r e s o n a n c e s

for marimba and electronics

A piece by
Maxwell Franko and Samuel Wheeler

2023

Resonances was initially composed as a collaboration between composer Maxwell Franko and percussionist Samuel Wheeler in Austin, Texas.

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After a closer listening, you can hear the fascinating sounds that appear out of the marimba beyond the intended pitch that's being played. Individual keys resonate on higher partials in the harmonic series, the combination of two close pitches creates a powerful frequency clashing, the lower register begins to disappear – favoring its higher partials, etc.

These ever-present sounds resonate so well together and have such beautiful movement in themselves, yet they need just a little push to be heard in the context of a performance. This piece focuses on these sounds, the room they are being played in, and, using live electronic processing, enhances them so that they become the central listening experience.

Using a performer-controlled Max MSP patch, pitch bending from minute increments to the full octave, a few moments of fixed media, and live-sampling of resonances, the performer accesses some the deeper sounds found within the keys of the marimba and puts them into focus for the audience.

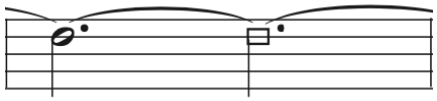
Equipment Needs

5-octave marimba
2 bass bows
4 soft-medium mallets
fabric cloth – to cover upper half of marimba
Max MSP (created on v8.3.1)
laptop
interface with at least 4 outputs if no mixer is available
4.1 speaker system – quadrophonic + 1 subwoofer – can be re-routed to stereo
on/off footpedal + MIDI controller if no USB to MIDI is accessible
(optional) electronic drum pad trigger
(optional) additional laptop stand or music stand as needed

Performance Notes

- Throughout, the upper staff is representing only the left hand (LH) and the lower staff, the right hand (RH).
- When shown, the third staff is showing either the current processing in the electronics or what the performer should be doing to trigger that processing. All moments where the performer must trigger an electronic process are marked with a bold number (#) in a circle in the third staff.
- All mallet and bow changes are shown by little pictures of what the current hand should look like. Anything beyond that – *such as additional mallets for changes in tone and color* – are up to the performer to decide.
- While the tempo is marked as around Qu = 50, the performer can push and pull any moments as needed as long as enough time is given for the audience to hear the intricacies of the sounds – especially in the final section where the audience is meant to hear the slow change in resonance and frequency beating.

Notation



Block noteheads indicate the performer should be applying little to no bow pressure on the marimba. The result should be a very airy sound with light pitch if any at all.

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When bowing for an extended period of time, alternate bow takes up and down ad lib. Try to create as smooth of a connection as possible.

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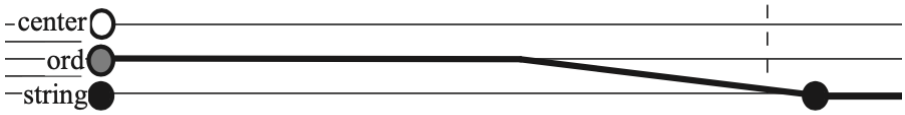

In the final section of the piece, the three-line staff shows where the performer should be playing on each key on (LH) and (RH) separately. From top to bottom, the nodes are:

1. Center – a lot of high partials, a little bit of fundamental
2. Ord. – a lot of fundamental, not much of anything else
3. String – playing over the string, dampened sound, a lot of contact noise

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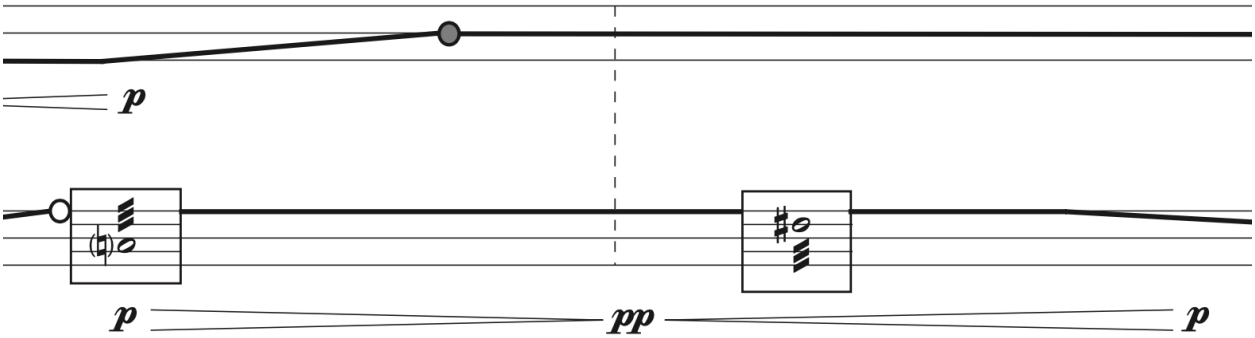

In the final section, changes in pitch are indicated by individual boxes. The performer should change pitch when reaching the box, and while doing so, use the second mallet in hand to create a crossfade from the previous pitch. Until the next pitch is shown, remain on the same one, continuing to follow the node changes as they come.

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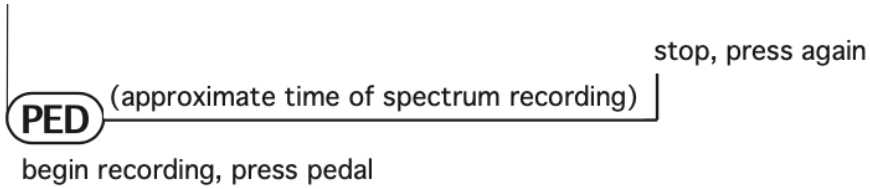

In the final section, these markings are shown to give an approximate time that the performer should press the footpedal to trigger the spectral recording. Like mentioned earlier, the amount of time is kind of arbitrary as long as enough time is given to capture the static recording of a pitch.

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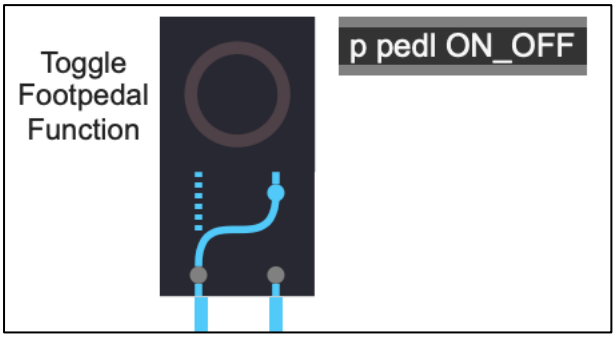
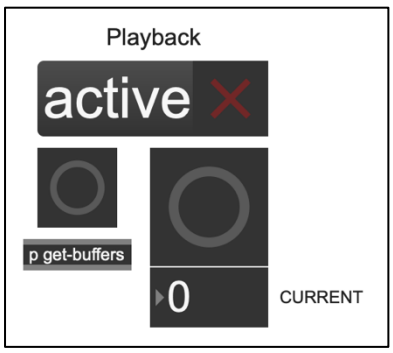
Max MSP (built in v8.3.1)

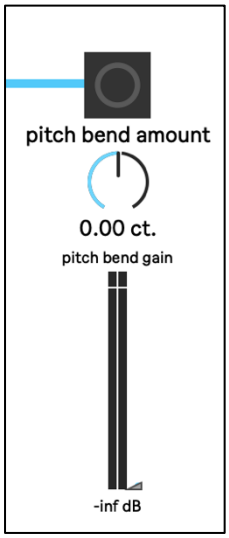
The large *bang* object toggles the patch between two different modes that change how the footpedal is functioning.



Mode 1: the footpedal triggers a series of incremental pitch bends followed by a stop. Both stops and starts are indicated on the electronics staff. Each press of the pedal advances the cue counter linearly so be careful to only press when shown.

- The final pitch bend is a full octave and should remain on for the rest of the performance after it is triggered.
- A manual cue interface is included if the pedal stops functioning.





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marimba score

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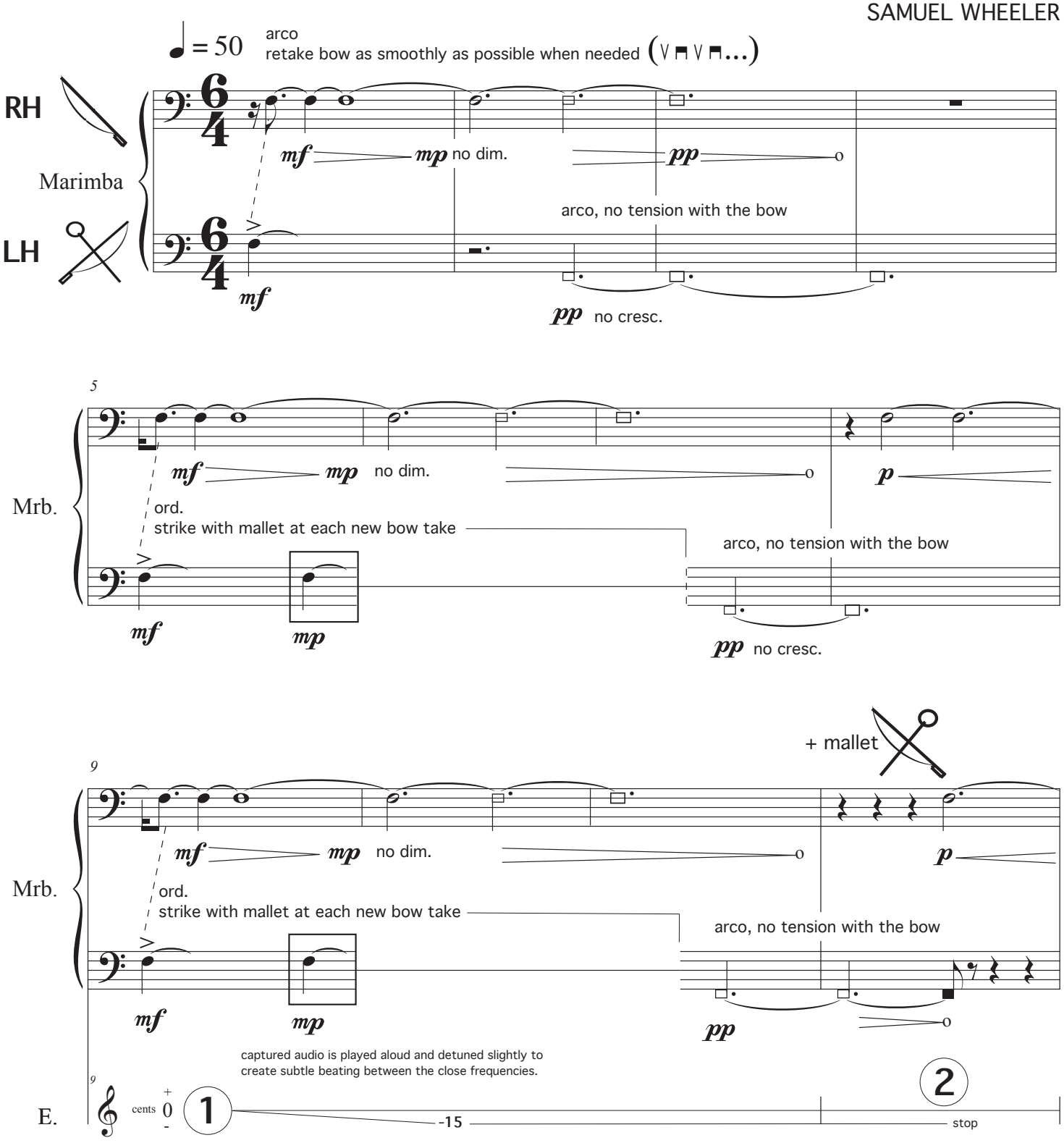
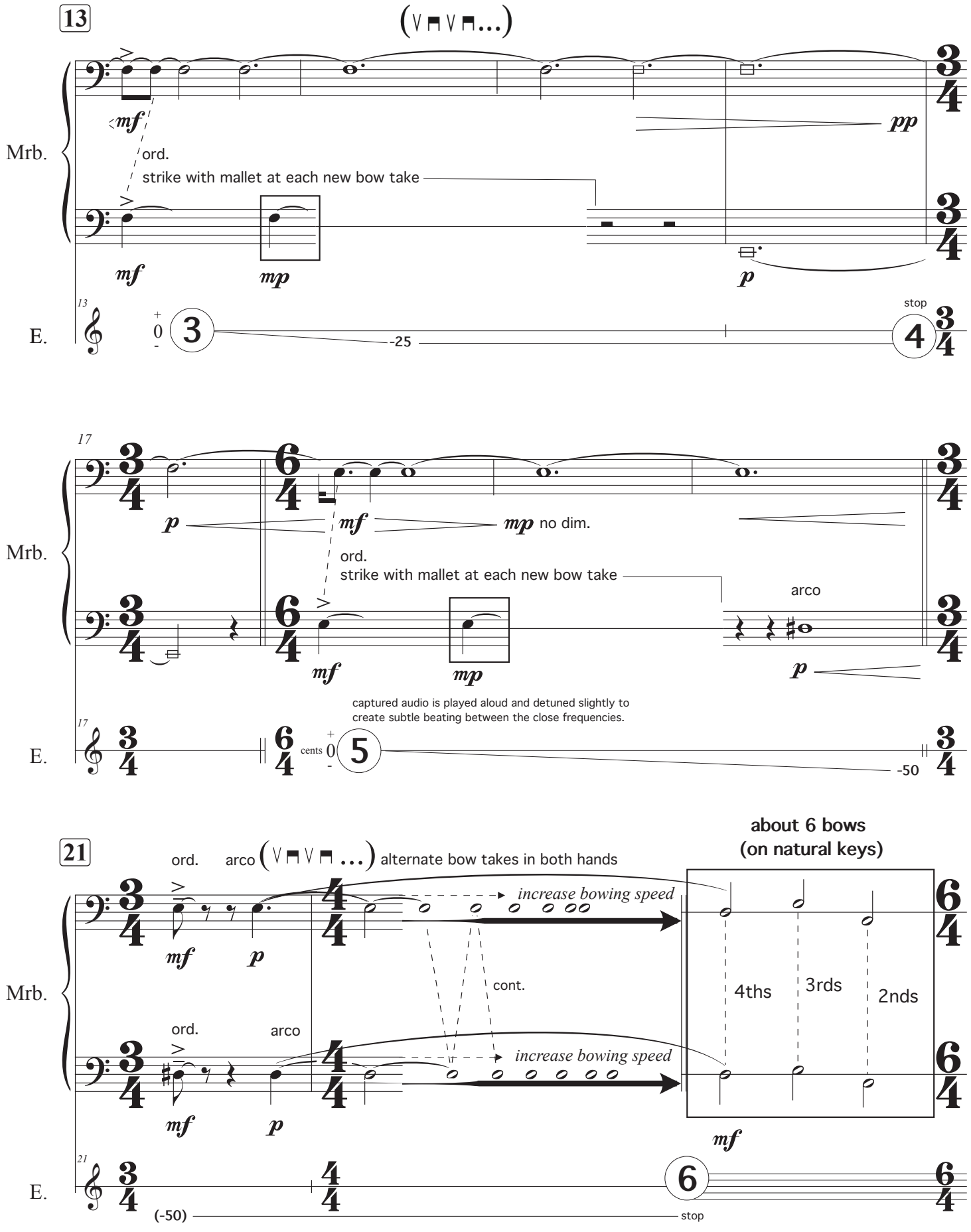
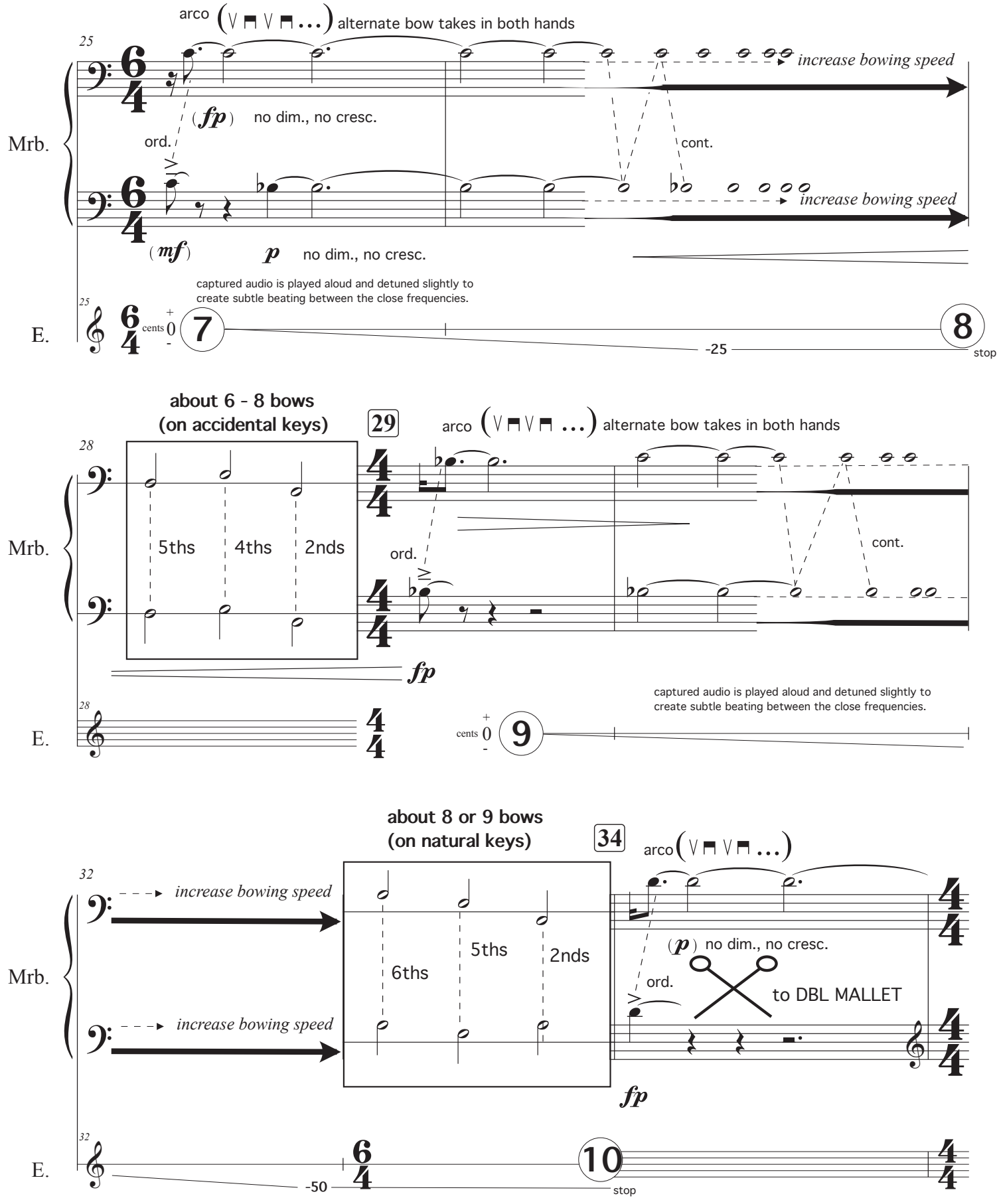
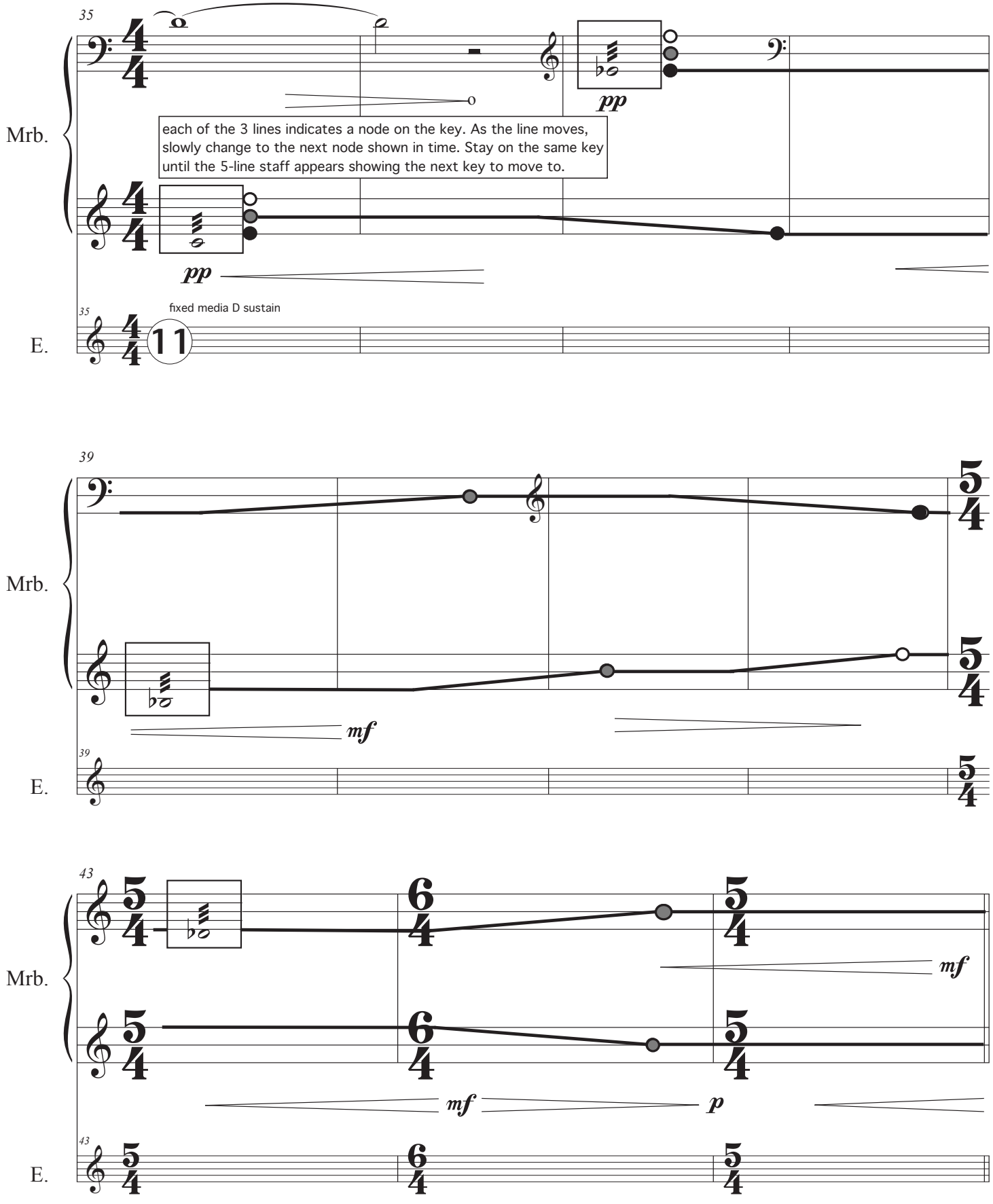
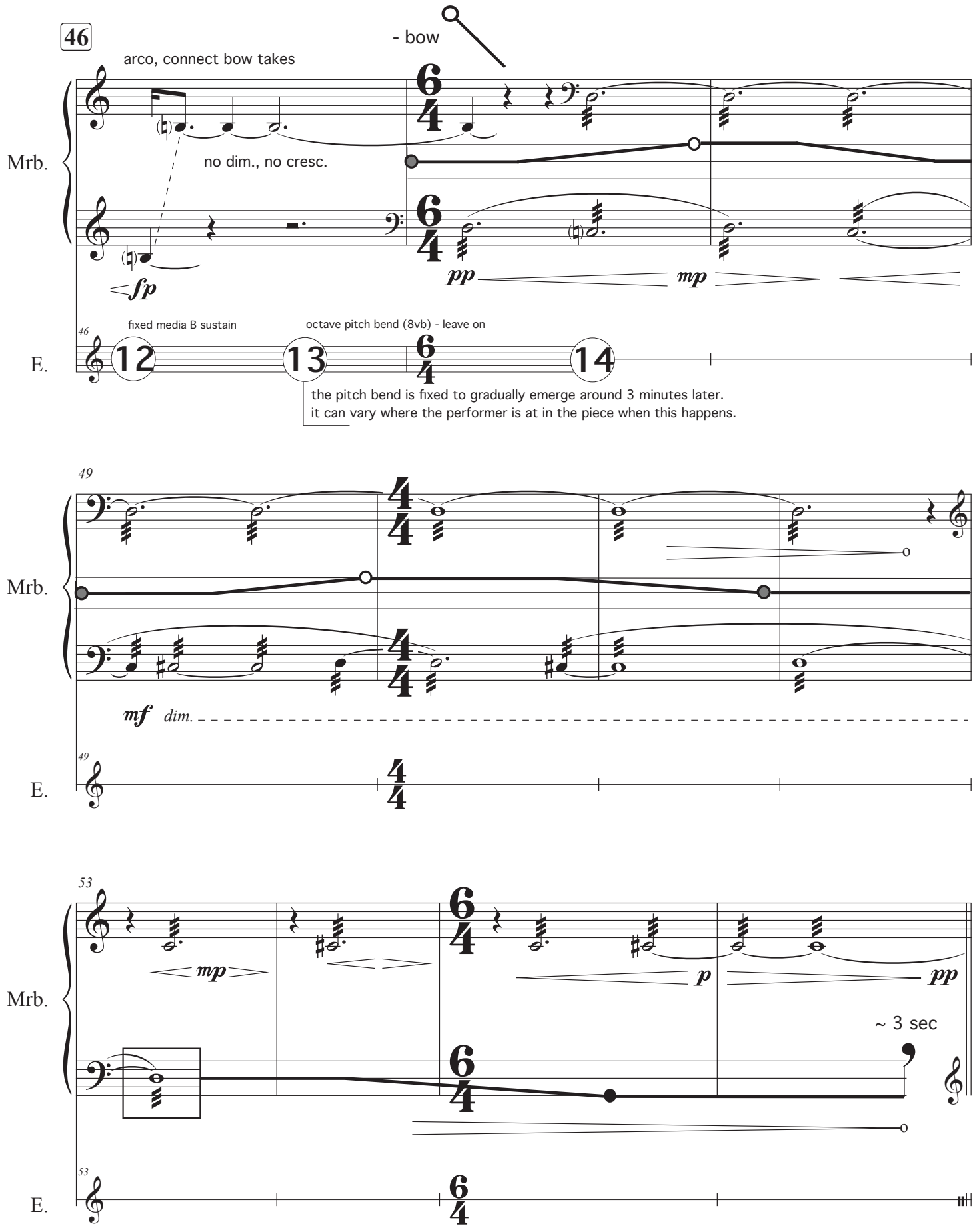
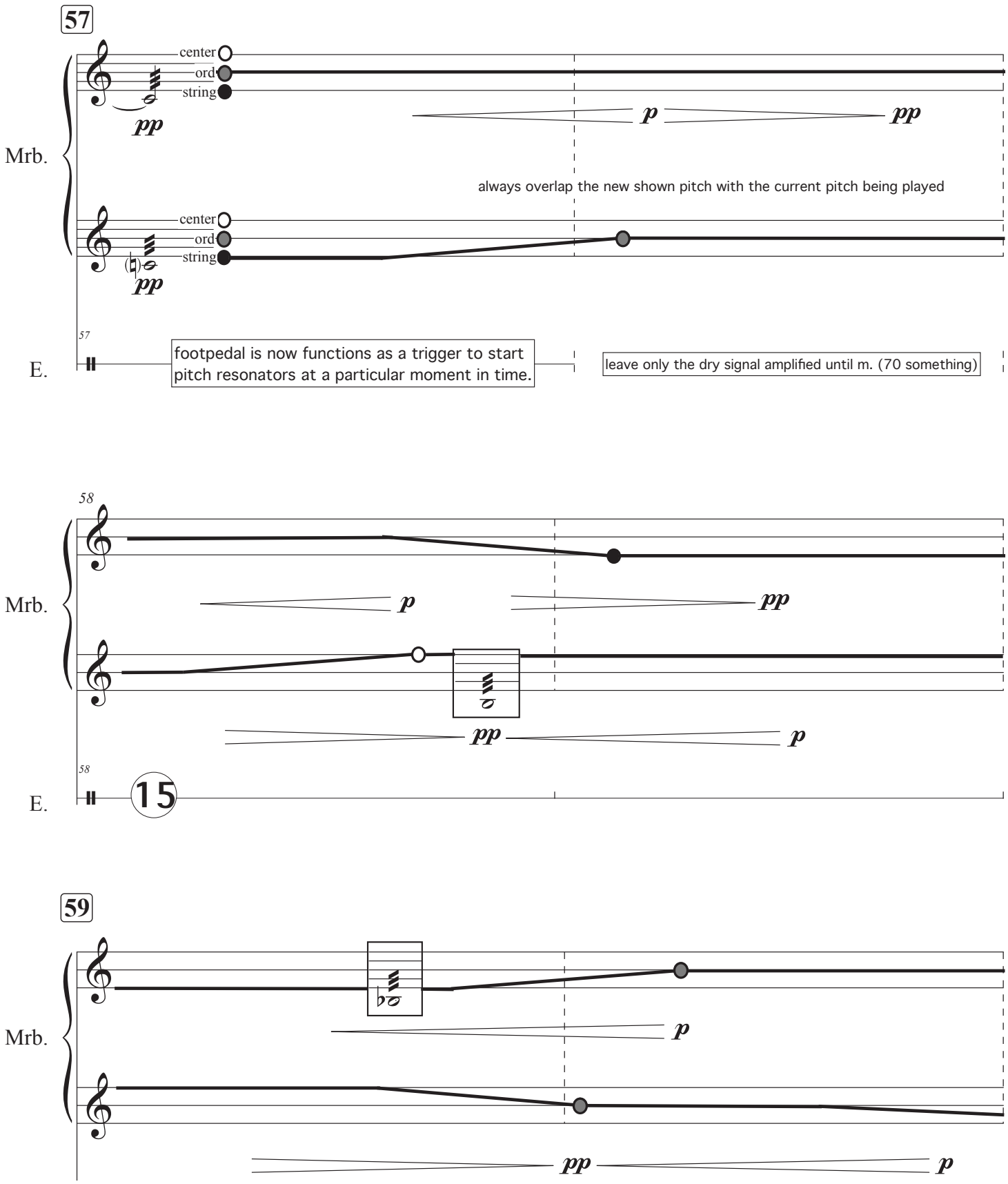


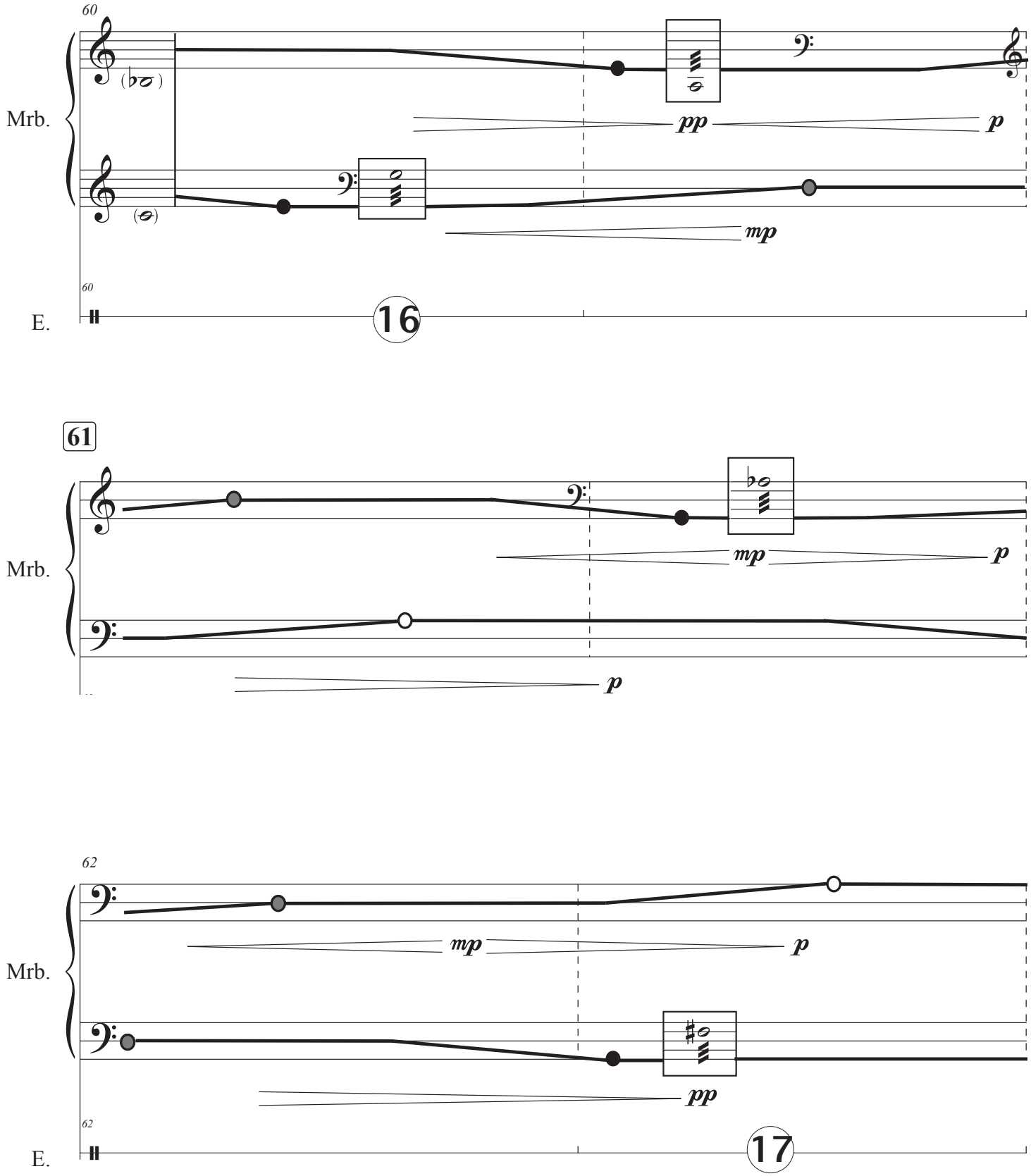

13
(∨ ⊓ ∨ ⊓ ...)
Mrb.
mf
ord.
strike with mallet at each new bow take
pp
mf
mp
p
E.
13
+ 0 -
3
-25
stop
4
17
p
mf
mp no dim.
ord.
strike with mallet at each new bow take
arco
mf
mp
p
captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.
E.
17
cents + 0 -
5
-50
21
ord.
arco (∨ ⊓ ∨ ⊓ ...) alternate bow takes in both hands
about 6 bows (on natural keys)
increase bowing speed
cont.
4ths
3rds
2nds
increase bowing speed
Mrb.
mf
p
ord.
arco
mf
p
mf
E.
21
6
(-50)
stop

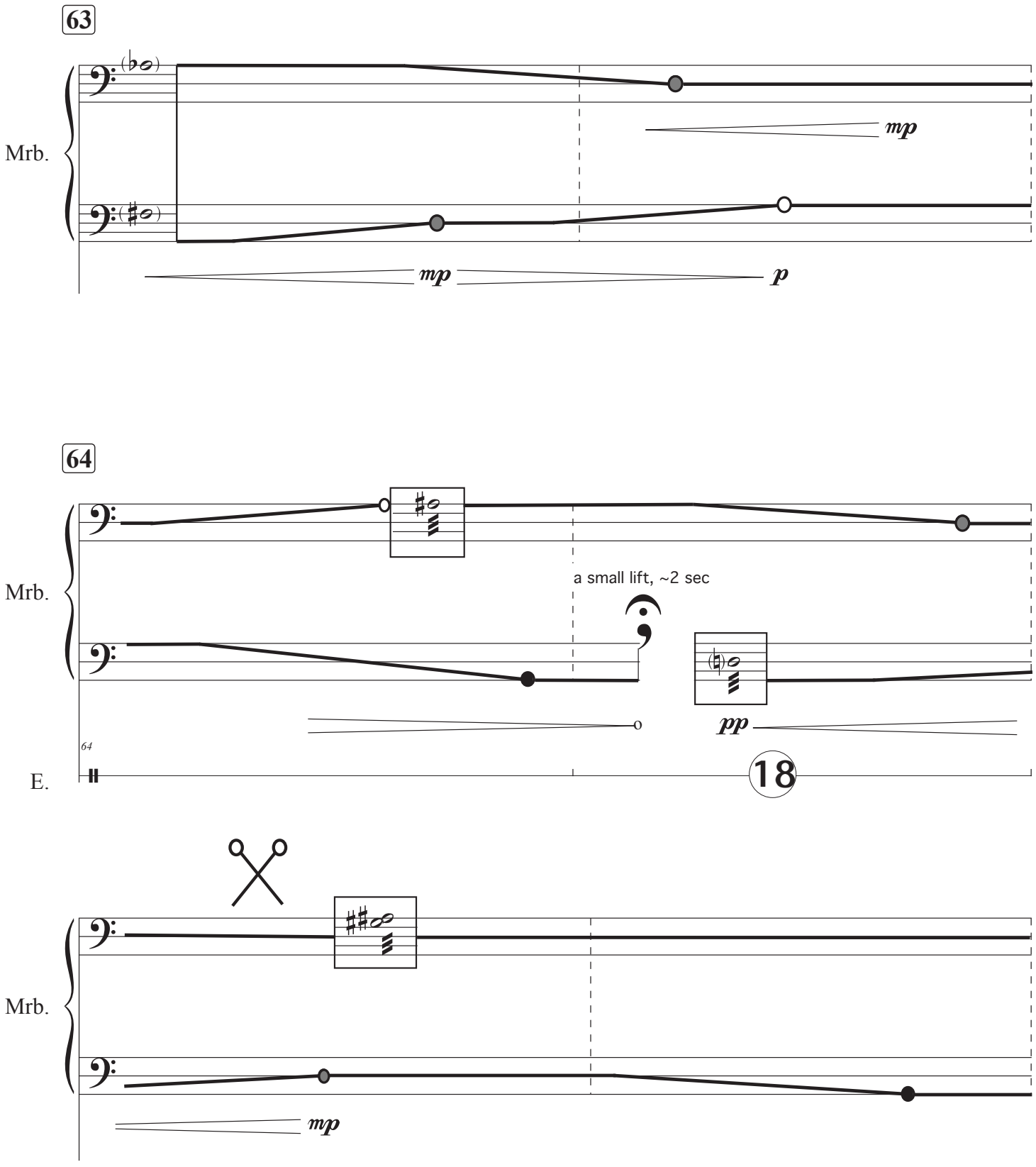

arco alternate bow takes in both hands
increase bowing speed
(fp) no dim., no cresc.
ord.
cont.
increase bowing speed
(mf)
p no dim., no cresc.
Mrb.
captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.
E.
cents
-25
stop
about 6 - 8 bows (on accidental keys)
5ths
4ths
2nds
arco alternate bow takes in both hands
ord.
cont.
fp
captured audio is played aloud and detuned slightly to create subtle beating between the close frequencies.
about 8 or 9 bows (on natural keys)
increase bowing speed
6ths
5ths
2nds
arco
(p) no dim., no cresc.
ord.
to DBL MALLET
fp
-50
stop

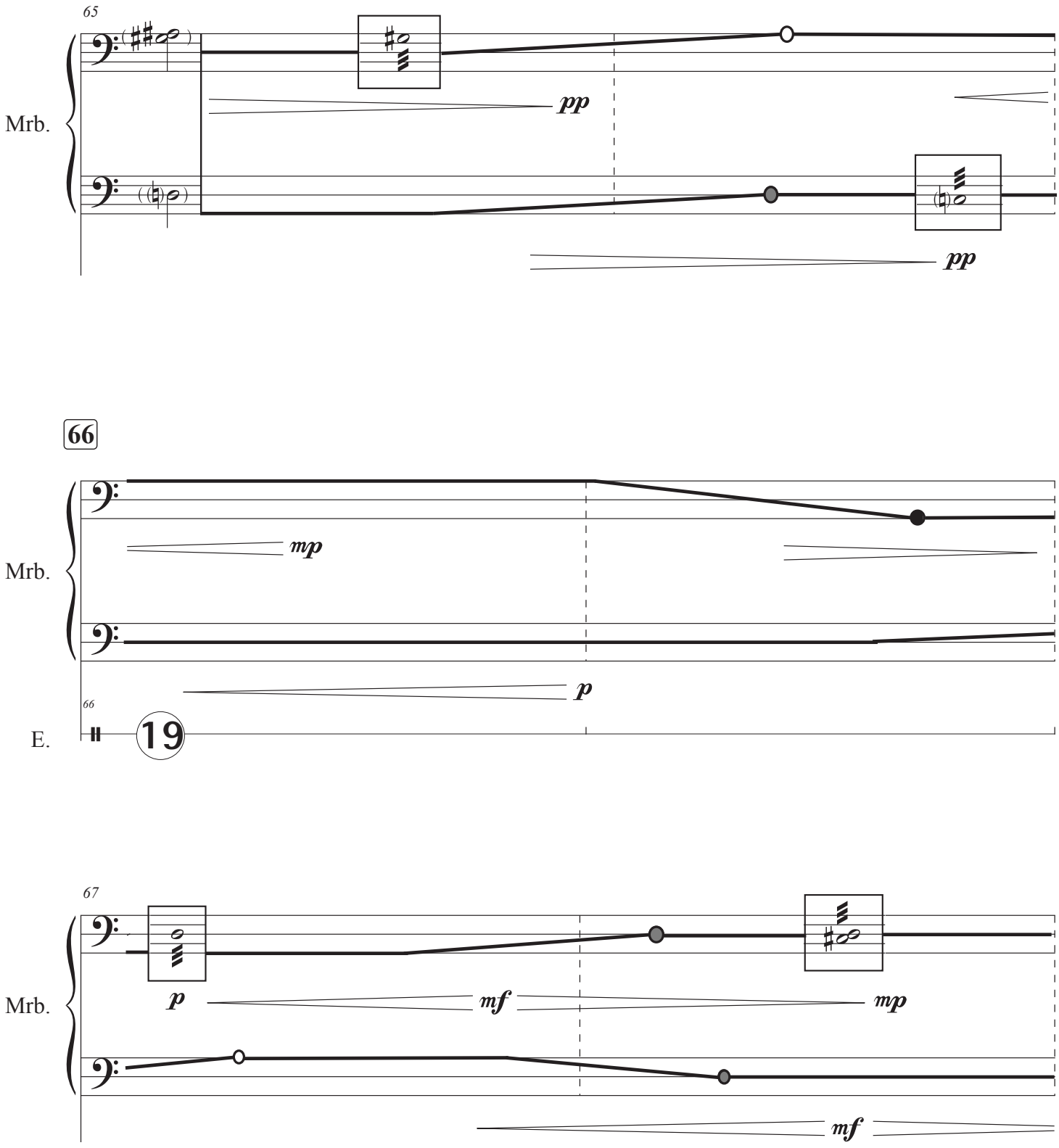

35
Mrb.
pp
each of the 3 lines indicates a node on the key. As the line moves, slowly change to the next node shown in time. Stay on the same key until the 5-line staff appears showing the next key to move to.
pp
35
fixed media D sustain
E.
11
39
Mrb.
mf
39
E.
43
Mrb.
mf
mf
p
43
E.

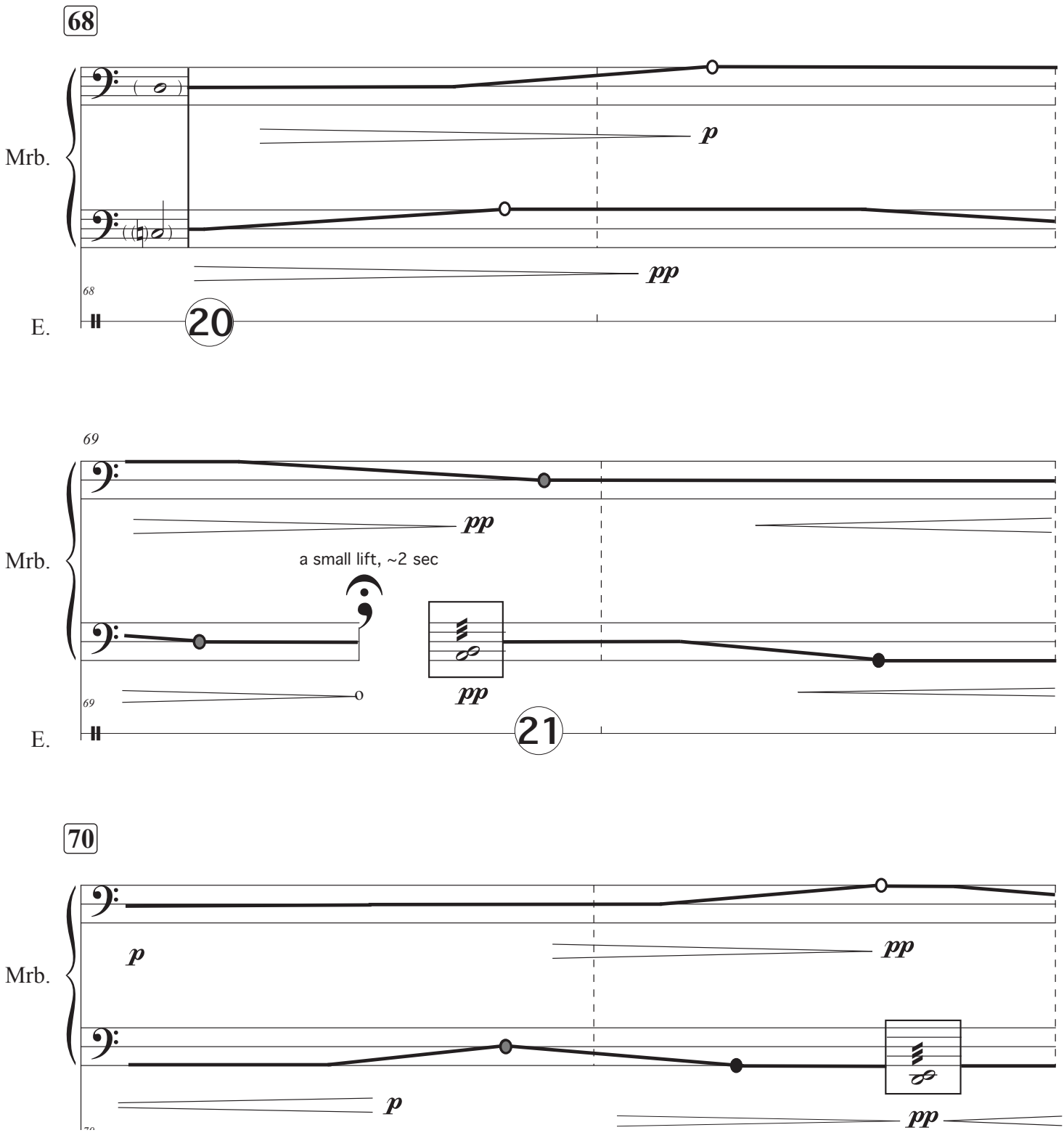

46
- bow
arco, connect bow takes
Mrb.
no dim., no cresc.
fp
pp
mp
46
fixed media B sustain
octave pitch bend (8vb) - leave on
E.
12
13
14
the pitch bend is fixed to gradually emerge around 3 minutes later.
it can vary where the performer is at in the piece when this happens.
49
Mrb.
mf
dim.
49
E.
53
Mrb.
mp
p
pp
~ 3 sec
53
E.

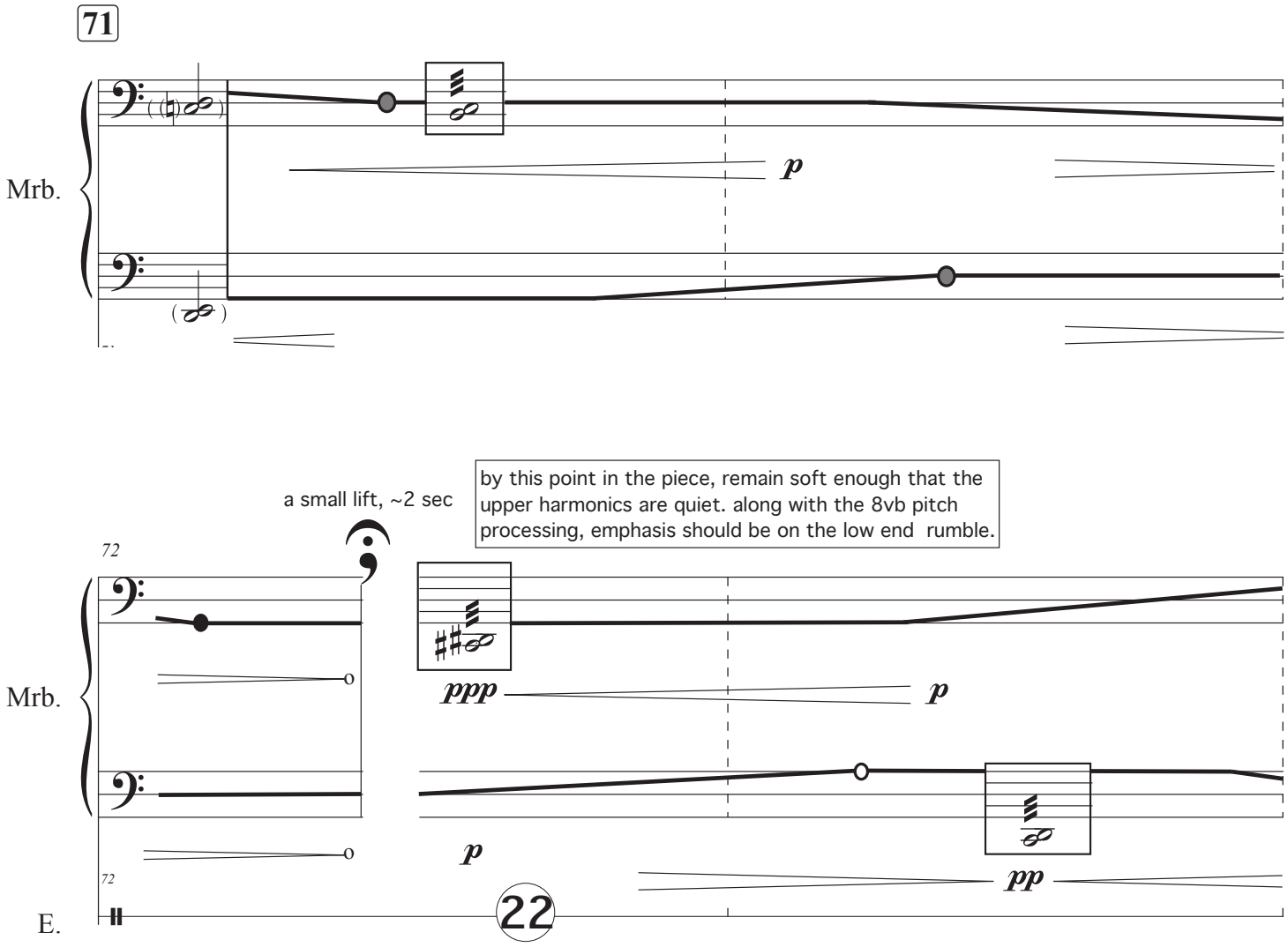

57
center
ord.
string
pp
p
pp
Mrb.
always overlap the new shown pitch with the current pitch being played
center
ord.
string
pp
57
E.
footpedal is now functions as a trigger to start pitch resonators at a particular moment in time.
leave only the dry signal amplified until m. (70 something)
58
Mrb.
p
pp
pp
p
58
E.
15
59
Mrb.
p
pp
p

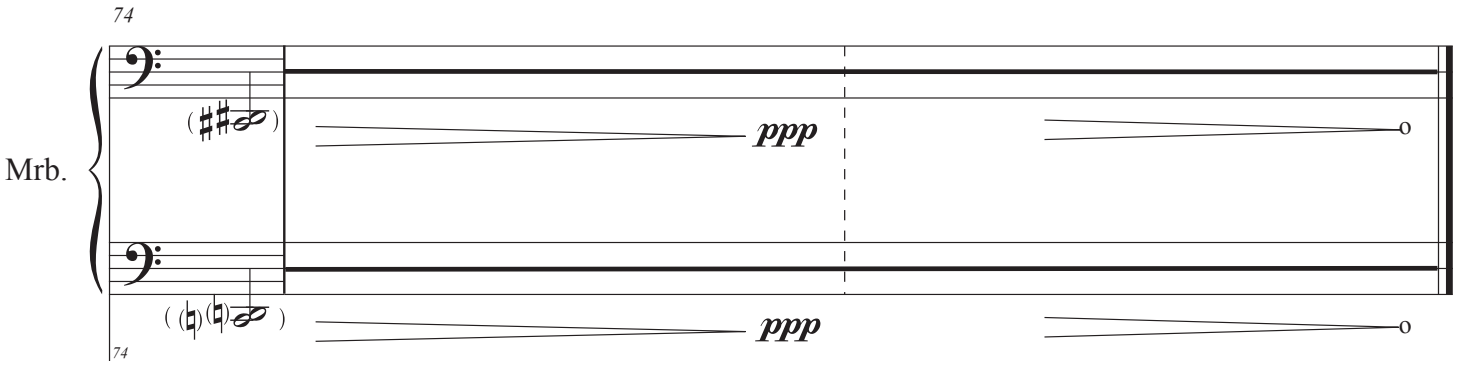

60
Mrb.
pp
p
mp
60
E.
16
61
Mrb.
mp
p
p
62
Mrb.
mp
p
pp
62
E.
17


63
Mrb.
mp
mp
p
64
Mrb.
a small lift, ~2 sec
pp
64
E.
18
Mrb.
mp


65
Mrb.
pp
pp
66
Mrb.
mp
p
66
E.
19
67
Mrb.
p
mf
mp
mf


68
Mrb.
p
pp
68
E.
20
69
Mrb.
pp
a small lift, ~2 sec
pp
69
E.
21
70
Mrb.
p
pp
p
pp


71
Mrb.
p
a small lift, ~2 sec
by this point in the piece, remain soft enough that the upper harmonics are quiet. along with the 8vb pitch processing, emphasis should be on the low end rumble.
72
Mrb.
ppp
p
p
pp
72
E.
22
73
Mrb.
pp
p
pp
73


74
Mrb.
ppp
ppp
74

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