher the air-pressure of the modalys clarinet.

key clicks with air sound
(upper side of cross note is metronome symbol)

air sound with pitch

random granular

TONALITY SYSTEM



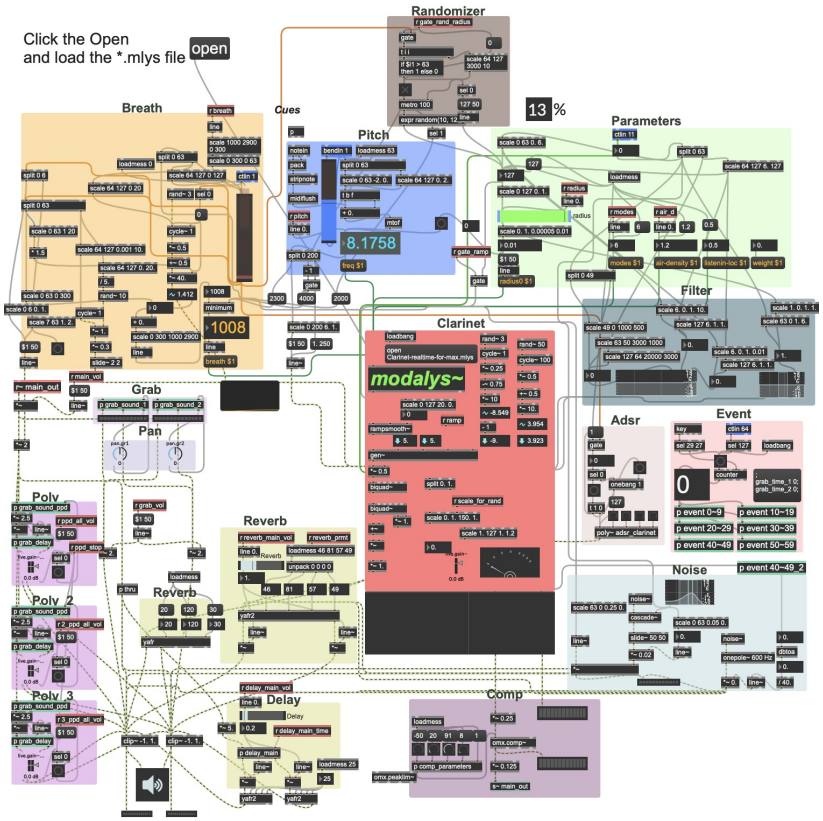
48 Equal Temperament iss used in the notation of modalys and live electronic scores.
The table above divides pitches based on units of 25 cents (1200 cents/48).

MODALISP SCRIPT AND MAX PATCH

```
;;;-*-Mode: Lisp; Package: MODALYS -*-
(new)

;ctl-for-max
(setq freq-ctl (make-controller 'dynamic 1 -1 220. "freq"))
(setq air-density-ctl (make-controller 'dynamic 1 -1 1.2 "air-density"))
(setq listenin-loc-ctl (make-controller 'dynamic 1 -1 0.5 "listenin-loc"))

;spefic ctl-for max
(setq modes-ctl (make-controller 'dynamic 1 -1 80 "modes"))
(setq radius0-ctl (make-controller 'dynamic 1 -1 0.01 "radius0"))
(setq radius1-ctl (make-controller 'dynamic 1 -1 0.01 "radius1"))
(setq length-ctl (make-controller 'dynamic 1 -1 1. "length"))
(setq air-elasticity-ctl (make-controller 'dynamic 1 -1 .00000721 "air-elasticity"))
(setq freq-loss-ctl (make-controller 'dynamic 1 -1 1.5 "freq-loss"))
(setq const-loss-ctl (make-controller 'dynamic 1 -1 1. "const-loss"))
;make tube
(setq my-tube (make-object 'closed-open-tube
                           (modes modes-ctl)
                           (radius0 radius0-ctl)
                           (radius1 radius1-ctl)
                           (length length-ctl)
                           (air-elasticity air-elasticity-ctl)
                           (air-density air-density-ctl)
                           (freq-loss freq-loss-ctl)
                           (const-loss const-loss-ctl)))
(set-pitch my-tube 'length freq-ctl)

;make reed
(setq my-reed (make-object 'rect-plate
                           (modes         5)
                           (length0   .7e-2)
                           (length1    2e-2)
                           (thickness  2e-5)
                           (density     700)
                           (freq-loss   400)
                           (const-loss  200)
                           ))

;make reed-tube interaction

(setq breath-env (make-controller 'dynamic 1 -1 0 "breath"))

(setq my-tube-blowin (make-access my-tube (const 0) 'long))
(setq my-tube-listenin (make-access my-tube listenin-loc-ctl 'long))

(setq my-reed-tip (make-access my-reed (const .1 .2) 'normal))

(setq weight-ctl (make-controller 'dynamic 1 -1 1. "weight"))

;make connection
(make-connection 'reed my-tube-blowin my-reed-tip 0.001
                 (make-controller 'arithmetic 1 '* (list (const 6) breath-env))
                 (const 0.000276)
)
```

The modalys clarinet used in this piece was implemented using a physical modeling method as a script of IRCAM software Modalys, and Max/msp has been specified so that it can be used effectively in Live situations. In the clarinet creation stage through Modalys, I used objects that control parameters related to length and quality of air. In Max, the patch was composed of detailed manipulation of these parameters, work related to harmonics and white noise for sound processing, humanization work by filter and LFO method, and adding various effects.

* The script on the left is an excerpt from the entire Modalisp script.

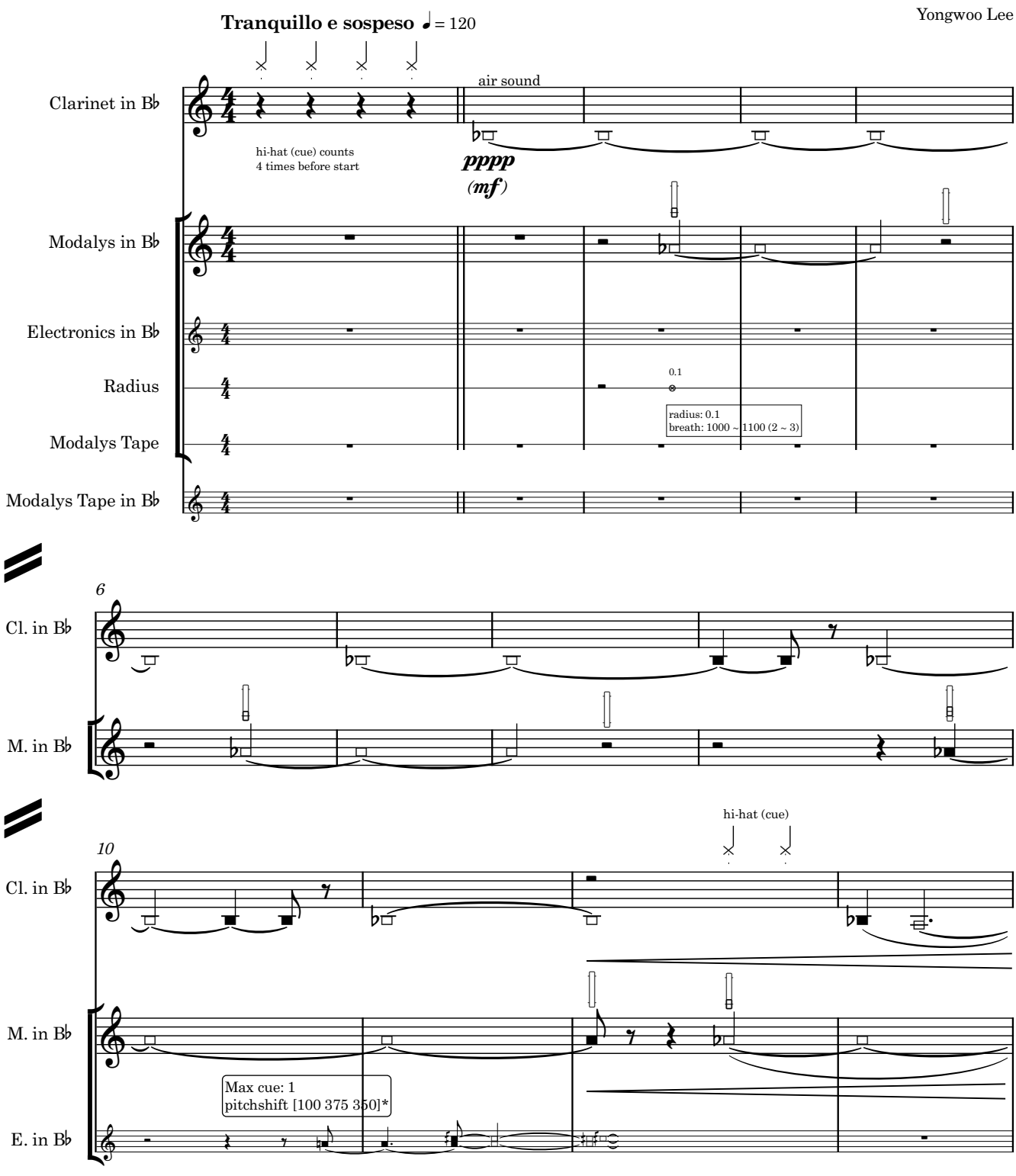


Permeation

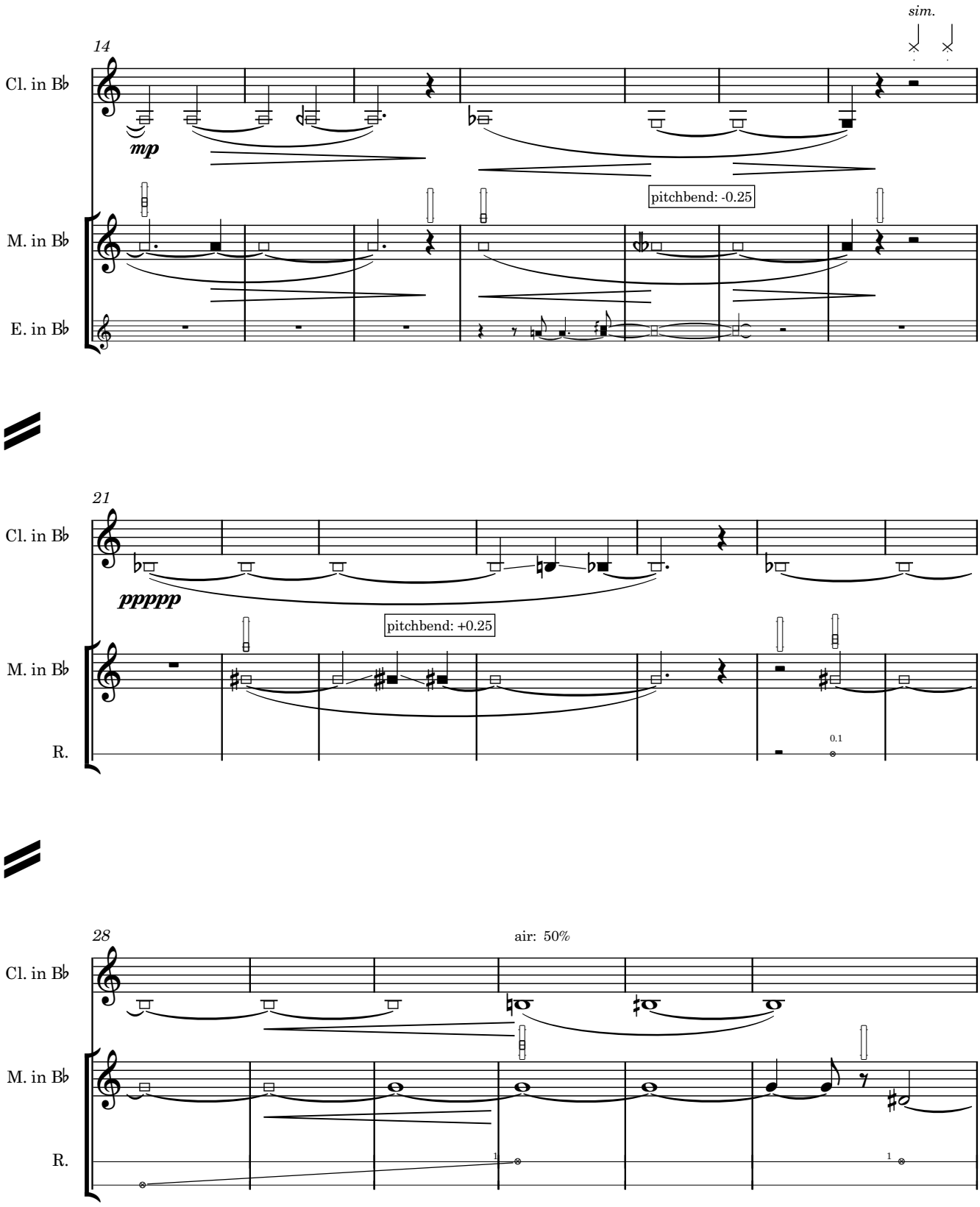
Transposed Score

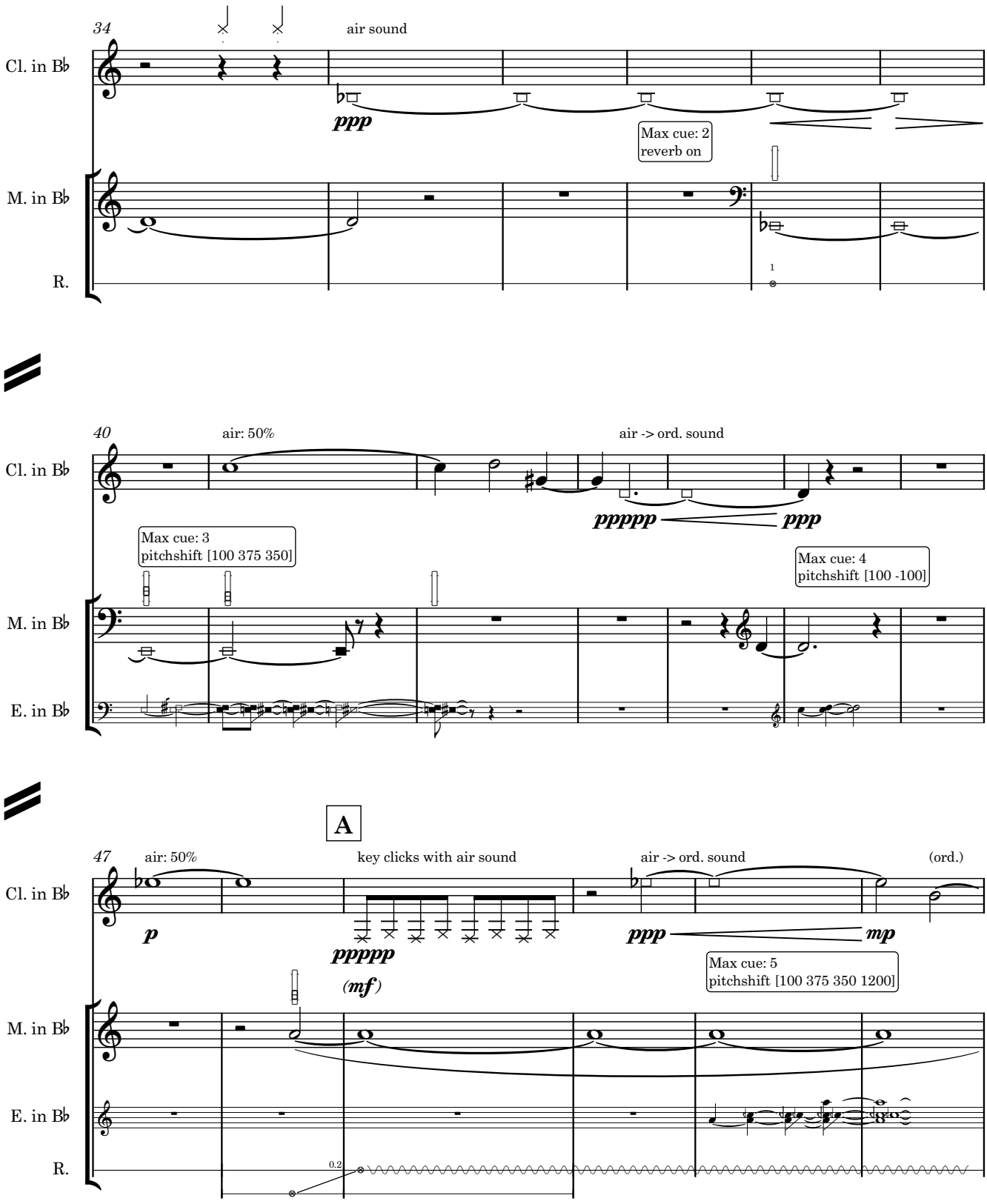
for Clarinet and Modalys Clarinet

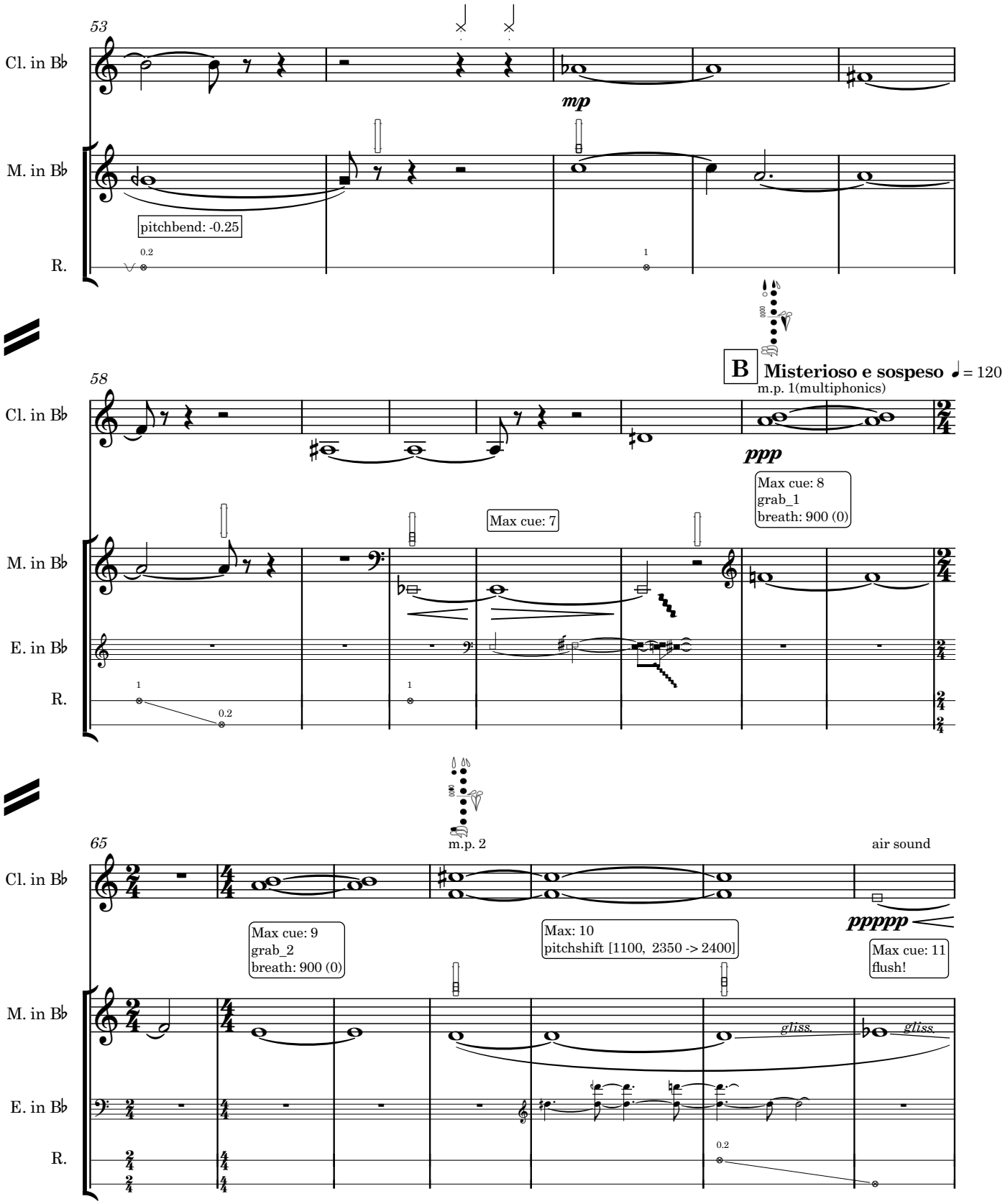
Yongwoo Lee

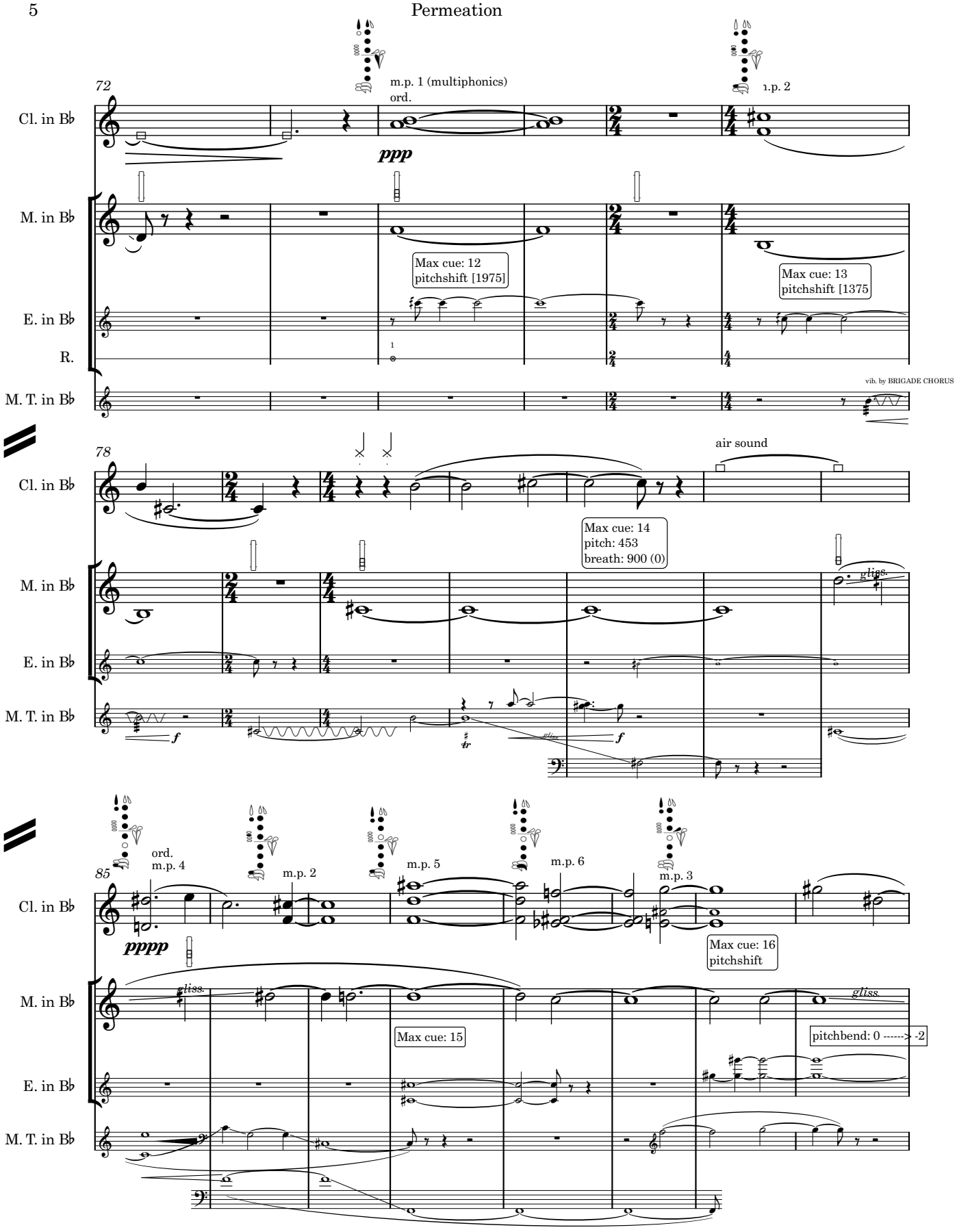


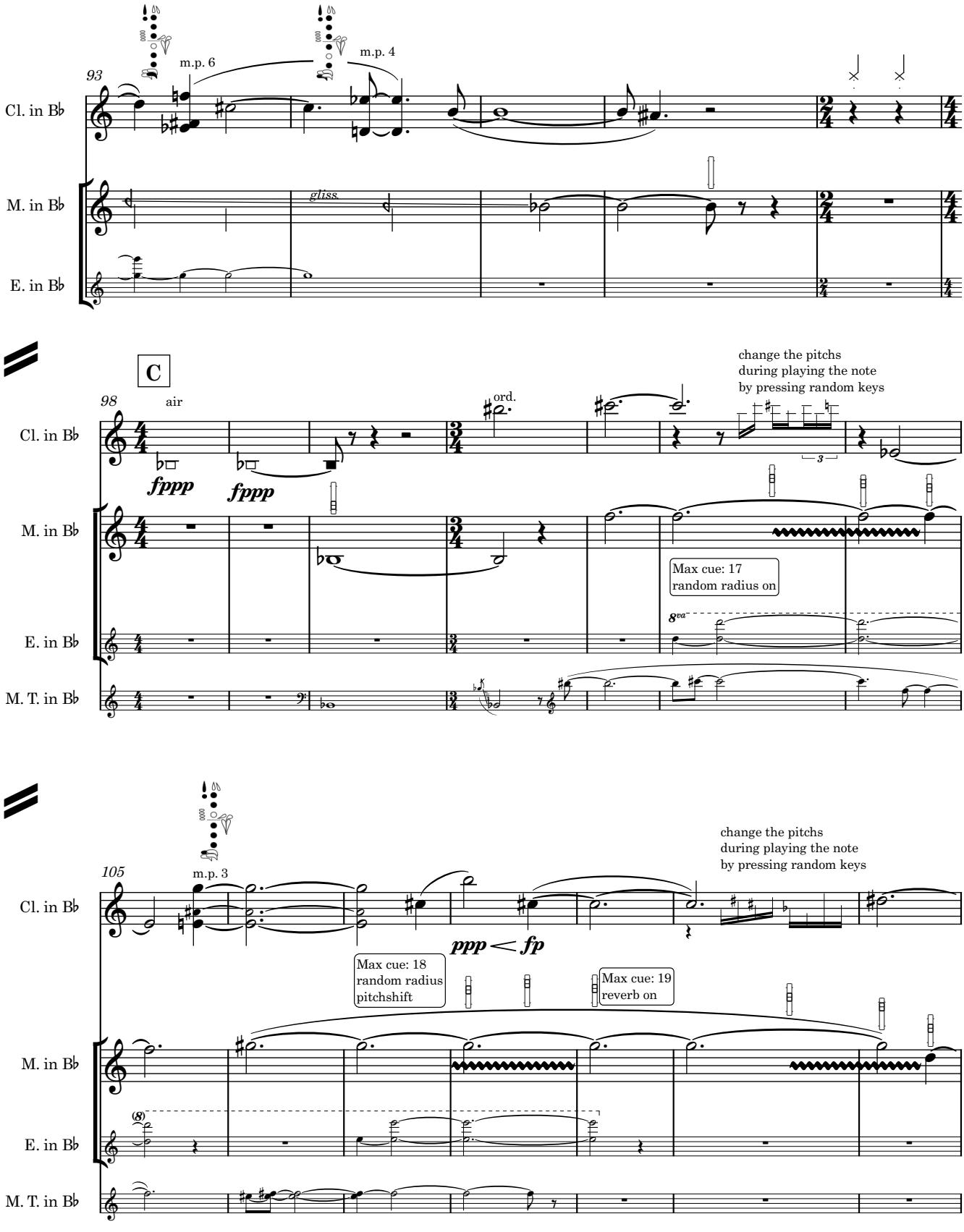
* above the numbers are the cent from the modalys clarinet's sound

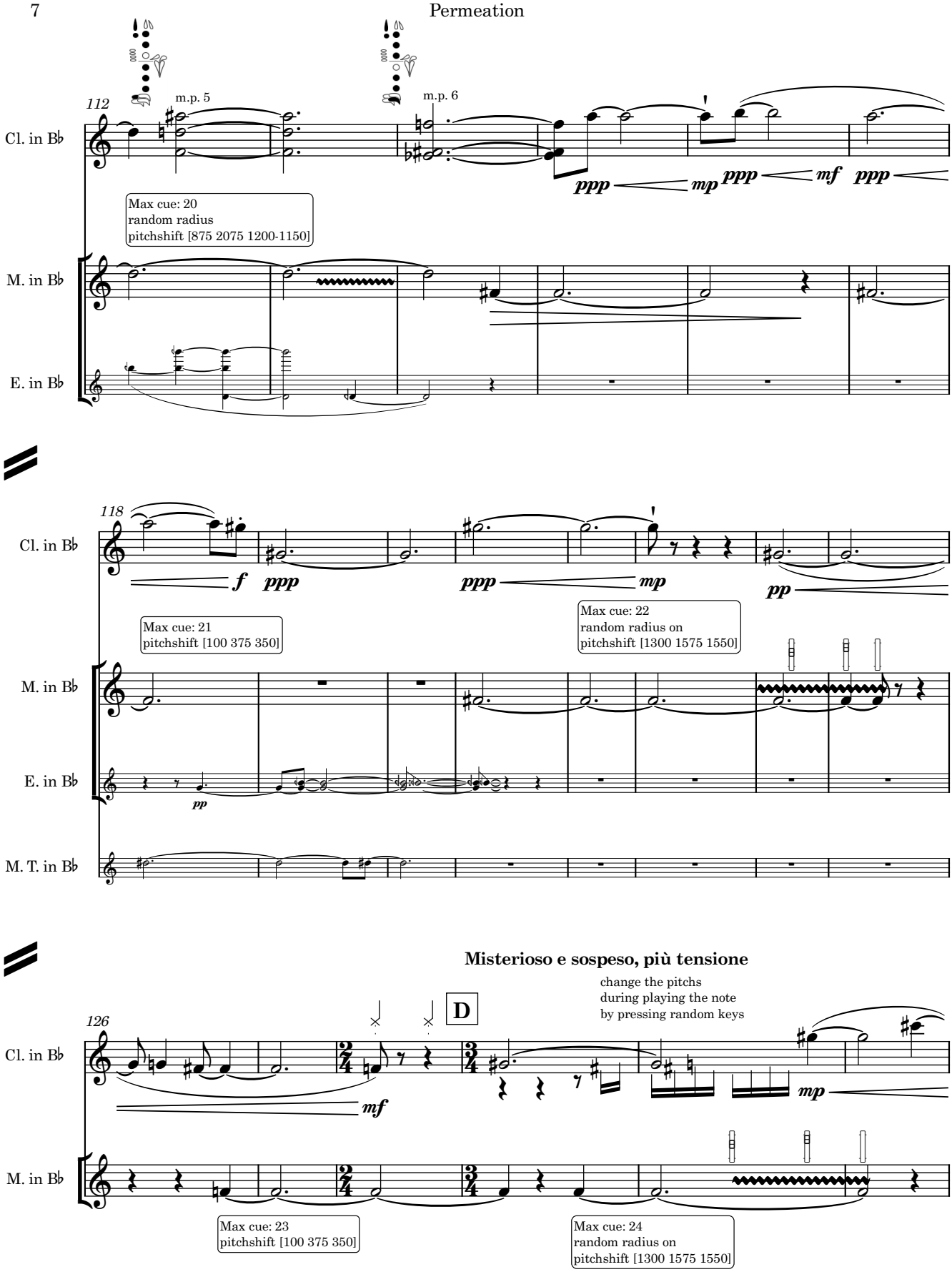

14
sim.
Cl. in B♭
mp
pitchbend: -0.25
M. in B♭
E. in B♭
21
Cl. in B♭
ppppp
pitchbend: +0.25
M. in B♭
R.
0.1
28
air: 50%
Cl. in B♭
M. in B♭
R.

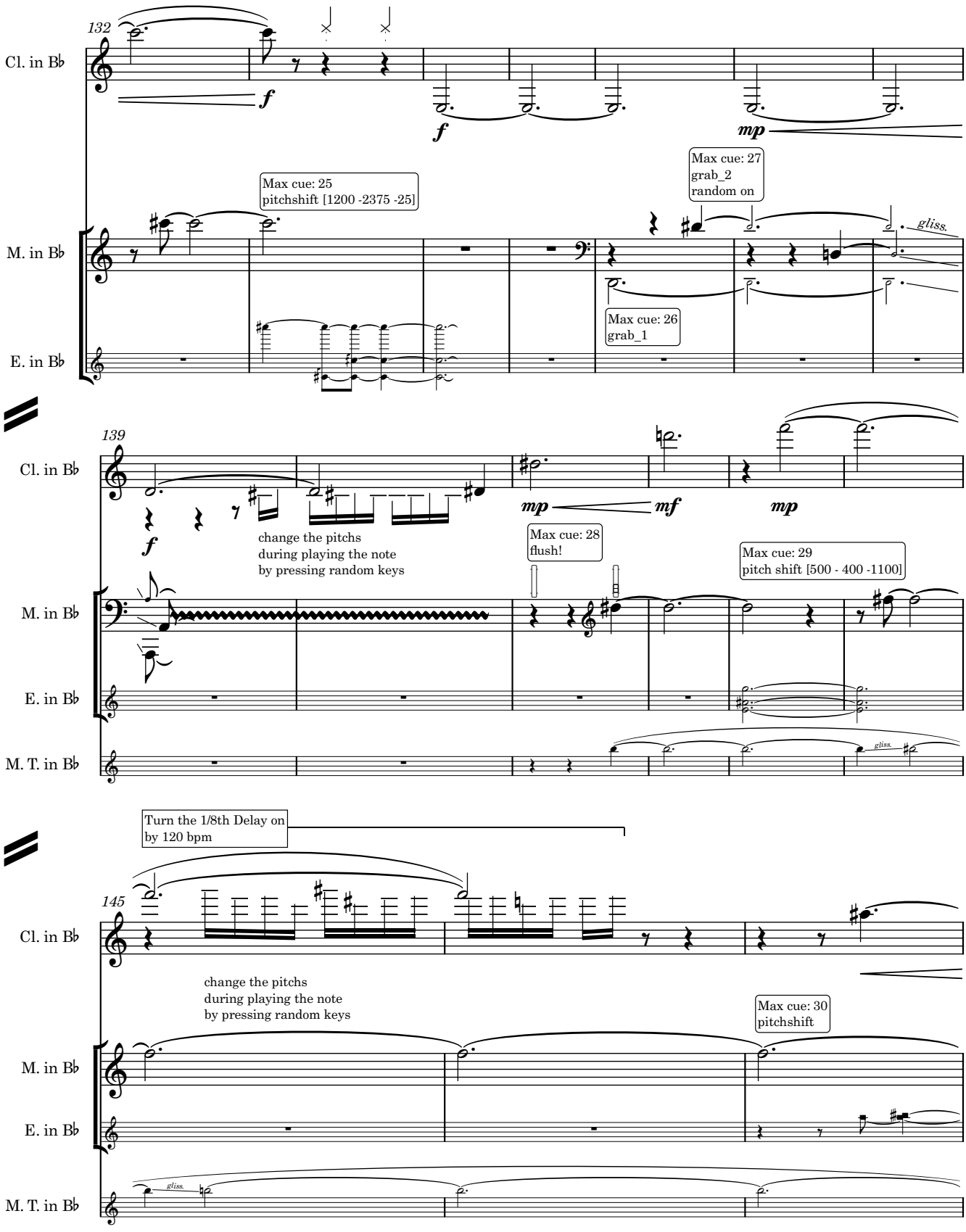

34
air sound
Cl. in B♭
M. in B♭
R.
ppp
Max cue: 2
reverb on
1
40
air: 50%
air -> ord. sound
Cl. in B♭
M. in B♭
E. in B♭
ppppp
ppp
Max cue: 3
pitchshift [100 375 350]
Max cue: 4
pitchshift [100 -100]
A
47
air: 50%
key clicks with air sound
air -> ord. sound
(ord.)
Cl. in B♭
M. in B♭
E. in B♭
R.
p
ppppp
(mf)
ppp
mp
Max cue: 5
pitchshift [100 375 350 1200]
0.2

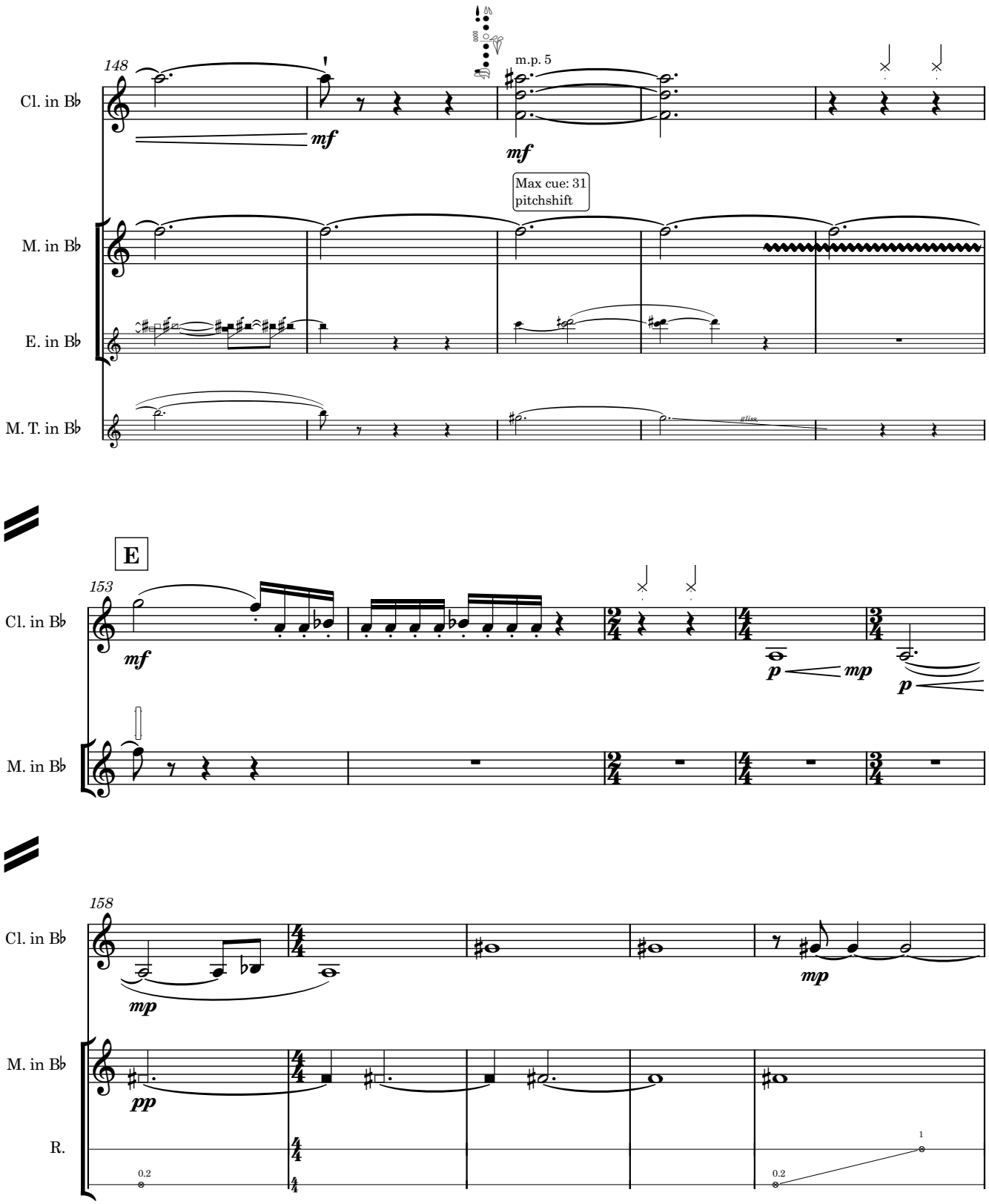

53
Cl. in B♭
M. in B♭
R.
mp
pitchbend: -0.25
0.2
1
58
B
Misterioso e sospeso ♩= 120
m.p. 1(multiphonics)
ppp
Max cue: 8
grab_1
breath: 900 (0)
Max cue: 7
E. in B♭
65
m.p. 2
air sound
pppp
Max cue: 9
grab_2
breath: 900 (0)
Max: 10
pitchshift [1100, 2350 -> 2400]
Max cue: 11
flush!
gliss.

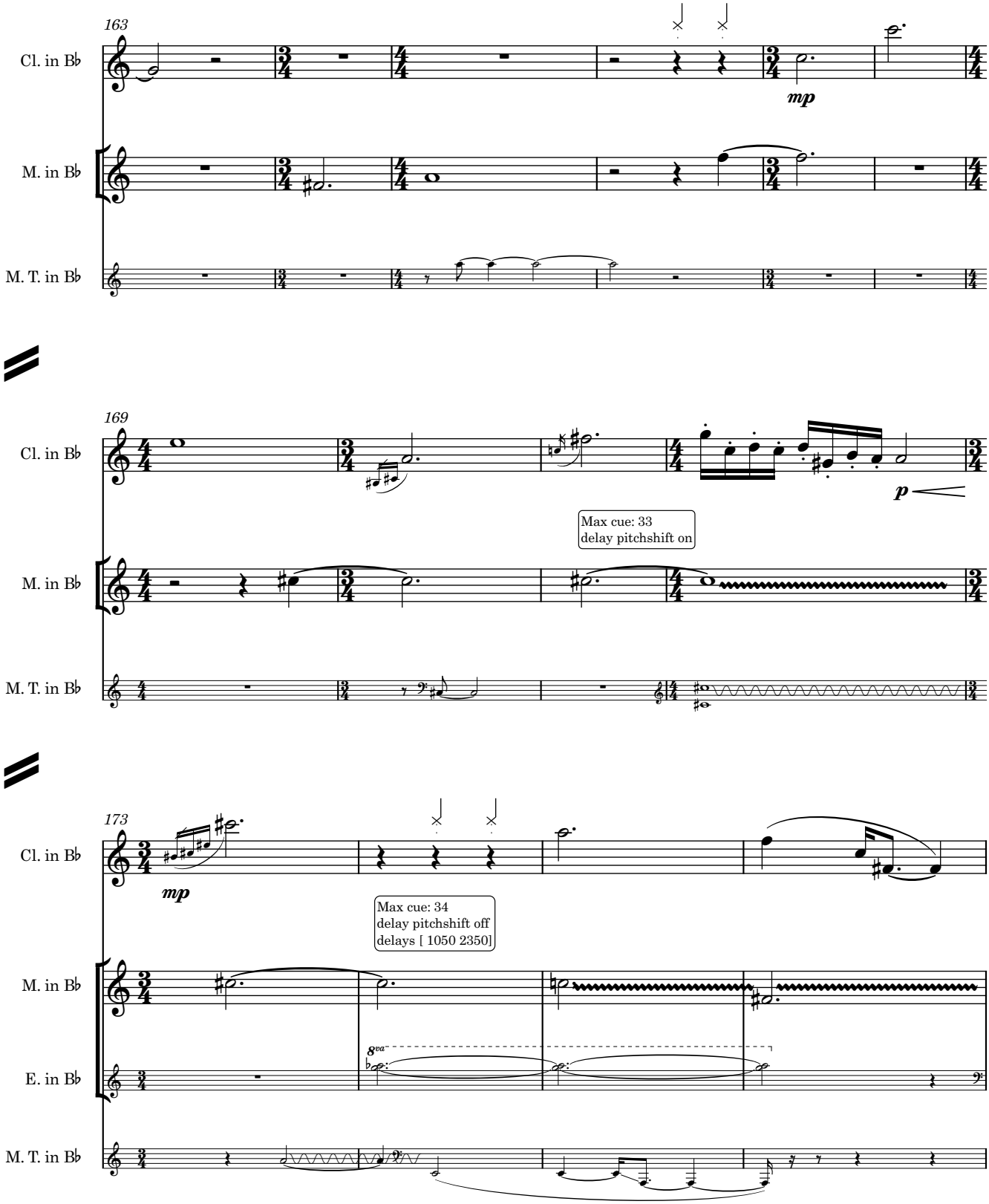

72
m.p. 1 (multiphonics)
ord.
ı.p. 2
Cl. in B♭
ppp
M. in B♭
Max cue: 12
pitchshift [1975]
Max cue: 13
pitchshift [1375
E. in B♭
R.
M. T. in B♭
vib. by BRIGADE CHORUS
78
air sound
Max cue: 14
pitch: 453
breath: 900 (0)
gliss.
f
85
ord.
m.p. 4
m.p. 2
m.p. 5
m.p. 6
m.p. 3
pppp
Max cue: 16
pitchshift
Max cue: 15
pitchbend: 0 -----> -2

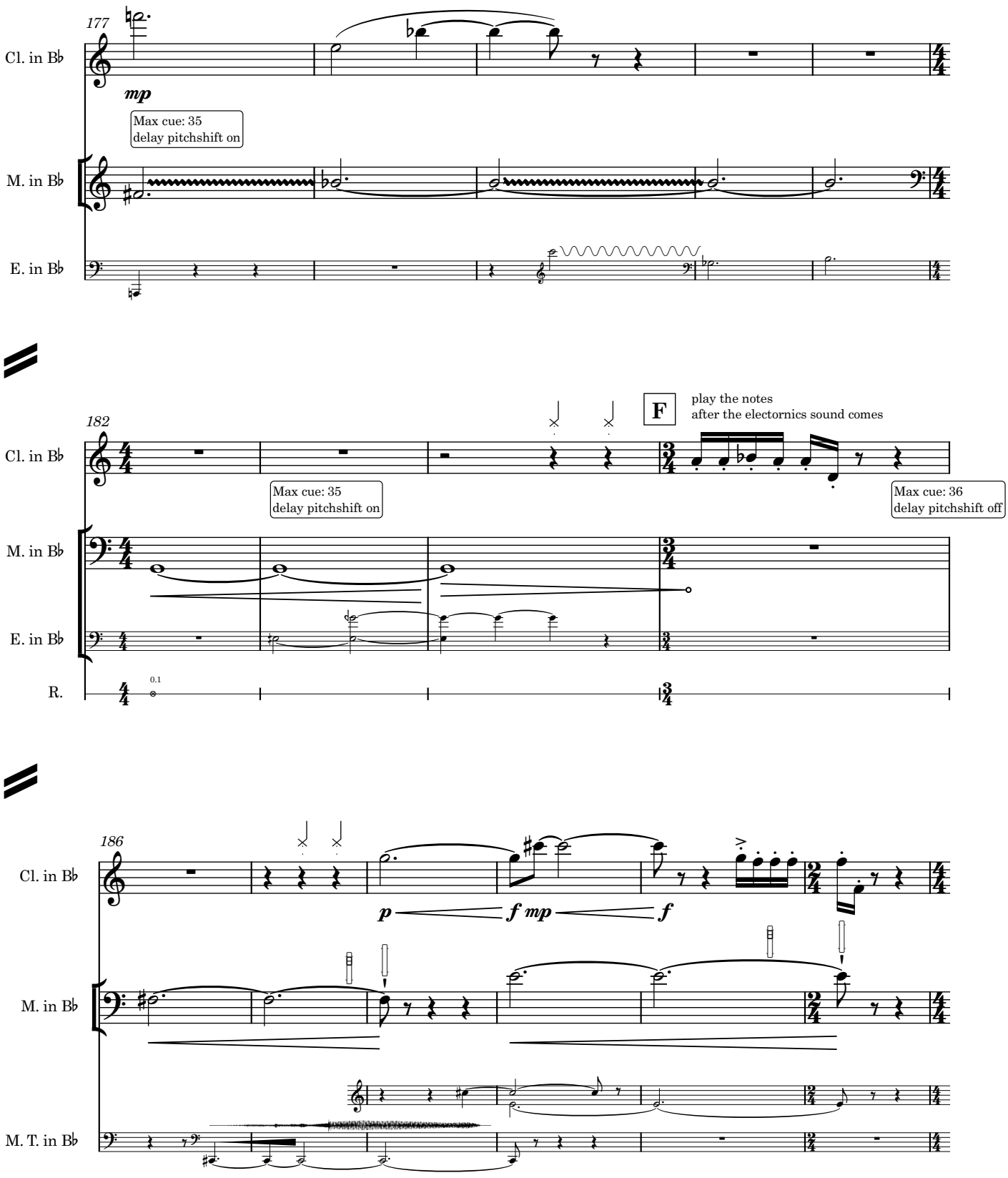

93
m.p. 6
m.p. 4
Cl. in B♭
M. in B♭
E. in B♭
gliss.
C
98
air
ord.
fppp
fppp
change the pitchs
during playing the note
by pressing random keys
3
Max cue: 17
random radius on
8va
M. T. in B♭
105
m.p. 3
ppp < fp
Max cue: 18
random radius
pitchshift
Max cue: 19
reverb on
(8)

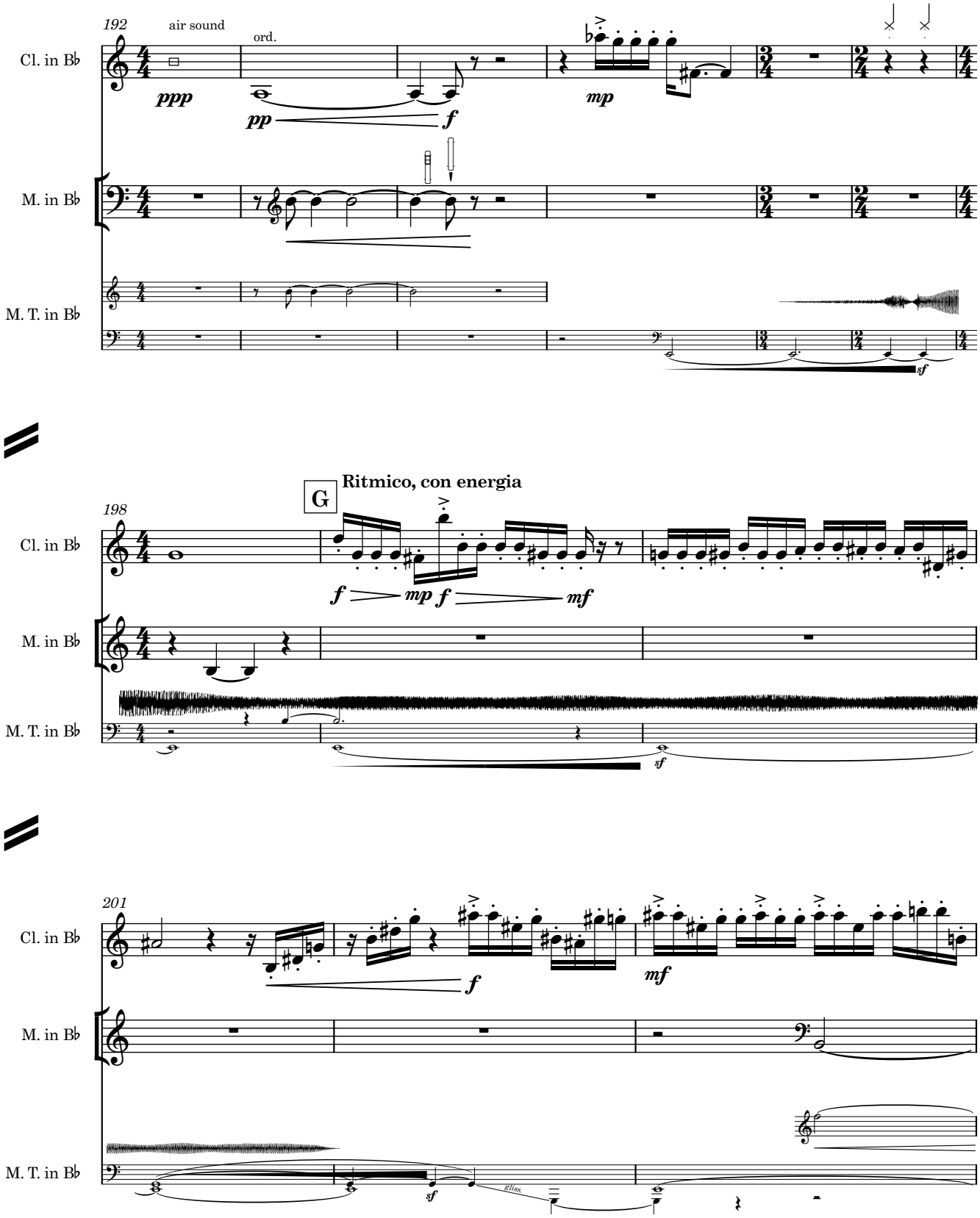

112
m.p. 5
m.p. 6
Cl. in B♭
M. in B♭
E. in B♭
ppp
mp
ppp
mf
ppp
Max cue: 20
random radius
pitchshift [875 2075 1200-1150]
118
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
f
ppp
ppp
mp
pp
pp
Max cue: 21
pitchshift [100 375 350]
Max cue: 22
random radius on
pitchshift [1300 1575 1550]
126
Misterioso e sospeso, più tensione
change the pitchs
during playing the note
by pressing random keys
D
Cl. in B♭
M. in B♭
mf
mp
Max cue: 23
pitchshift [100 375 350]
Max cue: 24
random radius on
pitchshift [1300 1575 1550]

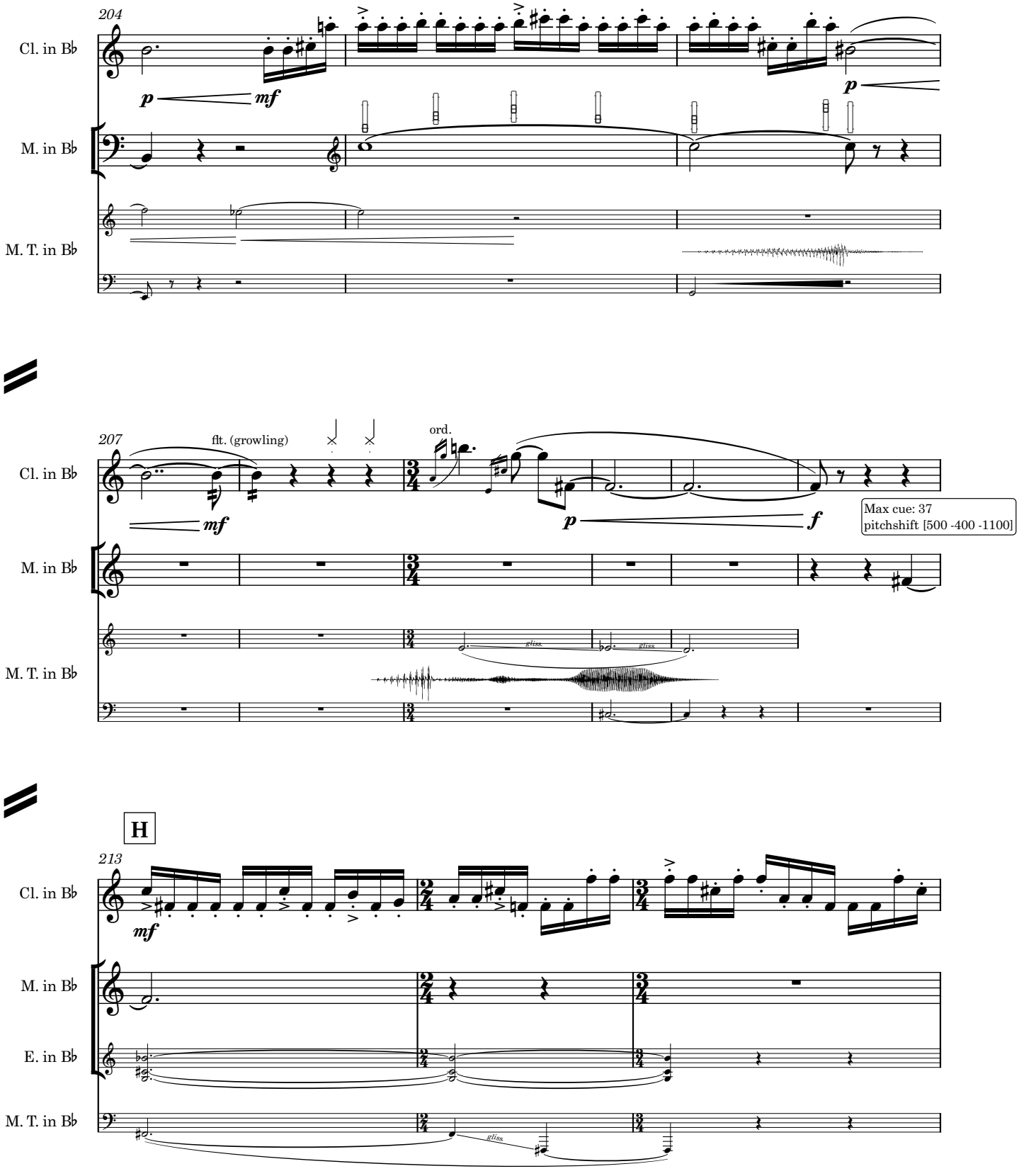

132
Cl. in B♭
M. in B♭
E. in B♭
f
f
mp
Max cue: 25
pitchshift [1200 -2375 -25]
Max cue: 27
grab_2
random on
gliss.
Max cue: 26
grab_1
139
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
f
mp
mf
mp
change the pitchs
during playing the note
by pressing random keys
Max cue: 28
flush!
Max cue: 29
pitch shift [500 - 400 -1100]
gliss.
Turn the 1/8th Delay on
by 120 bpm
145
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
change the pitchs
during playing the note
by pressing random keys
Max cue: 30
pitchshift
gliss.

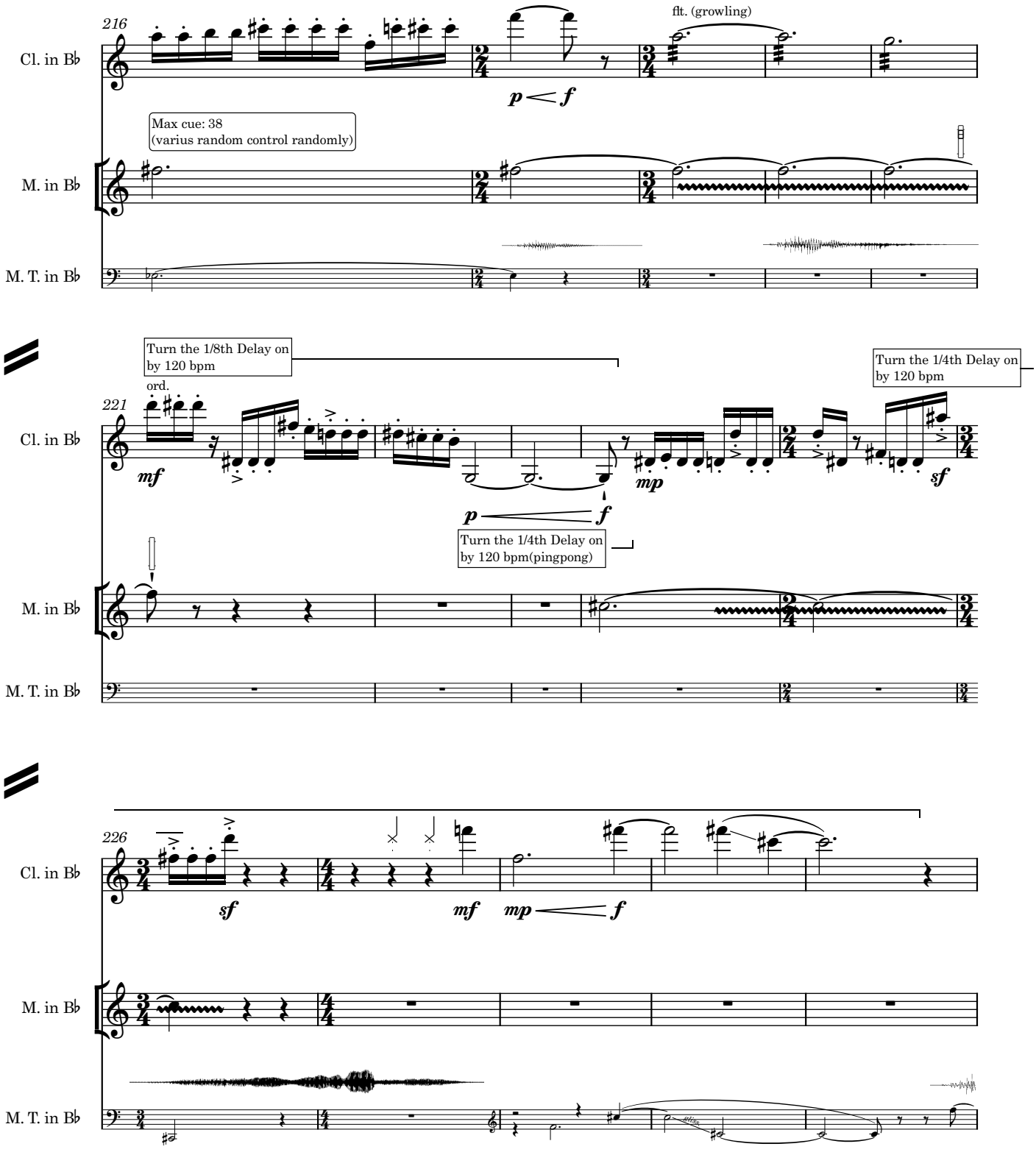

148
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
mf
m.p. 5
Max cue: 31
pitchshift
gliss.
E
153
p
mp
158
pp
R.
0.2
1

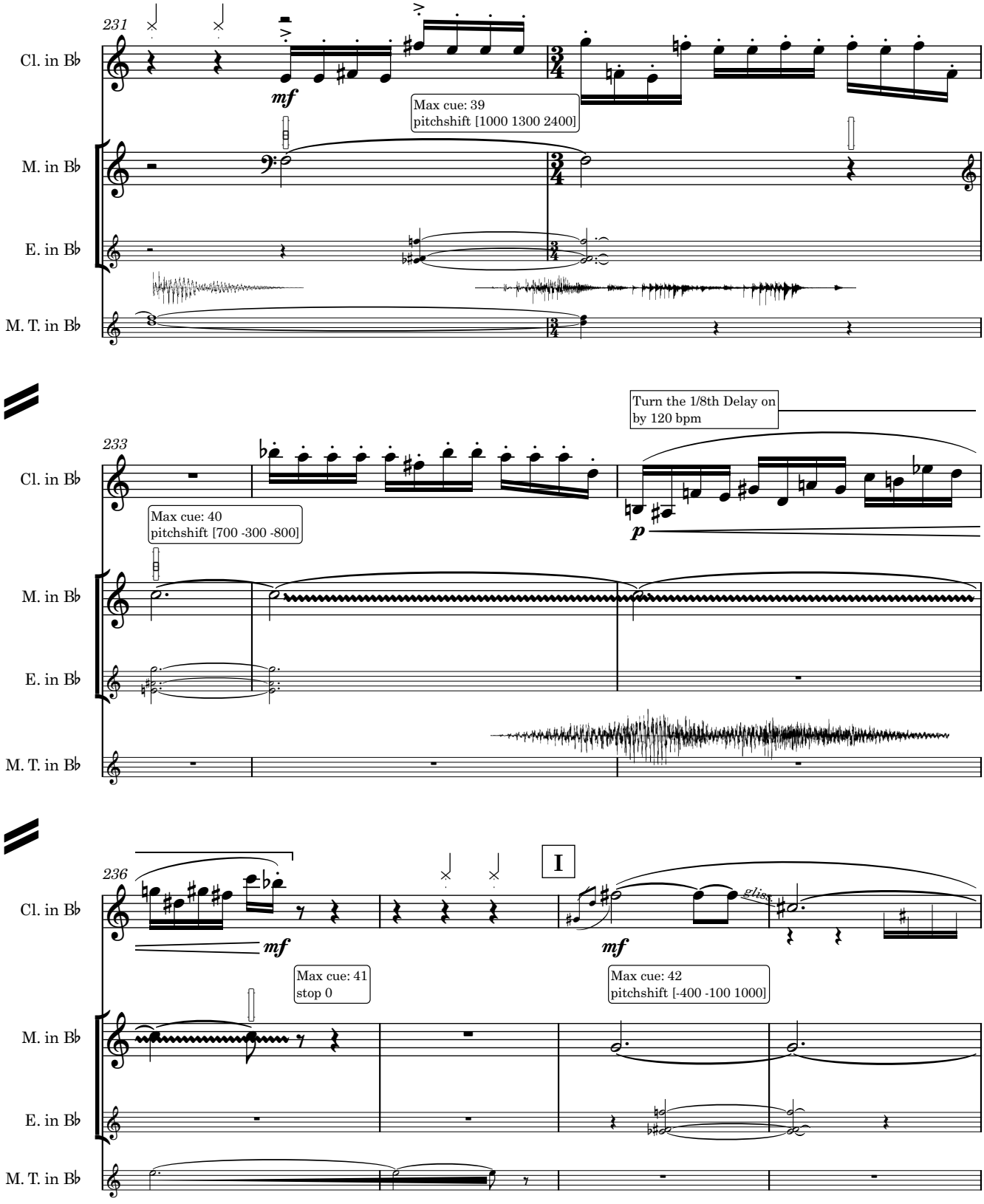

163
Cl. in B♭
M. in B♭
M. T. in B♭
mp
169
Cl. in B♭
M. in B♭
M. T. in B♭
p
Max cue: 33
delay pitchshift on
173
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
mp
Max cue: 34
delay pitchshift off
delays [1050 2350]
8va

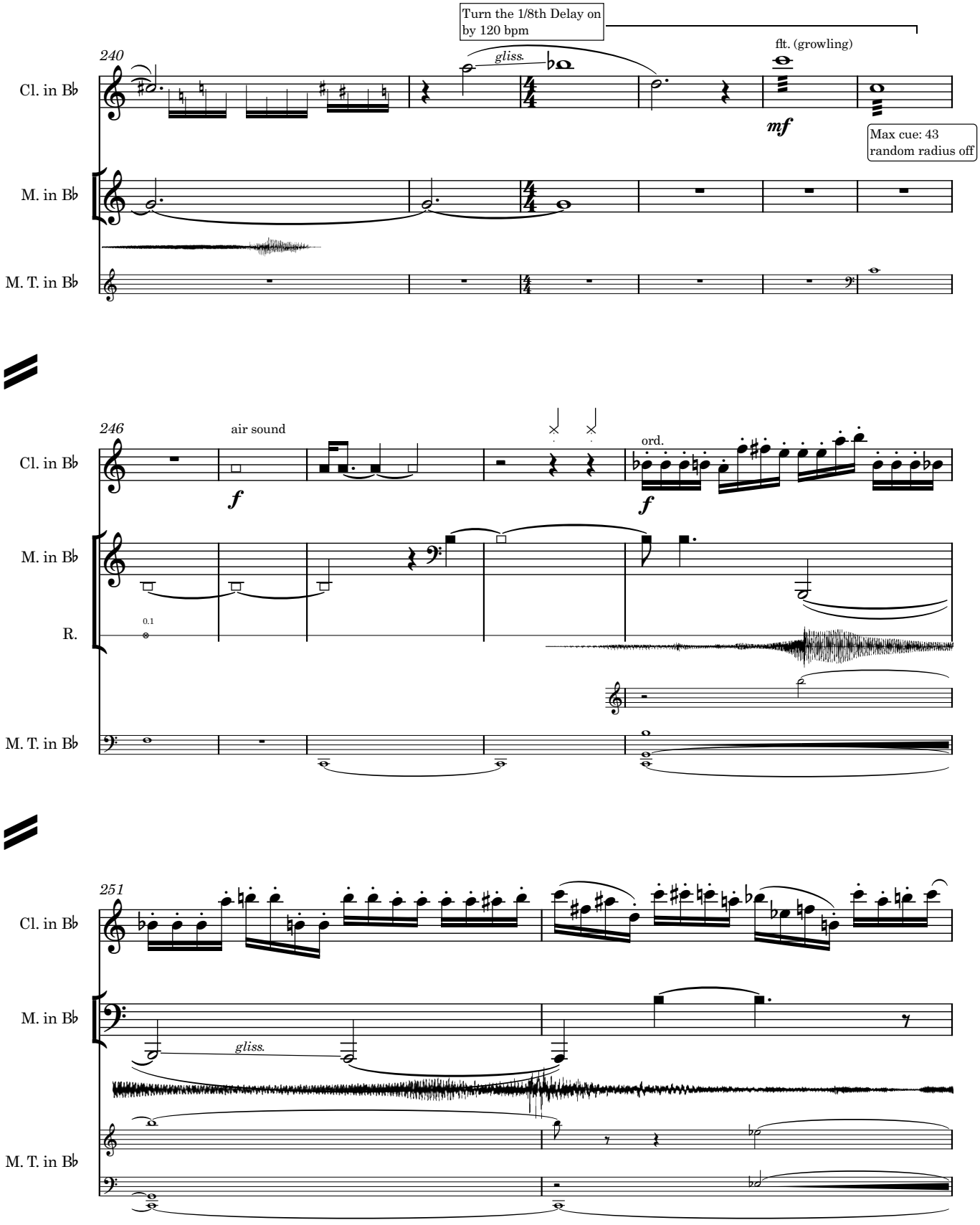

177
Cl. in B♭
mp
Max cue: 35
delay pitchshift on
M. in B♭
E. in B♭
182
Cl. in B♭
F
play the notes
after the electornics sound comes
Max cue: 35
delay pitchshift on
Max cue: 36
delay pitchshift off
M. in B♭
E. in B♭
R.
0.1
186
Cl. in B♭
p
f mp
f
M. in B♭
M. T. in B♭

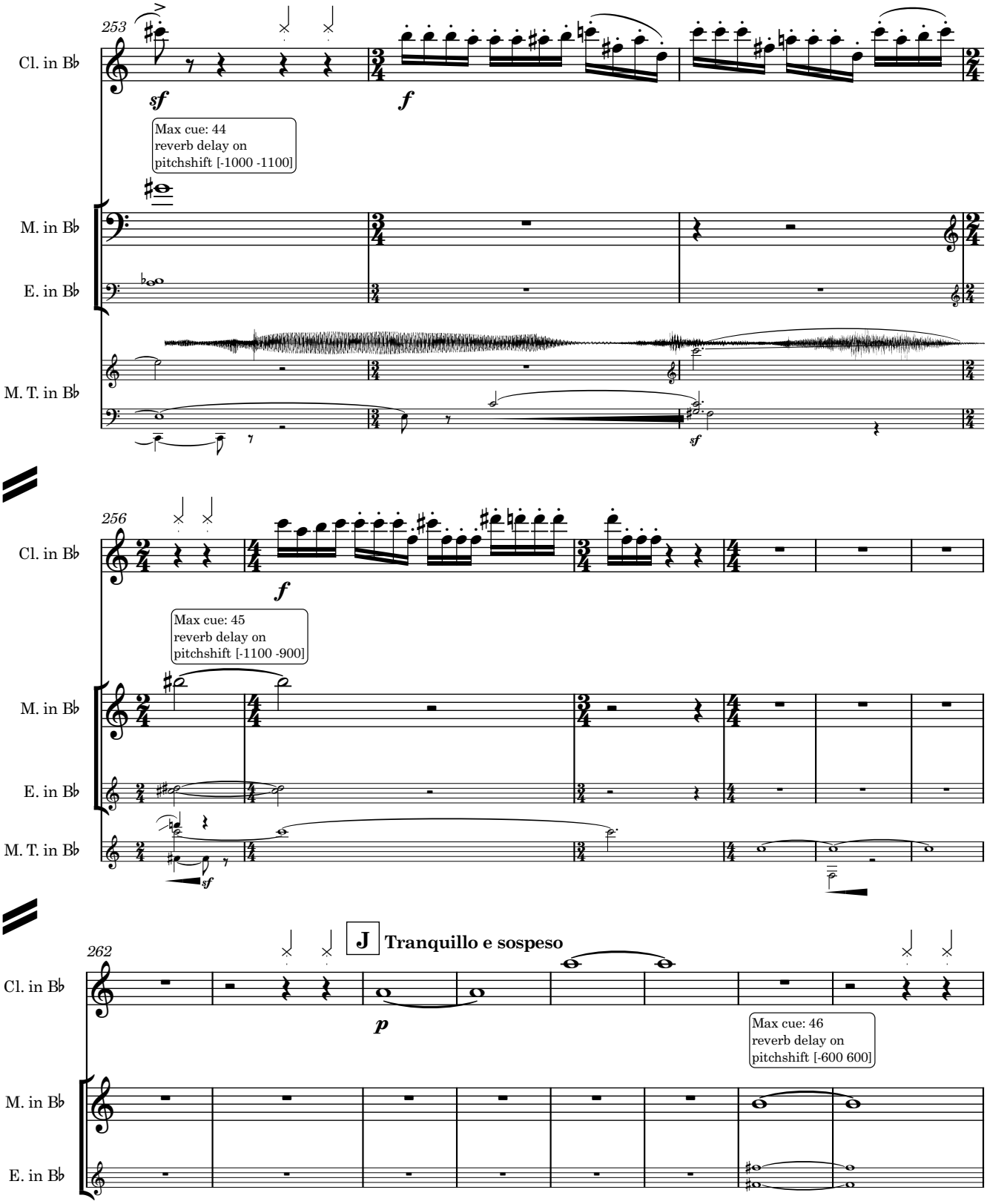

192
air sound
ord.
Cl. in B♭
M. in B♭
M. T. in B♭
ppp
pp
f
mp
sf
G
Ritmico, con energia
198
mp
mf
201
gliss.

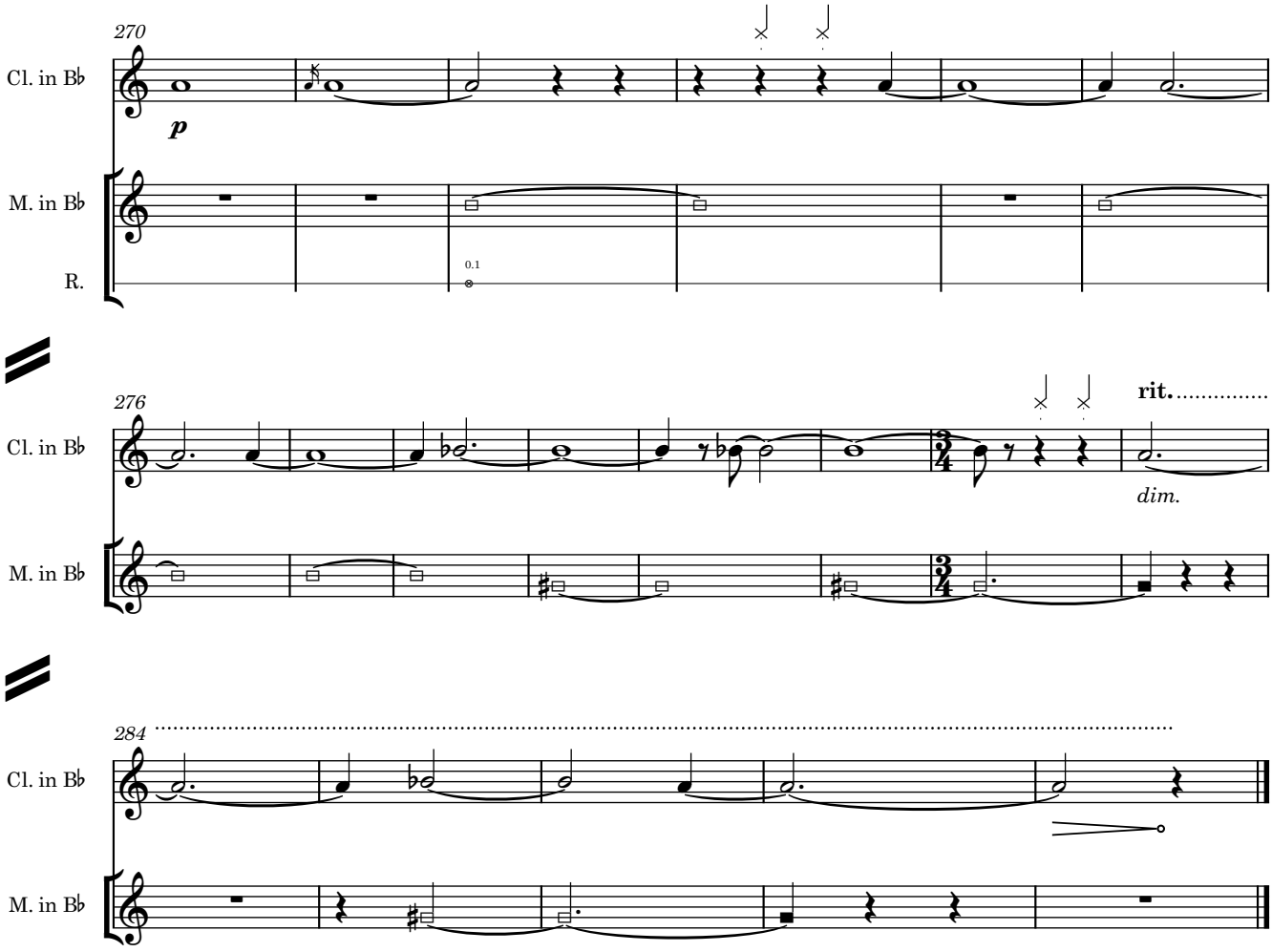

204
Cl. in B♭
M. in B♭
M. T. in B♭
p
mf
p
207
flt. (growling)
ord.
Cl. in B♭
M. in B♭
M. T. in B♭
mf
p
f
gliss.
gliss.
Max cue: 37
pitchshift [500 -400 -1100]
H
213
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
mf
gliss.


216
Cl. in B♭
flt. (growling)
p f
Max cue: 38
(varius random control randomly)
M. in B♭
M. T. in B♭
Turn the 1/8th Delay on
by 120 bpm
ord.
221
Cl. in B♭
mf
mp
p f
sf
Turn the 1/4th Delay on
by 120 bpm
Turn the 1/4th Delay on
by 120 bpm(pingpong)
M. in B♭
M. T. in B♭
226
Cl. in B♭
sf
mf
mp f
M. in B♭
M. T. in B♭


231
Cl. in B♭
M. in B♭
E. in B♭
M. T. in B♭
mf
Max cue: 39
pitchshift [1000 1300 2400]
233
Turn the 1/8th Delay on
by 120 bpm
p
Max cue: 40
pitchshift [700 -300 -800]
236
I
mf
gliss.
Max cue: 41
stop 0
Max cue: 42
pitchshift [-400 -100 1000]


Turn the 1/8th Delay on by 120 bpm
240
gliss.
flt. (growling)
mf
Max cue: 43 random radius off
Cl. in B♭
M. in B♭
M. T. in B♭
246
air sound
f
ord.
f
R.
0.1
251
gliss.


253
Cl. in B♭
sf
f
Max cue: 44
reverb delay on
pitchshift [-1000 -1100]
M. in B♭
E. in B♭
M. T. in B♭
sf
256
Cl. in B♭
f
Max cue: 45
reverb delay on
pitchshift [-1100 -900]
M. in B♭
E. in B♭
M. T. in B♭
sf
262
J Tranquillo e sospeso
Cl. in B♭
p
Max cue: 46
reverb delay on
pitchshift [-600 600]
M. in B♭
E. in B♭


270
Cl. in B♭
M. in B♭
R.
p
0.1
276
Cl. in B♭
M. in B♭
rit.
dim.
284
Cl. in B♭
M. in B♭