Four Squared for Ligeti

for solo piano, percussion, and laptop ensemble

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composed for Sideband and Kathy Supové

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by **Dan Trueman**

~11'

PROGRAM NOTES:

Both Ligeti's famous *Musica Ricercata II*, for solo piano (perhaps most known for its cameo in the Kubrick film *Eyes Wide Shut*), and my own *Four*, for, um, solo 6-string electric violin (unknown for anything, as far as I know) are spare, spacious pieces, featuring just a few notes, oft repeated and separated by long silences. In an experiment in musical vandalism, I have smashed these two pieces together and filled most of the silences as best I can.

At the heart of this new Frankenstein is a pair of "synchronic pianos:" strangely tuned virtual pianos with embedded, pitched metronomes (don't worry if that's not crystal clear—you'll hear). This pair, in tandem with a good, old-fashioned piano, creates a constantly shifting core of meter changes, among other things.

Surrounding this trio is a cohort of other laptop instruments. Some slowly sustain the piano sounds with modified golf video-game controllers (the tethers, fast becoming a standard instrument in the laptop orchestra worldwide; no kidding here!). Others type, creating chattering clusters of clicky sounds, all synchronized via a wireless network.

Finally (speaking of Frankensteins), others play a bizarre digital hybrid of the flute and electric guitar (affectionately called the *blotar*, a brainchild of the nutty Dr. Perry Cook), also with the tethers (multi-talented, these tethers), using a neural-network created with Rebecca Fiebrink's fantastic Wekinator.

Finally finally, the piece closes with the chatter of as many mechanical metronomes as can be mustered, something Ligeti himself would surely have appreciated. Did I forget anything?

INSTRUMENT LIST:

In addition to the piano soloist, there are four main instruments groups in *Four Squared for Ligeti:*

Synchronic Pianists— laptop instrument, performed with MIDI keyboard interface: ***2***
Stretch Pianists—laptop instrument, performed with "tether" interface, or substitute: ***2+ (in pairs)***
Tether Blotarists—laptop instrument, performed with "tether" interface, or substitute: ***2+ (optional)***

And then:

Percussion—two coffee mugs (different pitches), two pieces of wood (or table top), floor-tom: ***2+ (in pairs)***
Old fashioned mechanical metronomes: **LOTS**

A conductor is also likely necessary.

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The laptops need to be Macbooks, generation 2008 or later, running OSX. Networking—wireless, or with a wired router, or with Ethernet-over-power—is required for all the instruments.

Ideally, all laptopists use hemispherical speakers for their sound. Otherwise, an effort should be made to create a similar effect, with locally placed speakers that cast their sound as omnidirectionally as possible.

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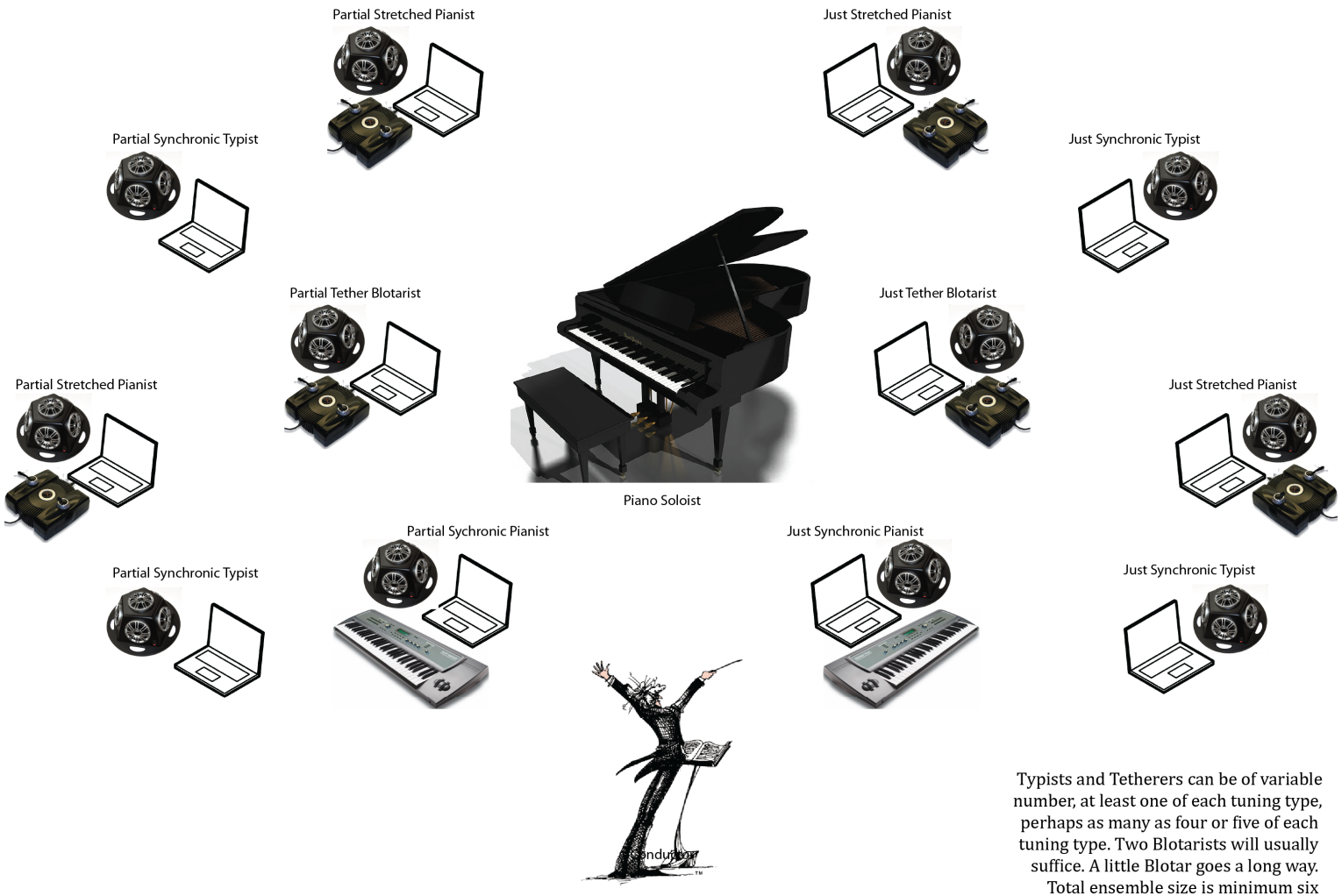


Typists and Tetherers can be of variable number, at least one of each tuning type, perhaps as many as four or five of each tuning type. Two Blotarists will usually suffice. A little Blotar goes a long way. Total ensemble size is minimum six (not including the soloist and conductor), to over twenty.

Four Squared for Ligeti, Rough Stage Sketch

TECHNICAL NOTES:

The ensemble is divided into two, each in a slightly different tuning. The *just* players use a scale based on just tunings, centered around A440, while the *partial* players use a scale based in part on intervals drawn from the overtone series (though the 7th is drawn more from fiddle tuning, so the name isn't really perfect; see below):

	Partial Tuning			**Just Tuning**		
Pitch	*Frequency*	*Ratio*	*Cents from ET*	*Frequency*	*Ratio*	*Cents from ET*
G#	**806.67**	**11/6**	**-51**	**825**	**15/8**	**-12**
G	770	7/4	-31	770	7/4	-31
F#	733.33	5/3	-16	733.33	5/3	-16
F	**715**	**13/8**	**+41**	**704**	**8/5**	**+14**
E	660	3/2	+02	660	3/2	+02
D#	**605**	**11/8**	**-49**	**616**	**7/5**	**-16**
D	586.33	4/3	-03	586.33	4/3	-03
C#	550	5/4	-14	550	5/4	-14
C	**513.33**	**7/6**	**-33**	**528**	**6/5**	**+16**
B	495	9/8	+04	495	9/8	+04
Bb	469.33	16/15	+12	469.33	16/15	+12
A	440	1/1	0	440	1/1	0

Pitches that are different in the two tunings are in bold.

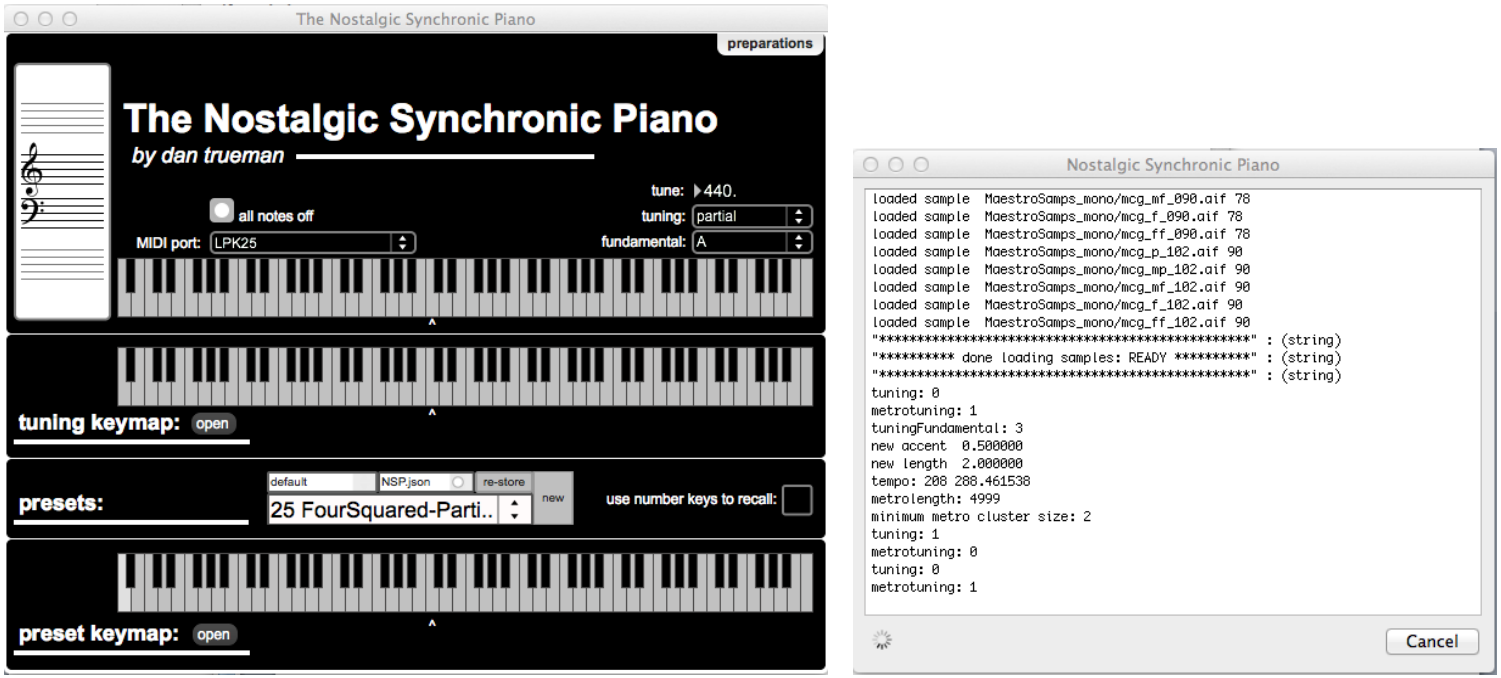
[These tunings are variously inspired. The most direct inspiration is from a recording of the Norwegian bridal march *Bruremarsj frå Engerdal* by Sven Nyus, the first Norwegian fiddle tune I ever learned. In particular, the 6th (F/A) is usually somewhere between and major and minor-6th, sounding similarly to the 13th partial; an awesome sound. He sometimes at the ends of phrases lets this rise up slightly to a just-tuned major-6th—glorious—and occasionally lets it sink to a just-tuned minor-6th. This was the starting point for building these two scales, and why they are so named. In Hardanger fiddle music, I often hear the major-7th tuned quite flat (11/6 sounds like the closest ratio to what I often hear, and I've chosen to use ratios of

some sort for all these intervals), and similarly, the raised 4th—giving the Hardanger music its characteristic "Lydian" sound—is not *so* raised (it also sounds a bit flat, to equal-tempered ears, and very much like the 11th-partial). While I am not typically drawn to number games in music, there is a certain symmetry to the way this D# is mirrored by the "partial" F around the perfect 5th E (11/8 : 12/8 : 13/8), and for that reason, I chose to tune the minor-3rd C similarly symmetrical to the previously described "flat" major-7th (7/6 : 9/6 : 11/6). I love the way these two scales sound relative to one another; the qualities of the 6ths and minor-3rds in particular are vivid, and it's not hard to start hearing micro-voice-leading patterns between them.]

The Synchronic Pianos

There are two synchronic pianists in this piece, one on either side of the solo pianist; one is in "just" tuning, the other in "partial" tuning. The instrument, which uses a MIDI keyboard along the software for the Nostalgic Synchronic Piano that I have used in a number of pieces, generates a metronomic pulse based on played chords (played as a simultaneity, or rapidly arpeggiated); these pulses will be tuned "opposite" to the normal tuning of the keyboard (so, the "just" piano will generate "partial" metronome pulses, and the "partial" piano will generate "just" metronome pulses). Single notes will silence the pulses, and every time a chord or arpeggio is played, the phase of the metronome is reset based on the start-time of the last note played. This is all best understood by trying the instrument and looking at the score (which doesn't notate the pitches of the metronome pulses, only their expected times).

To start this instrument, first make sure that the MIDI keyboard is connected properly, then double-click on the application. Two windows will open:



It takes a minute or so for all the samples to load, which you can track in the white window. After this is complete, in the black window, choose the preset appropriate for the part (so, in this image, the “partial” pianist) from the presets pull-down menu. You should then be able to play the MIDI keyboard controller and get to work; try the opening bars, and you should hear the metronome start (tuned differently than your played notes) and continue until you play again. Play a single note to silence as needed. In order to quit, you need to quit BOTH windows, which are actually separate applications running in parallel.

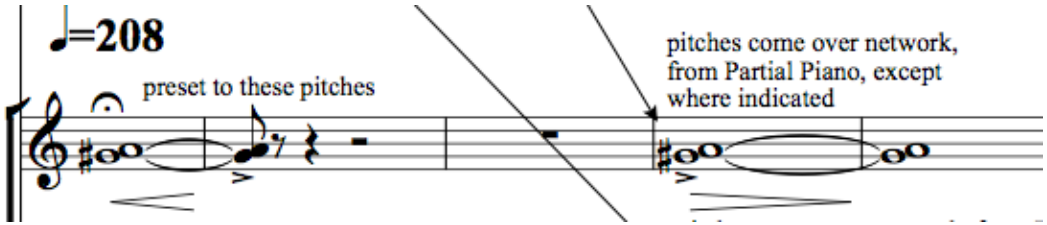
Also, note that you will need to be connected to the same wireless router that the Stretch Pianists and Blotarists are connected to, so they can receive pitch information from you (based on what you play). All players must also have LANdini running (http://jaschanarveson.com/pages/code.html); LANdini handles all the network connections and attempts to ensure that the timing and messaging is as robust as possible.

The Stretch Pianos

This instrument was designed to work with the "tethers," a modified golf video-game controller that has become a mainstay in laptop orchestra performance. While still available, it seems they aren't being made anymore, so they have become precious, and we are going to have to find a replacement at some point. This instrument could also be reconceived for another type of control interface, though some thought will be needed to try to make it as compelling for performer and audience alike as the tether has been.

The tether is basically two 3-axis joysticks (one for each hand). The 3rd axis is a "string" that can be pulled out to about 12 feet in length, and then released (it will automatically retract). I am using the Mad Catz Gametrak golf game controller, hacked as follows to it behaves like a standard USB HID device: http://x37v.com/x37v/post/2008/08/madcatz-gametrak-mod.html.

The software puts a piano sample in each hand that the player can pull through, freeze-framing at particular points in the sound. With the tether fully retracted, we hear the very end of the sample (silence!), and as we pull out, we move towards the attack, naturally getting louder (though some exploration of the x/y axes of the tether will reveal some other controls as well), and then getting a loud, noisy accent when we pull across the attack. In the score, a crescendo from nothing indicates starting from the fully retracted position (end of the sample) and pulling out/up (towards the beginning of the sample), an accent indicating where to pull past the beginning of the sample (the attack):



The inverse—an accent, followed by a decrescendo (bar 4 in the above)—indicates that we are starting from an extended position, with the tether pulled out (past the beginning of the sample), and that we release across the beginning of the sample

to create the accent at the notated time. Again, trying this out is the best way to figure it out! My dynamics are not exhaustive, but the part is written such that it always works, in terms of starting points (meaning, you will never be in a position where you have to start with an accent, and not already be stretched out past the beginning of the sample).

This is a challenging part. It takes practice to be able to play it effectively and convincingly, and the visual aspect is important; the players should decide on an approach that both feels and looks good as a section.

The software is straightforward to use (I hope!):

Make sure the tether is plugged in **before** opening the application. Once open, check the DSP Status to make sure you are using the correct audio interface for your system. Then, press the BIG BLUE “DSP Off” button, which will turn it red, and then read “DSP On.” Then, hit the “Load Buffers!” button, which will load the piano samples; this will take a few moments.

The pitches are mostly set over the network by the Synchronic Pianists; make sure you are attached to the same wireless network, you have LANdini running, and also choose your tuning from the pull-down menu (says “partial” in the image above); choose it even if it says the right thing, to make sure it gets initialized properly (you may need to choose another tuning, then go back to the one you want). If this isn’t set, then pitches won’t come in over the network properly.

Now, **sometimes** you need to set the pitches yourself. This can be done with a small USB MIDI keyboard, or it can be done with the laptop keyboard itself (hit “show keymap” to see how the laptop keys map to pitches; for instance, pressing the ‘j’ and ‘k’ keys will set the pitches to the G# and A of the opening of the piece).

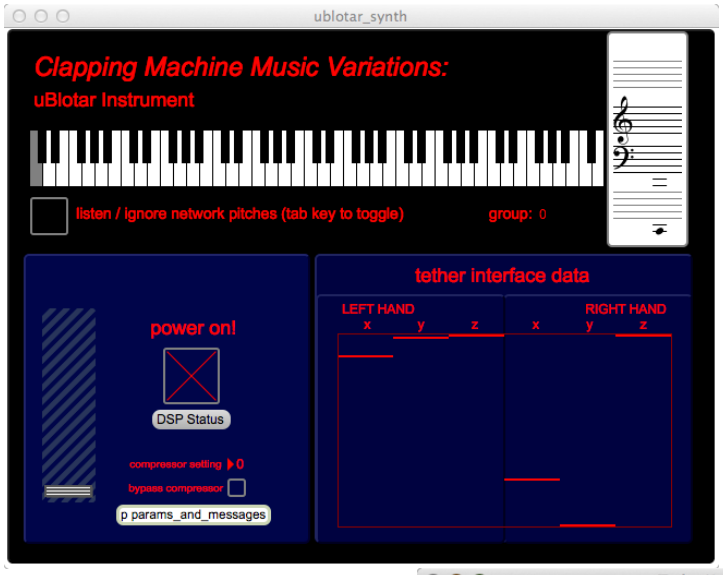
I don’t think this is as complicated as it sounds.

The Tether Blotars

It is possible to play *Four Squared* without the blotars—we've done it—so if short of players or tethers, don't worry. But they are awesome. This is the exact same instrument that I've used in other pieces, like *Clapping Machine Music Variations*, and it uses the tether, of course, as well as Rebecca Fiebrink's Wekinator system for creating rich mappings between interfaces and software synthesis algorithms.

The blotar is a hybrid physical model of the flute and electric guitar (learn more about it: http://vanstiefel.com/showl-). When you open the application, THREE separate applications open and run in parallel (all must be quit to fully quit the blotar). The only one to pay any attention to is the colorful one (blue and black). Make sure the tether is connected before you start this up. Assuming it has all started ok, you can "power on!", set a pitch on the virtual keyboard, and start playing away. There are very few pitches for the blotar in *Four Squared,* so they can be set manually this way, and you don't need to toggle on the "listen/ignore network pitches" (this is used in *Clapping Machine Music Variations*).

This part is easy to play, but it takes some time to fully explore the instrument and learn how to play it sensitively (yes, sensitively, with a thing called the blotar). For the most part, I imagine it being played somewhat quietly, texturally, and helping bring out the intensity towards the end of the piece.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Clapping Machine Music Variations:
uBlotar Instrument
listen / ignore network pitches (tab key to toggle)
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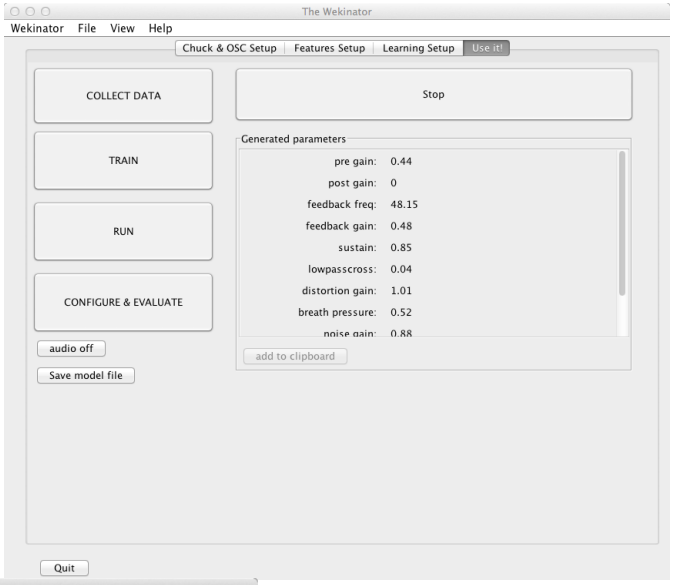
The Wekinator
Wekinator File View Help
Chuck & OSC Setup
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Use it!
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RUN
CONFIGURE & EVALUATE
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post gain: 0
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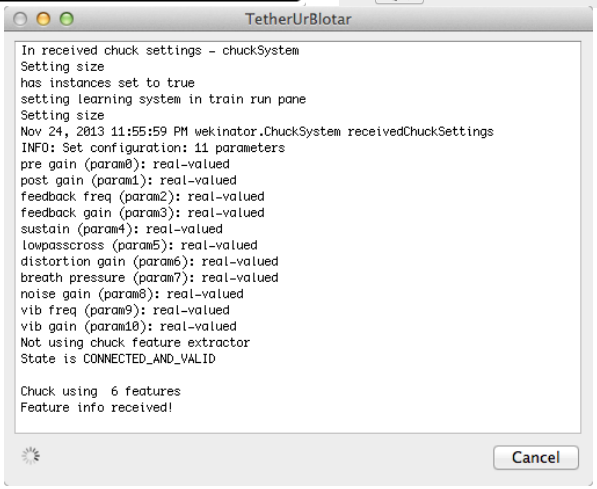
TetherUrBlotar
In received chuck settings - chuckSystem
Setting size
has instances set to true
setting learning system in train run pane
Setting size
Nov 24, 2013 11:55:59 PM wekinator.ChuckSystem receivedChuckSettings
INFO: Set configuration: 11 parameters
pre gain (param0): real-valued
post gain (param1): real-valued
feedback freq (param2): real-valued
feedback gain (param3): real-valued
sustain (param4): real-valued
lowpasscross (param5): real-valued
distortion gain (param6): real-valued
breath pressure (param7): real-valued
noise gain (param8): real-valued
vib freq (param9): real-valued
vib gain (param10): real-valued
Not using chuck feature extractor
State is CONNECTED_AND_VALID
Chuck using 6 features
Feature info received!
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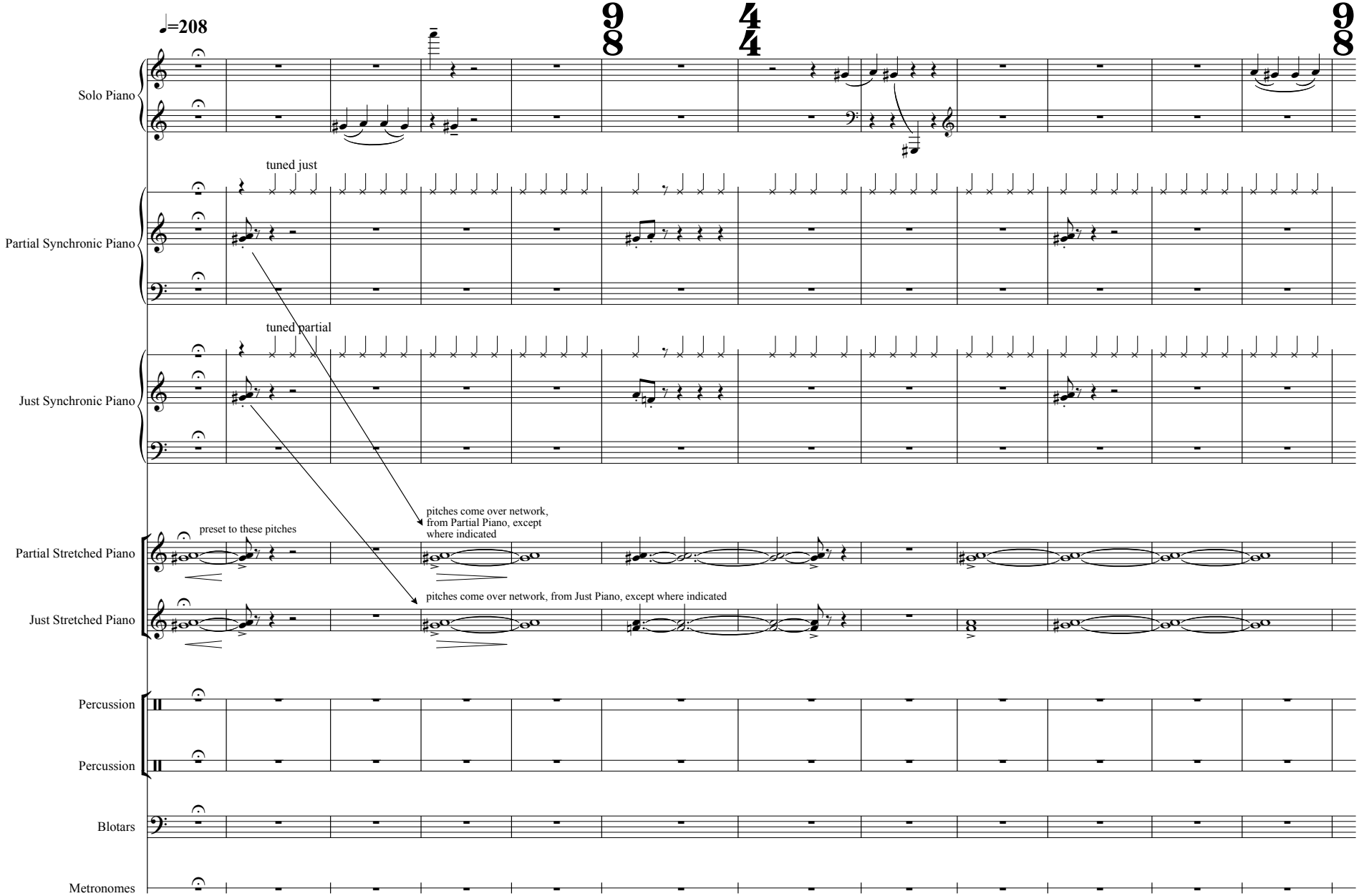
Four Squared for Ligeti

composed for Kathy Supové and Sideband

Dan Trueman



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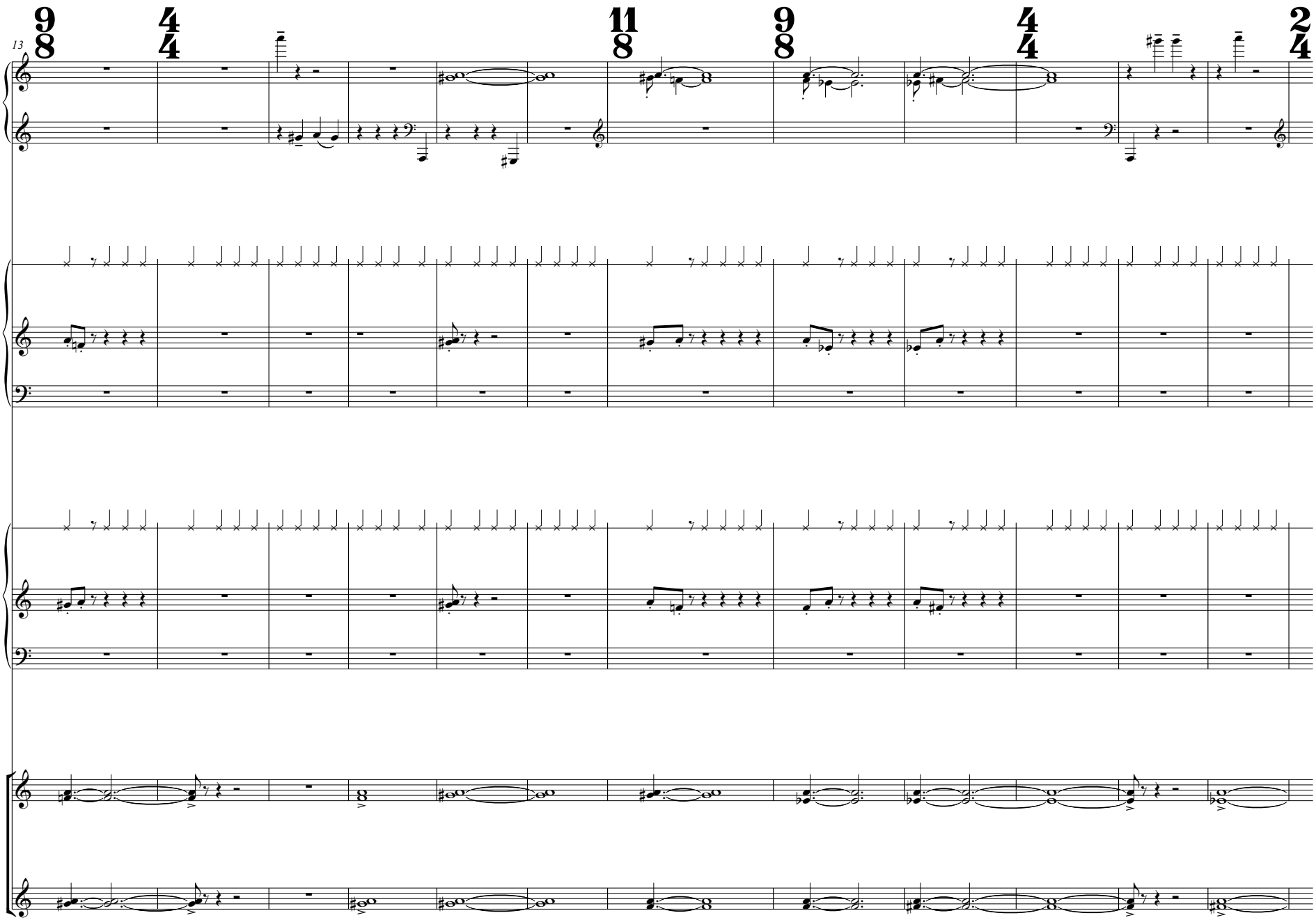
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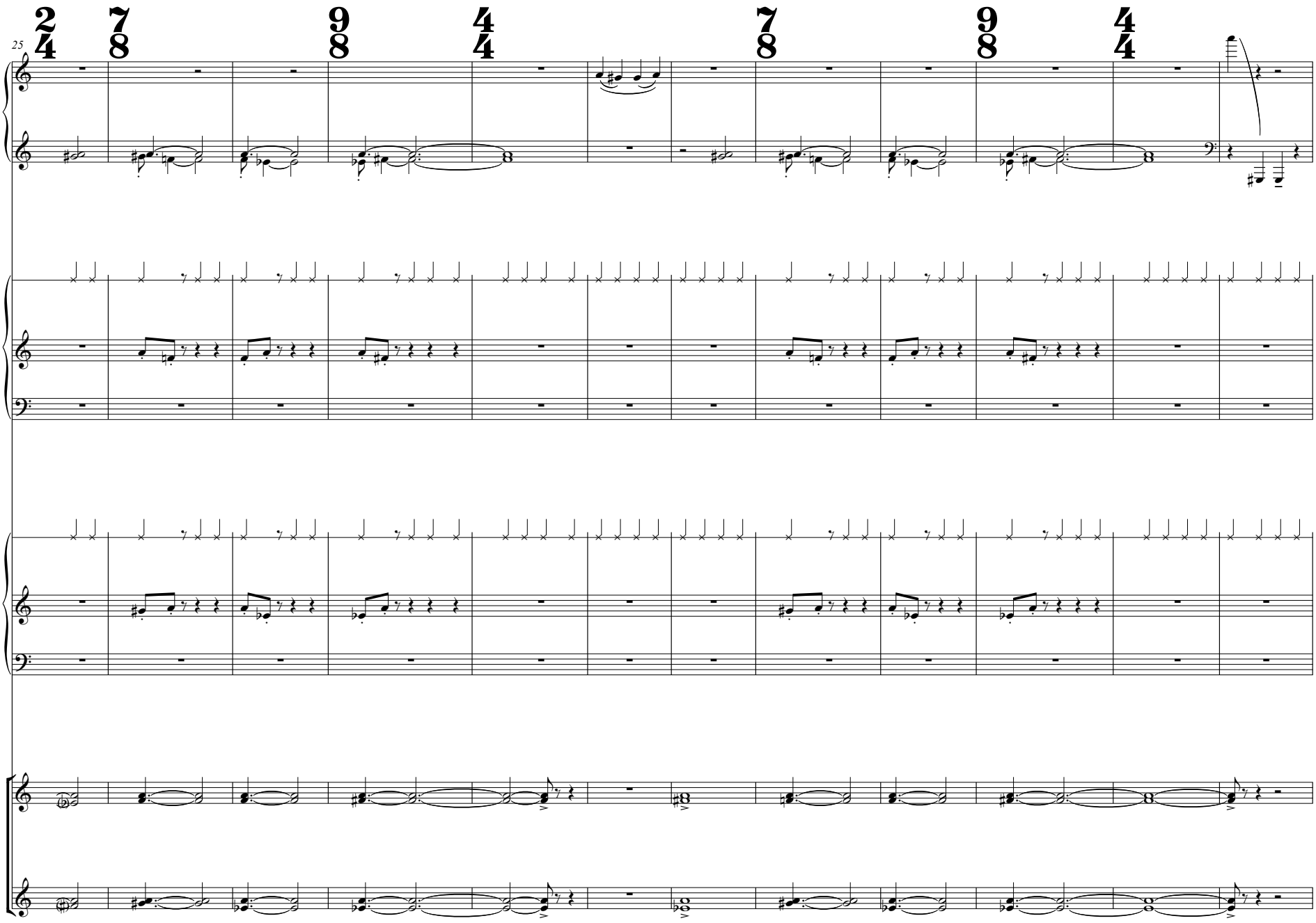
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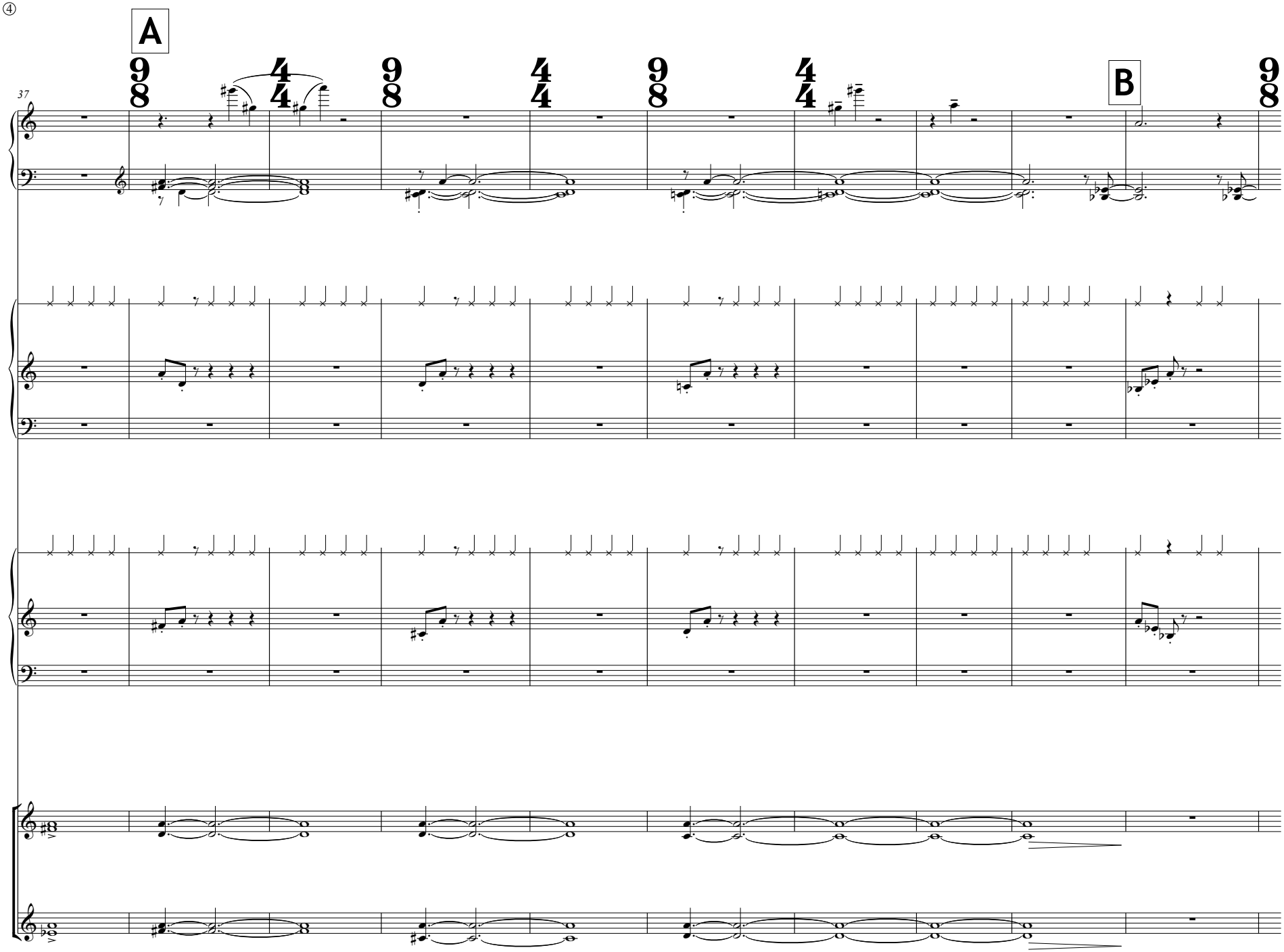
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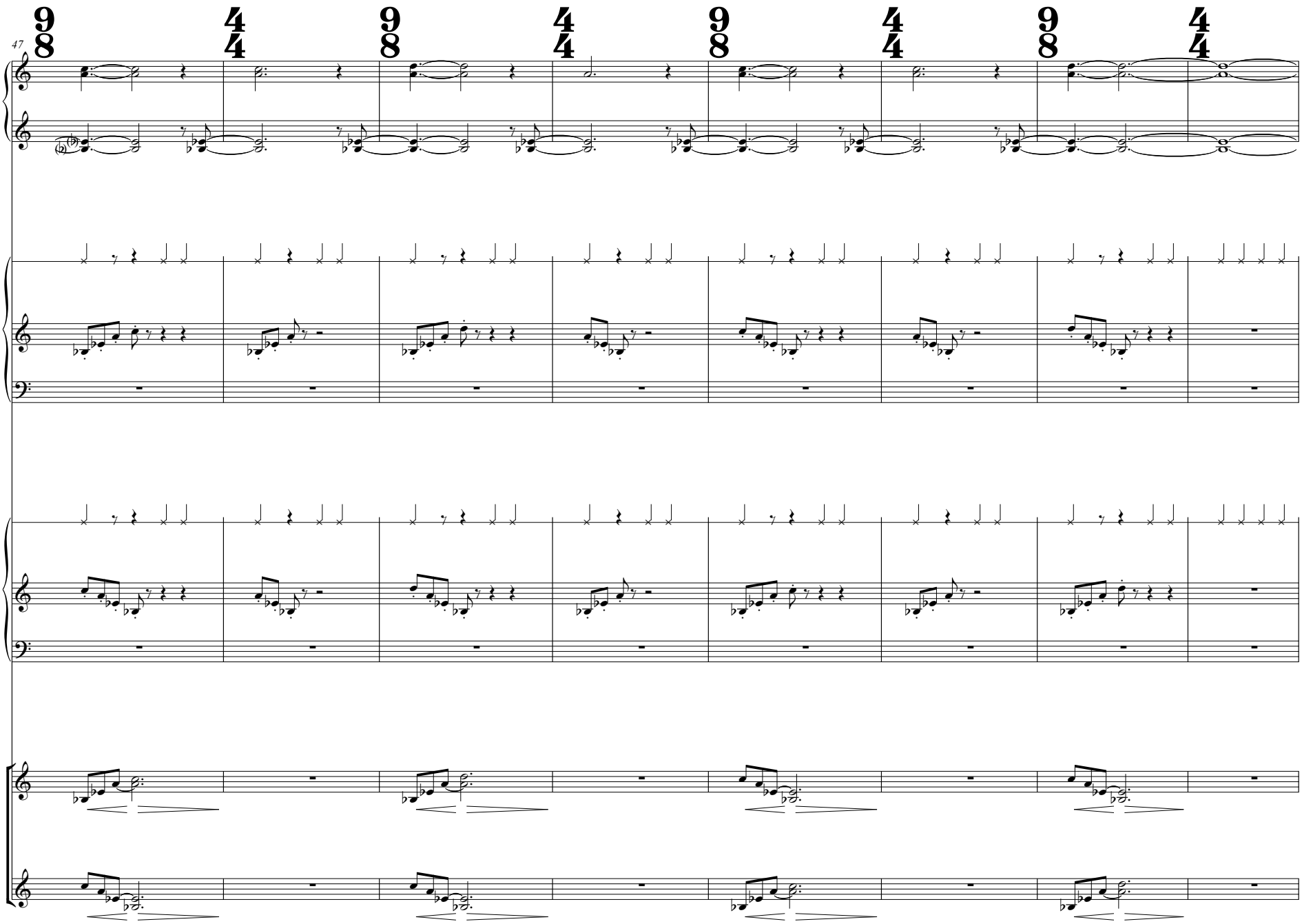
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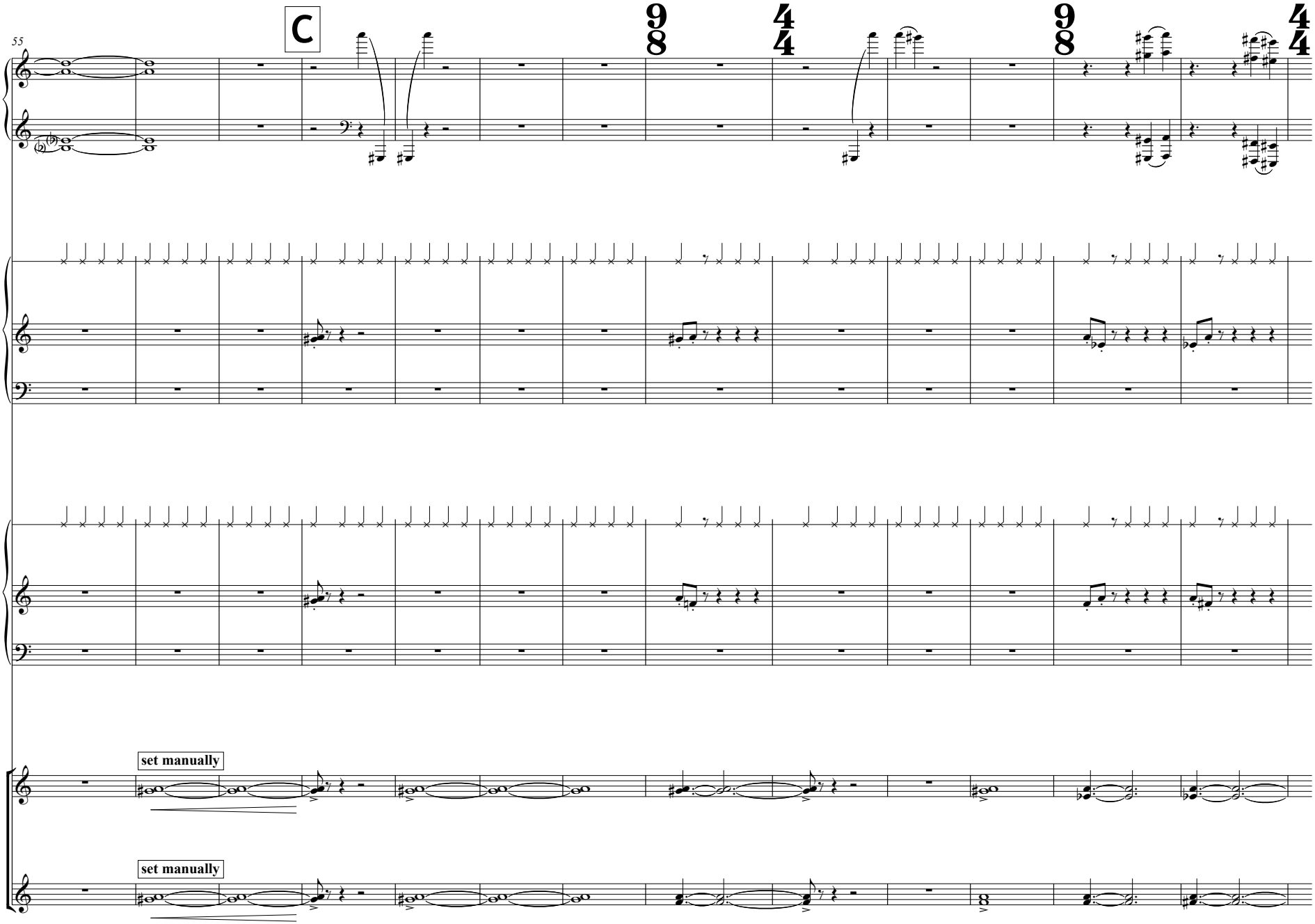
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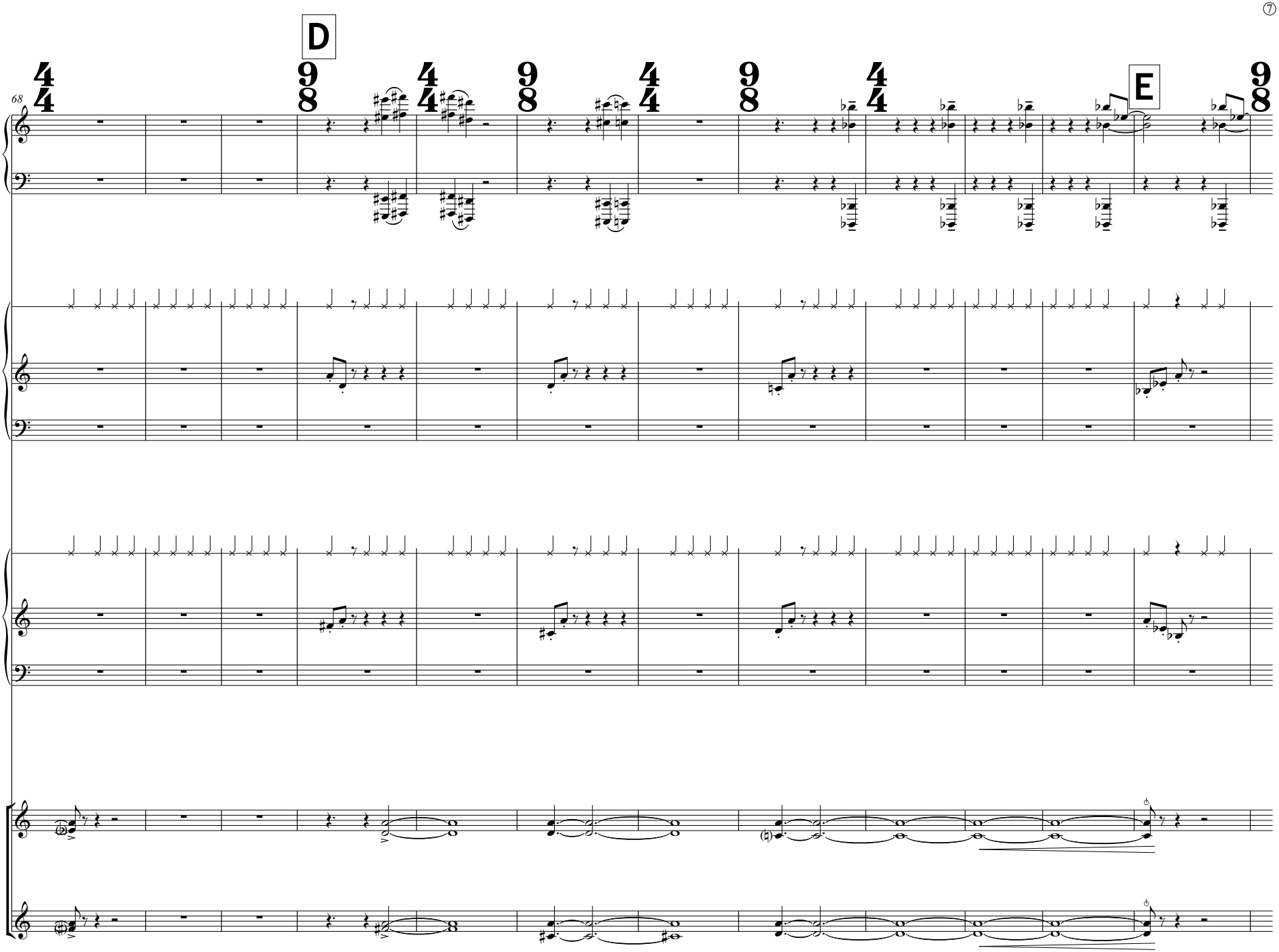
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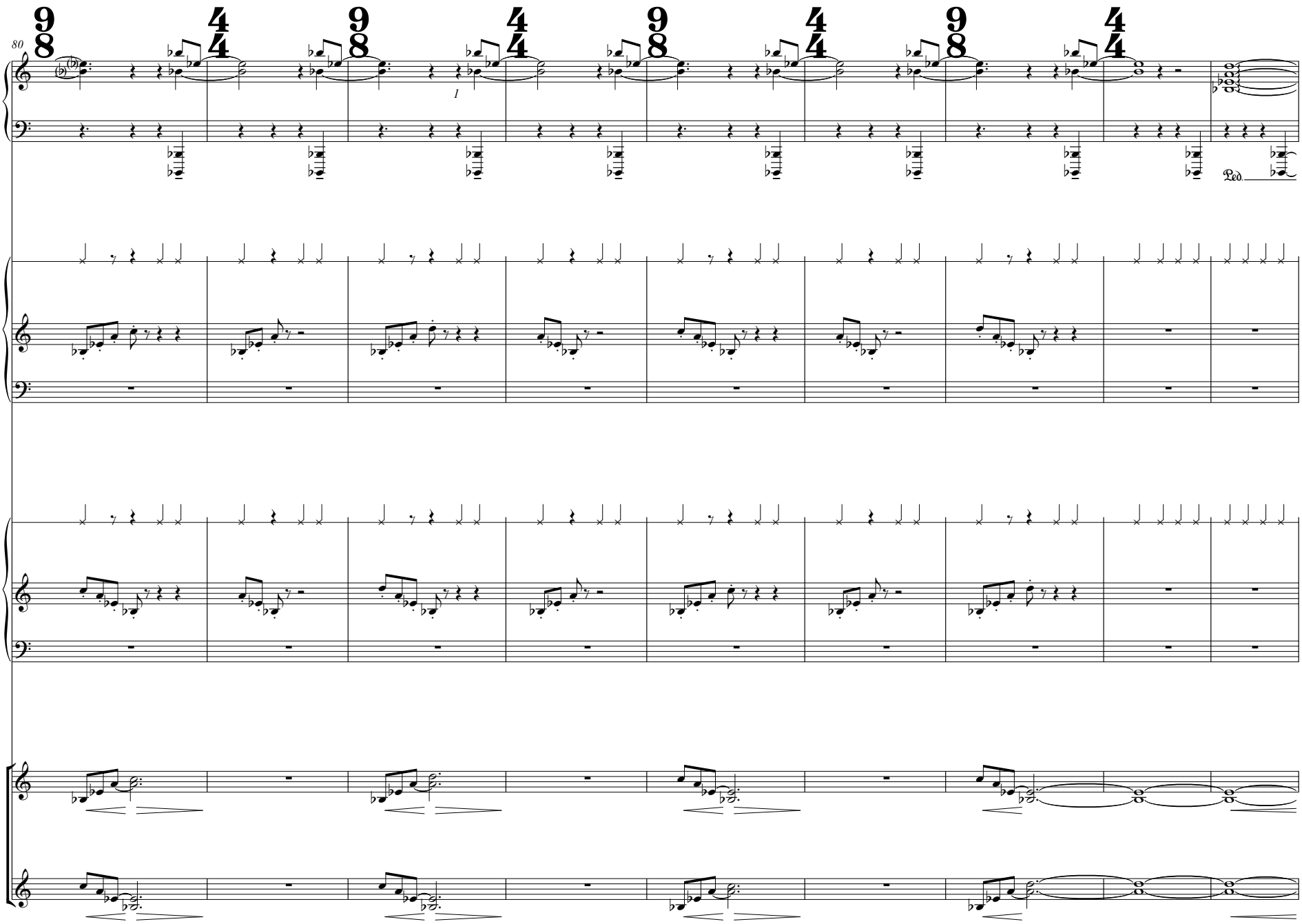
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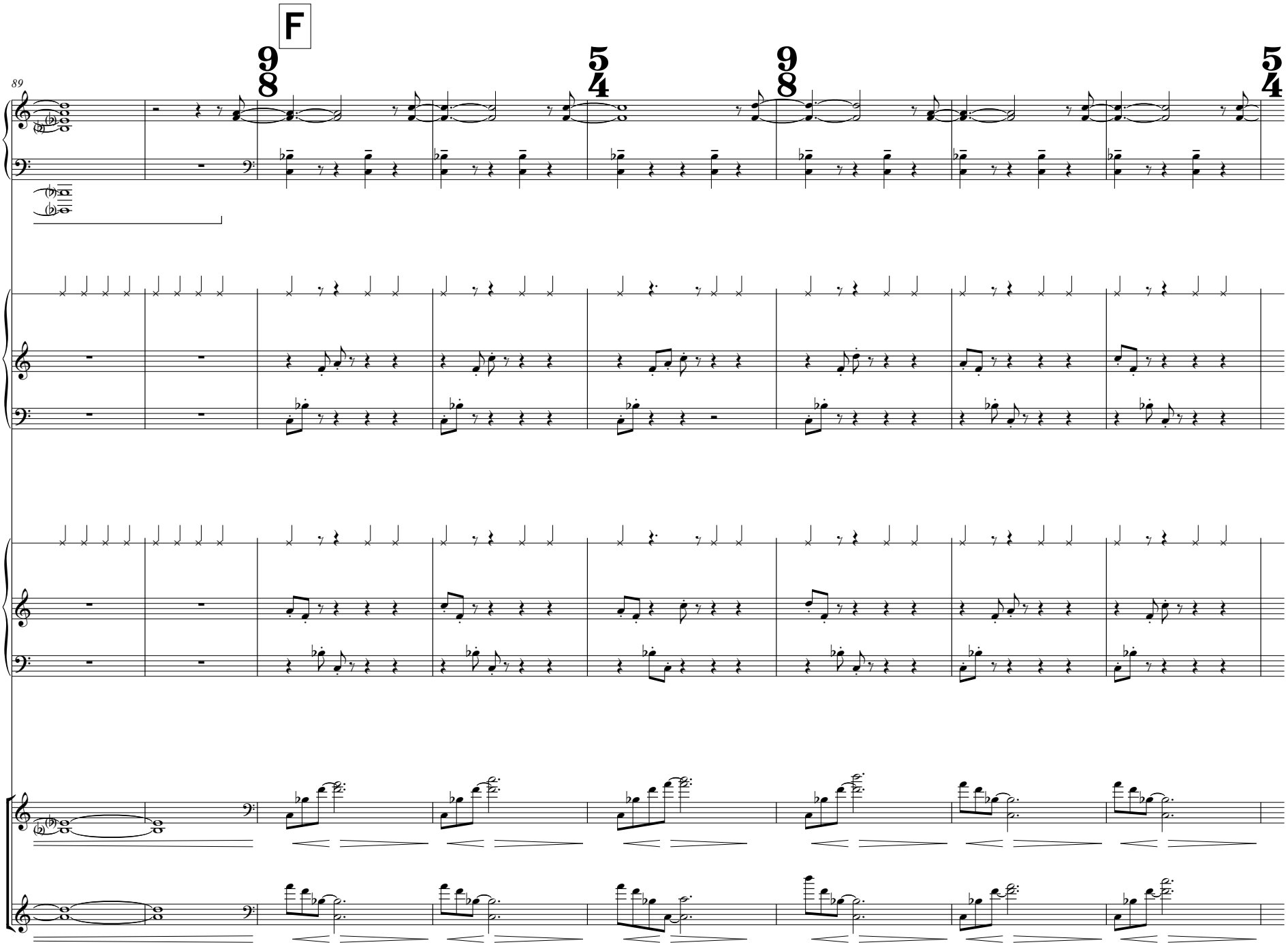
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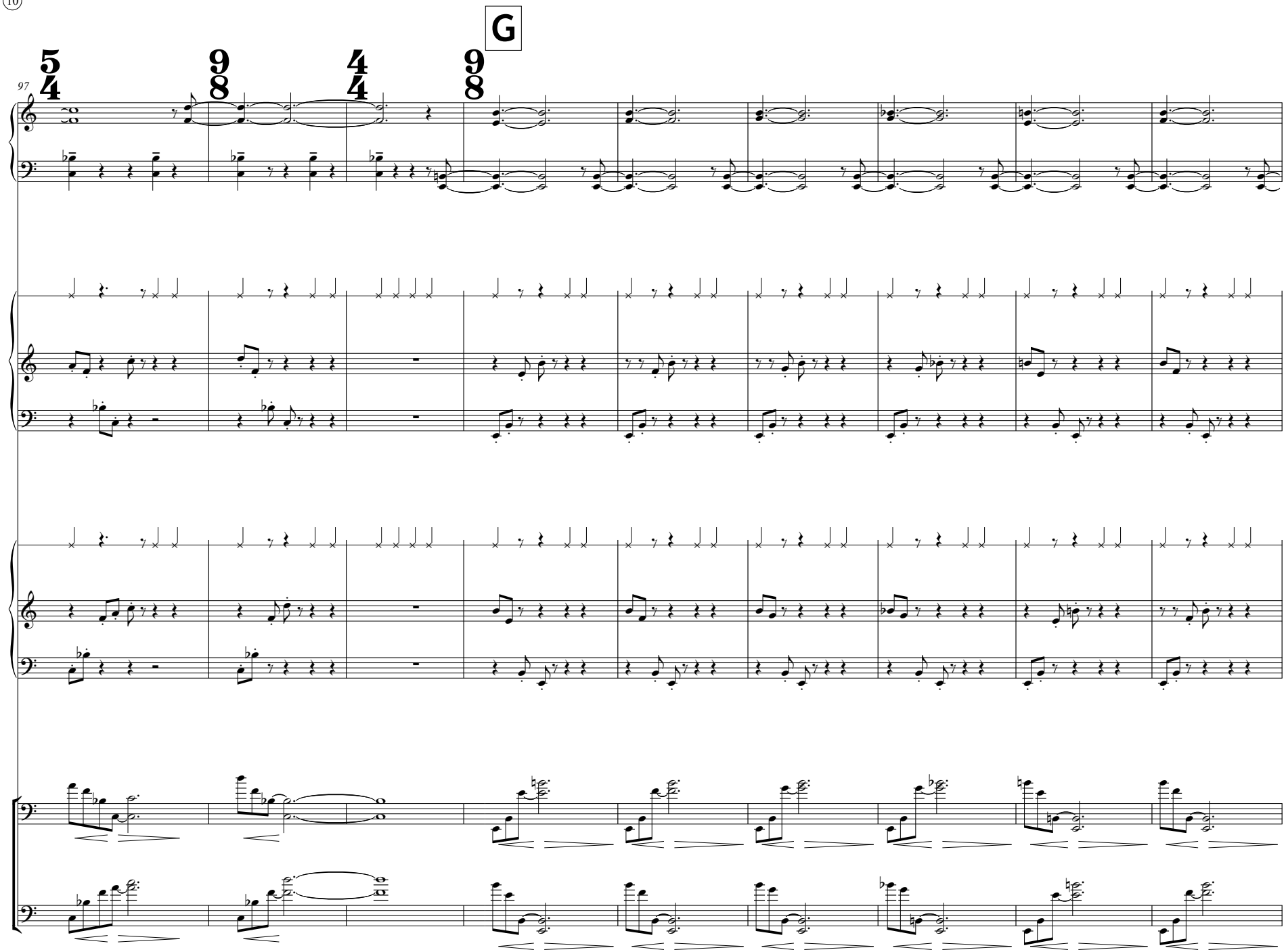
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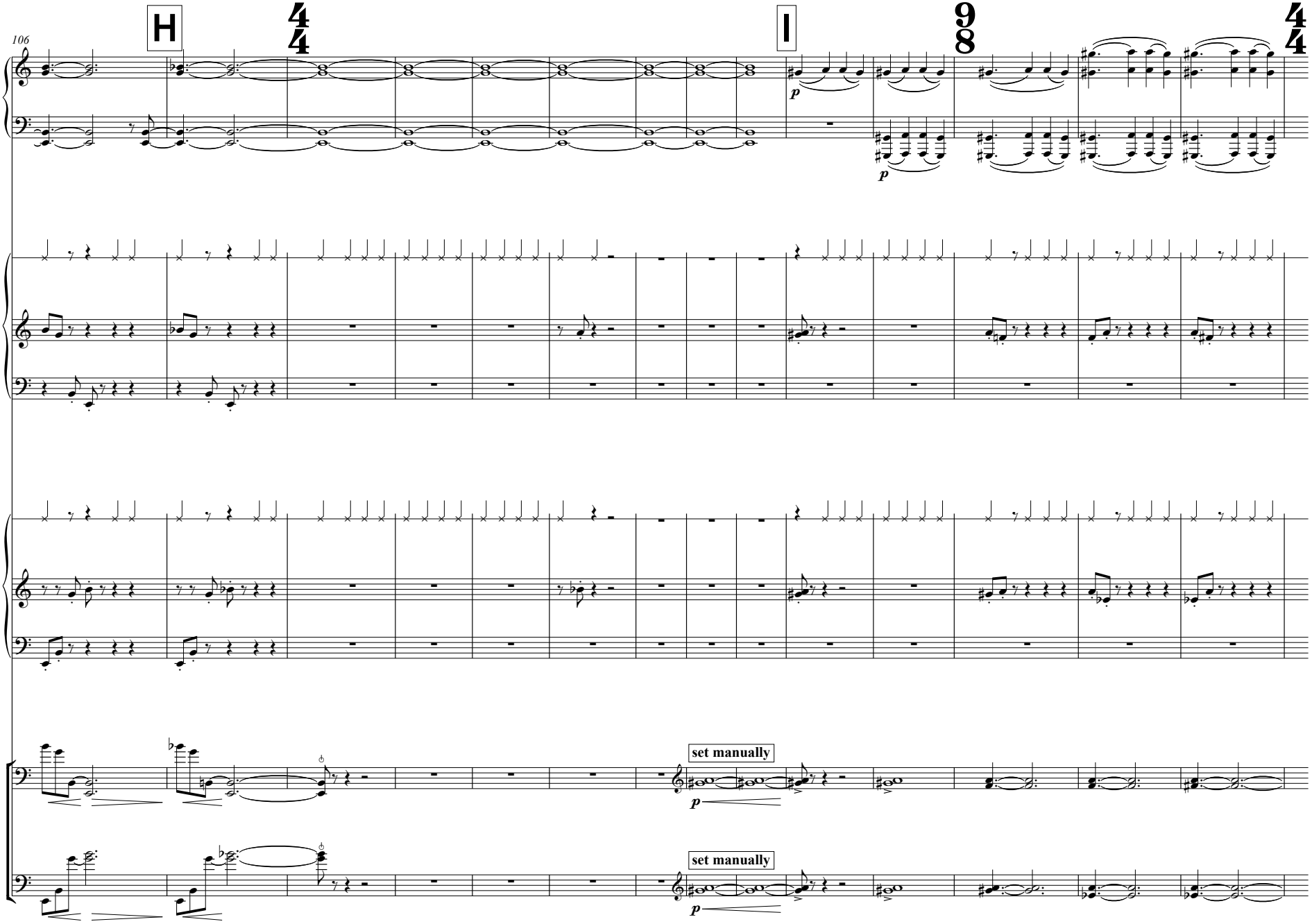
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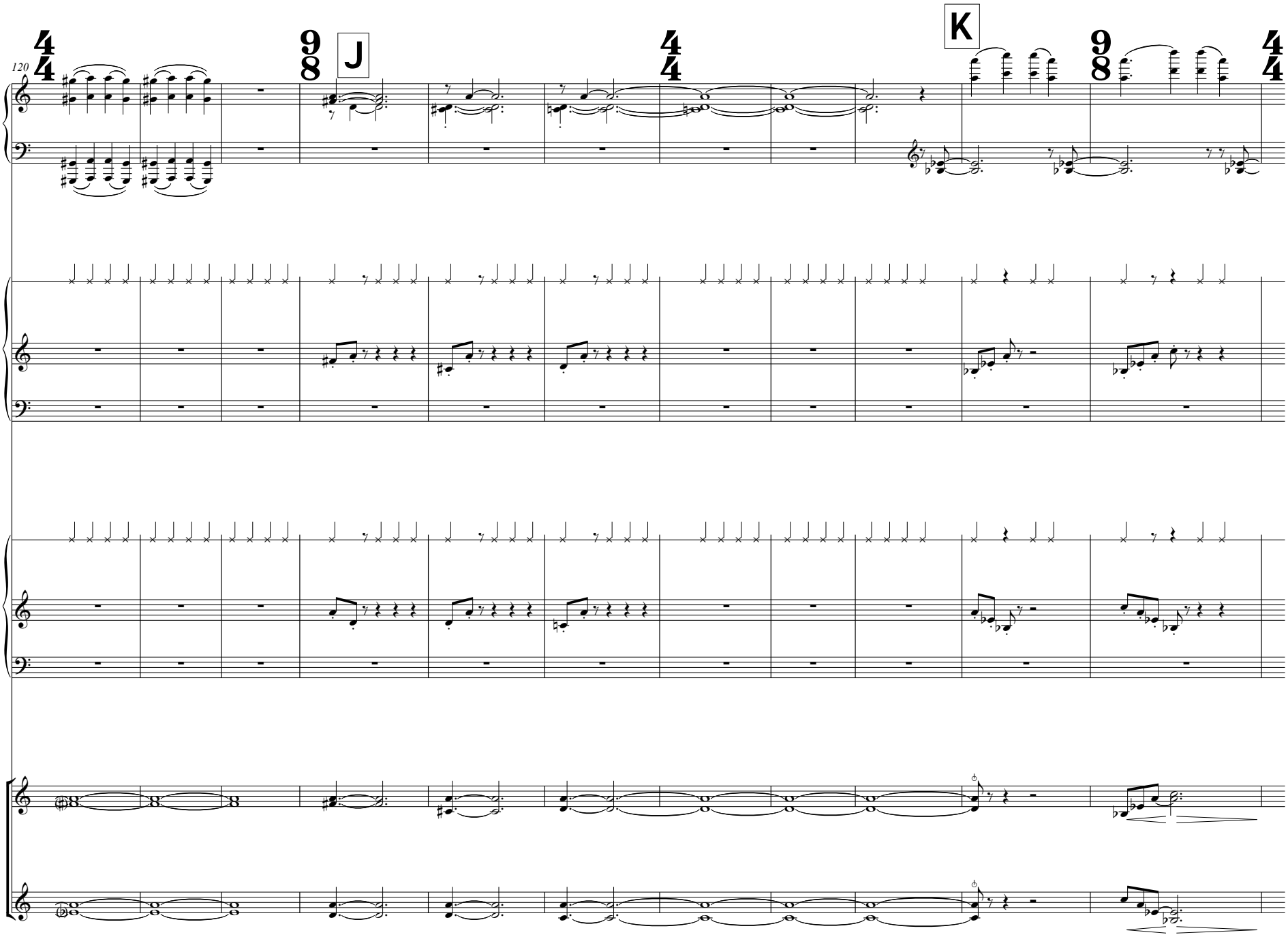
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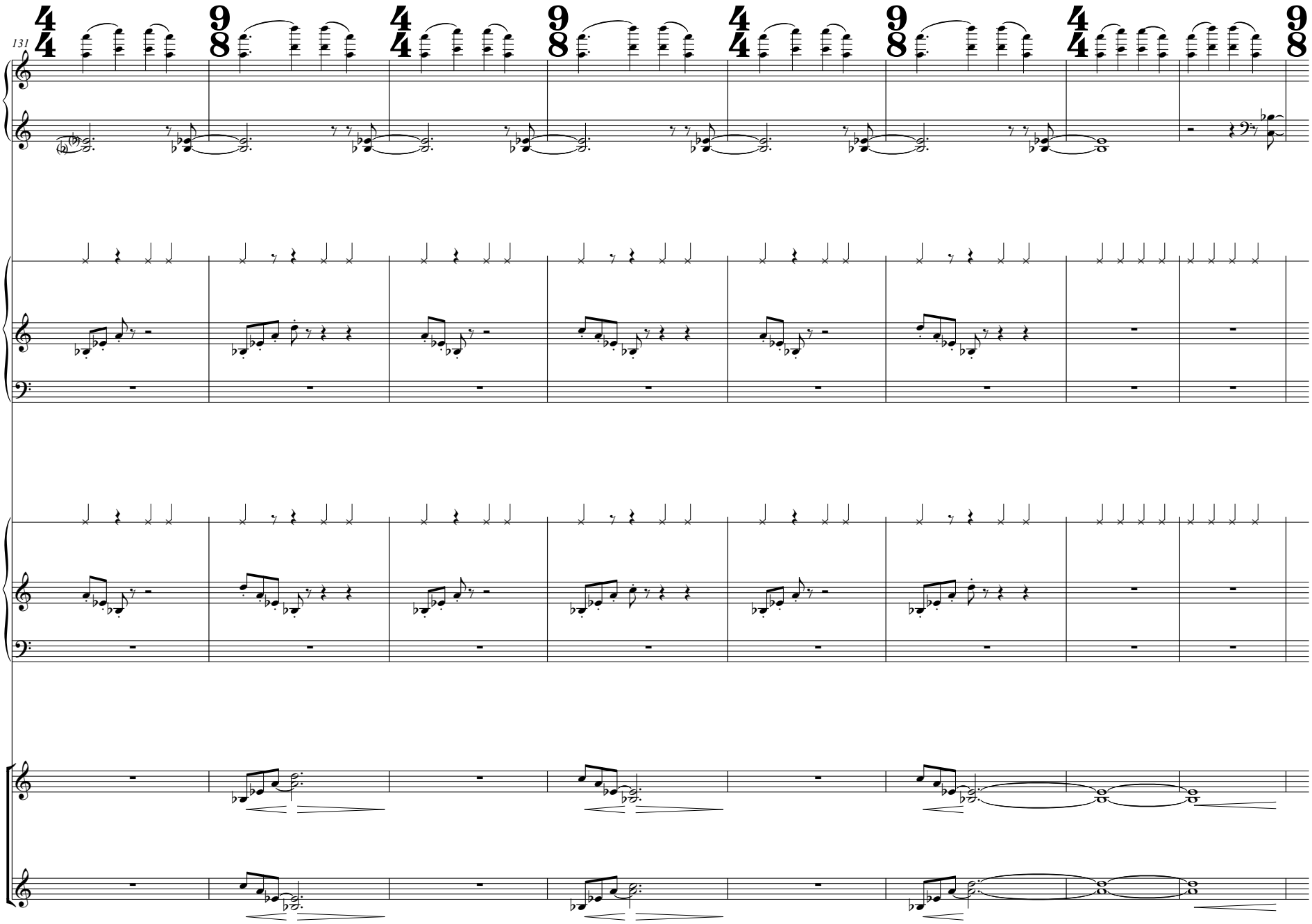
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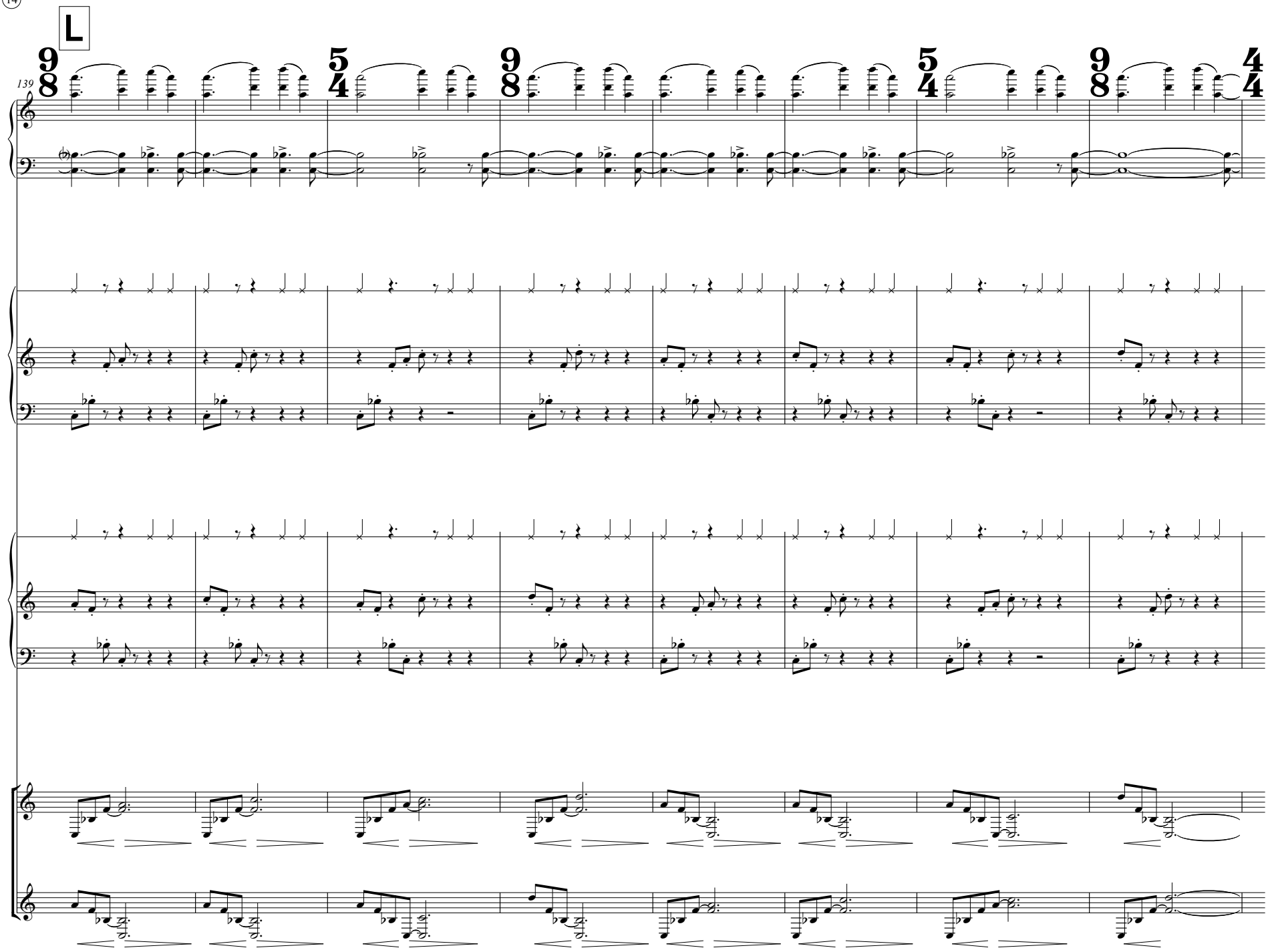
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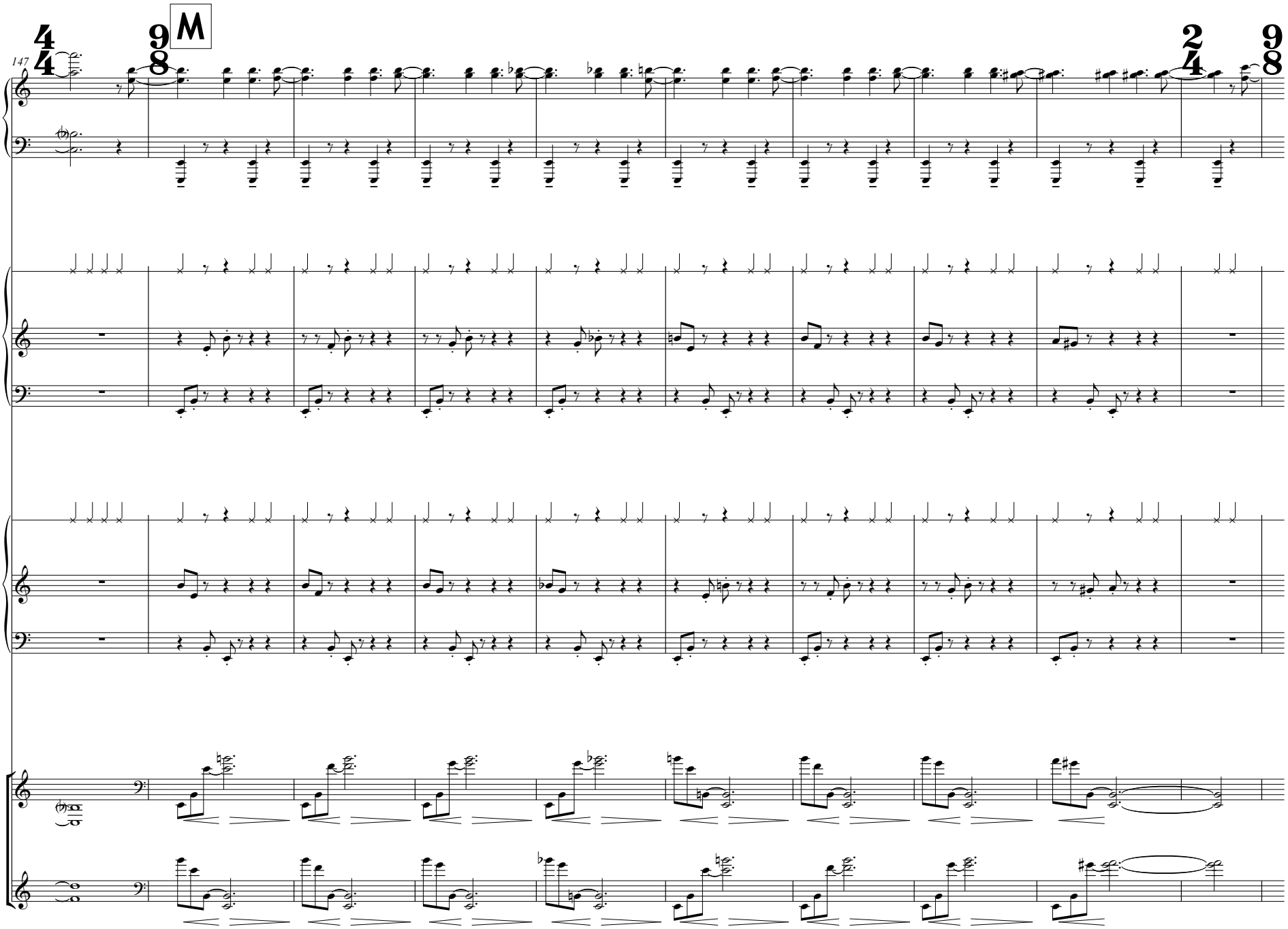
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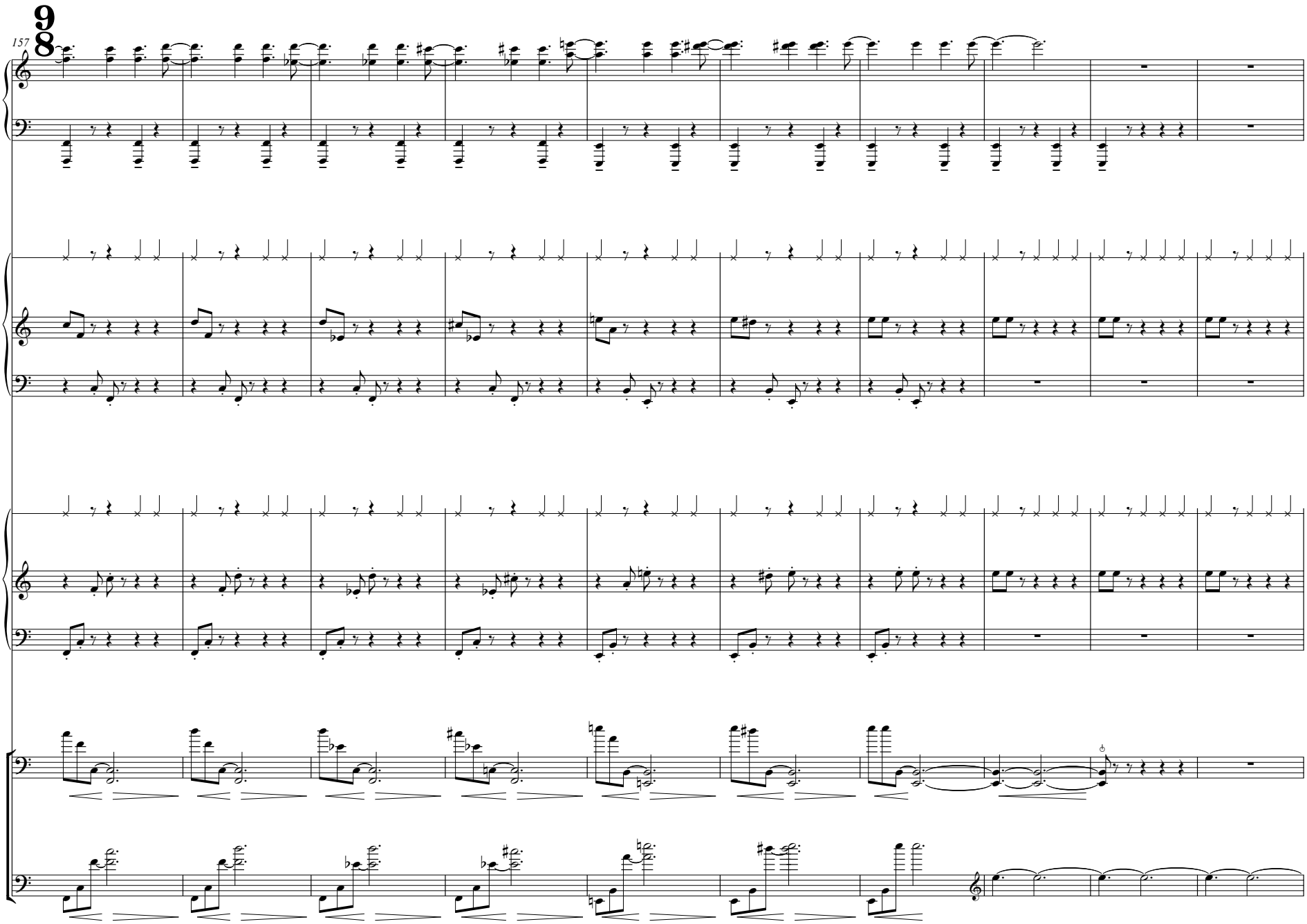
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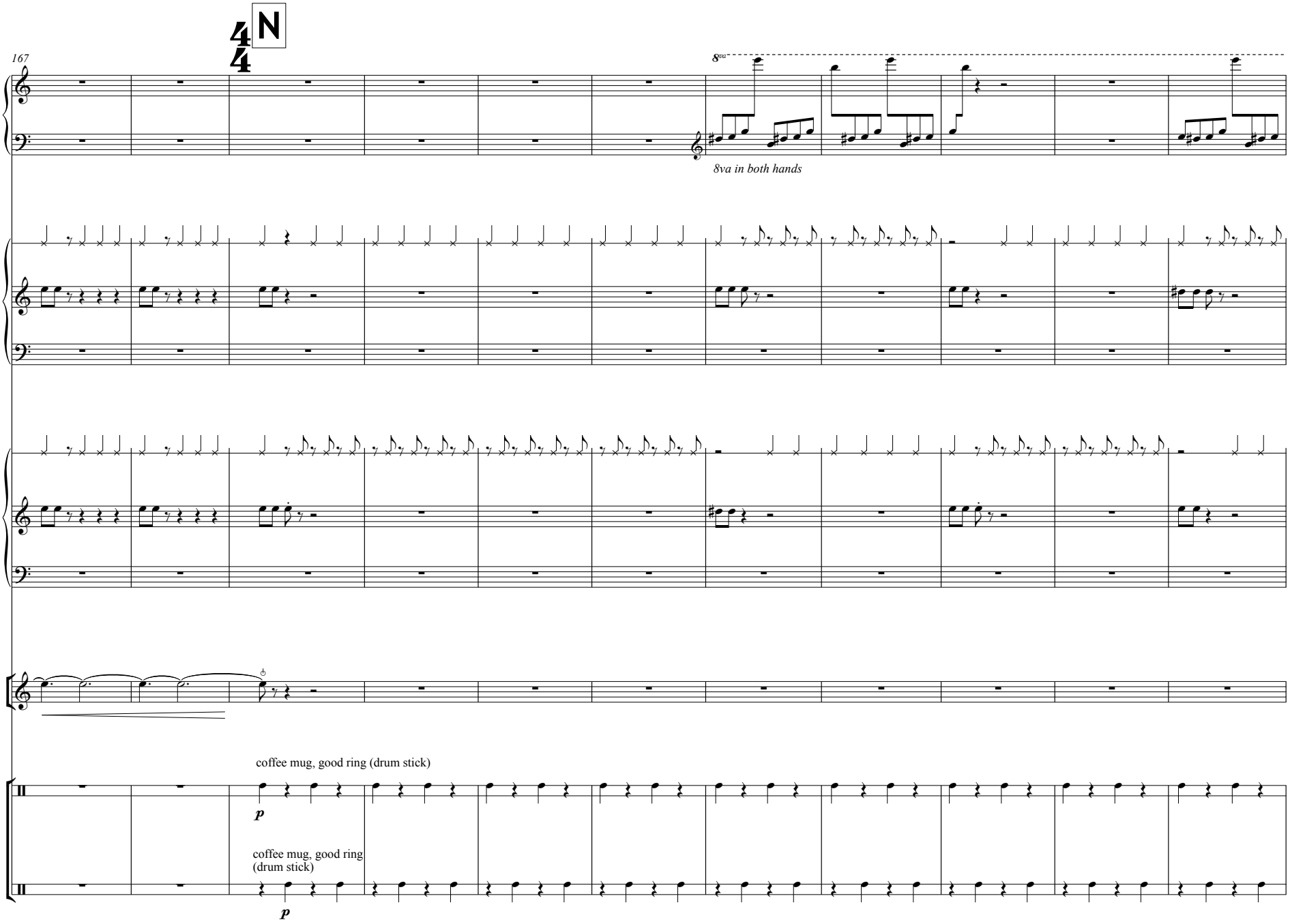
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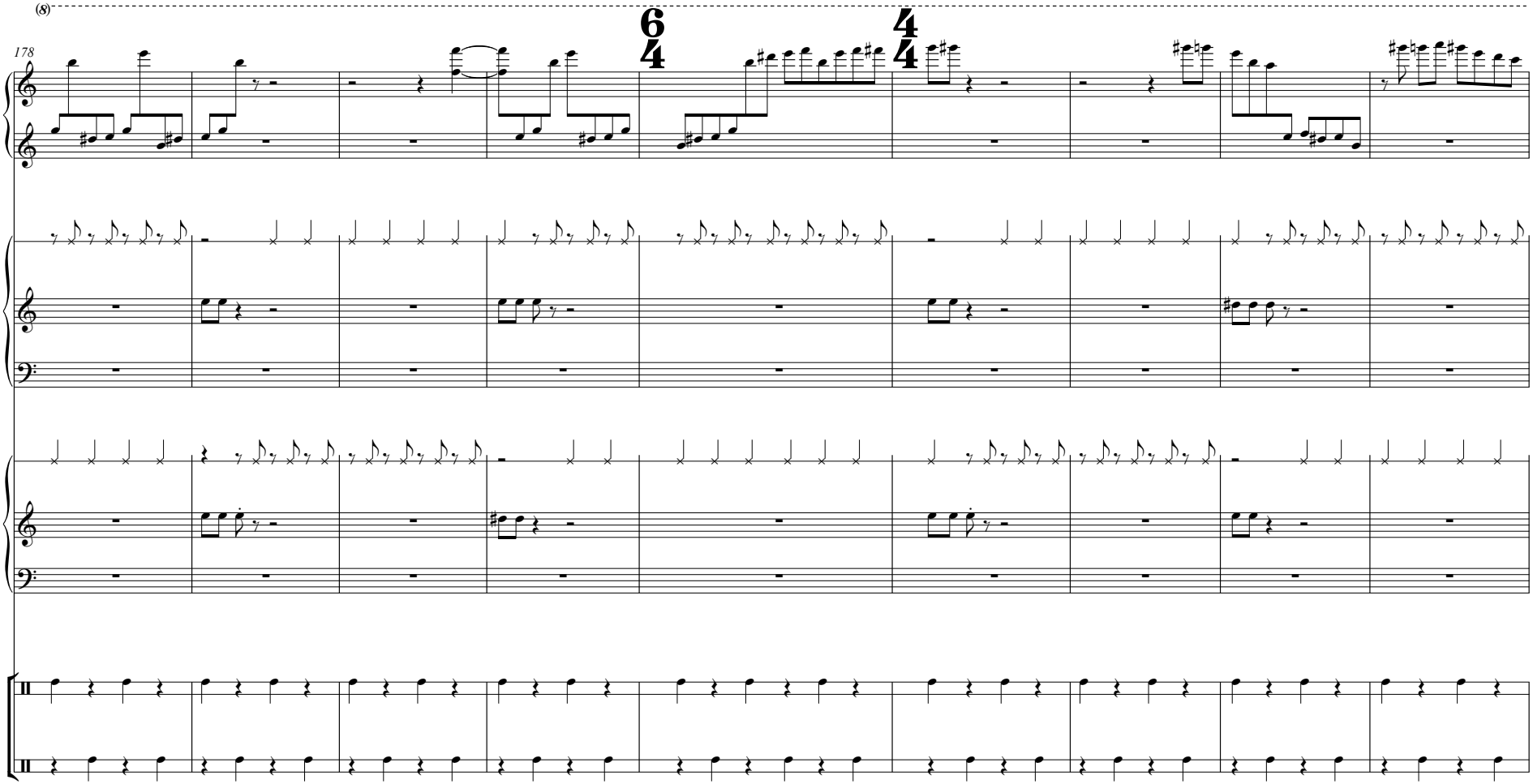
167
8va
8va in both hands
coffee mug, good ring (drum stick)
p
coffee mug, good ring
(drum stick)
p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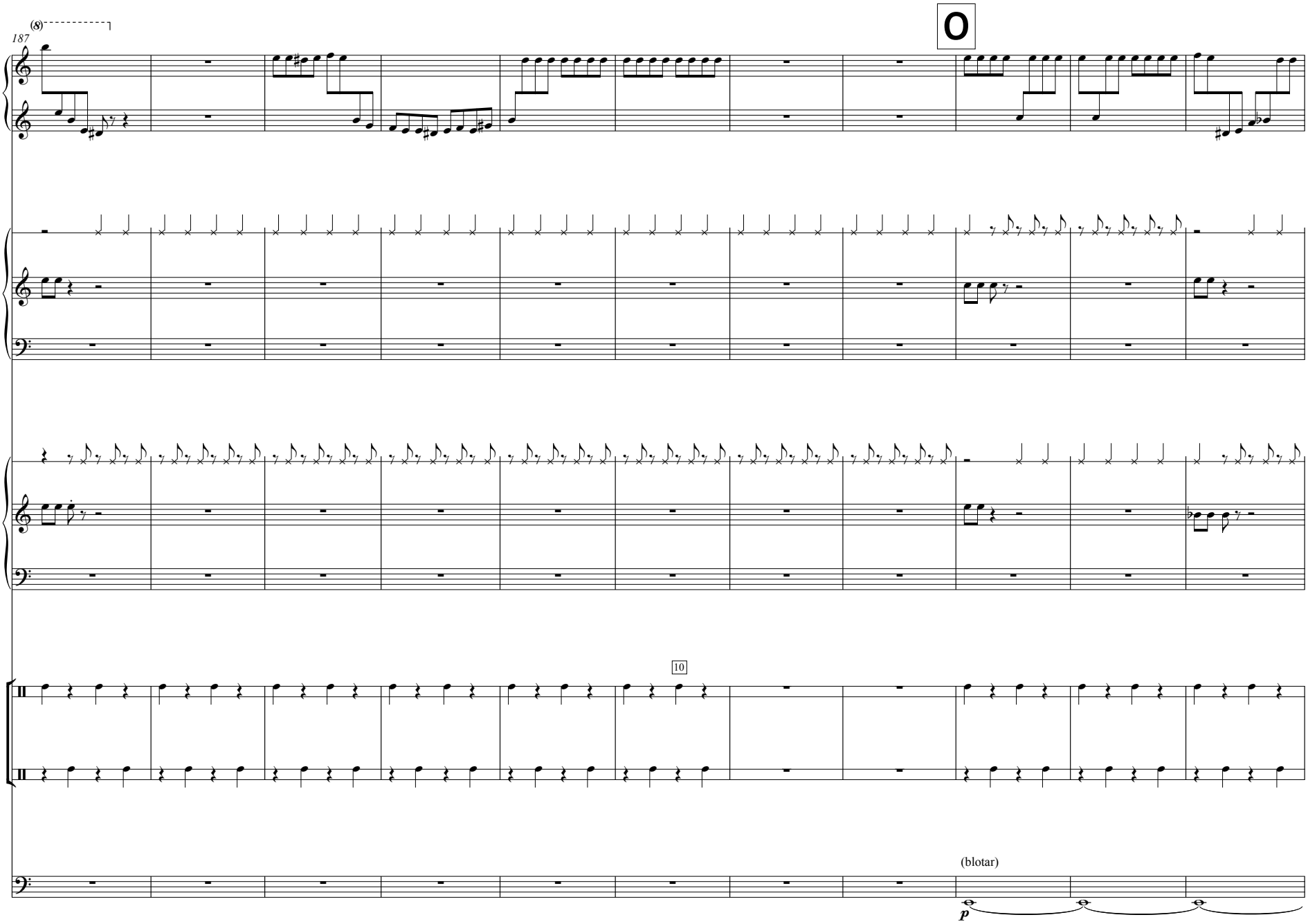
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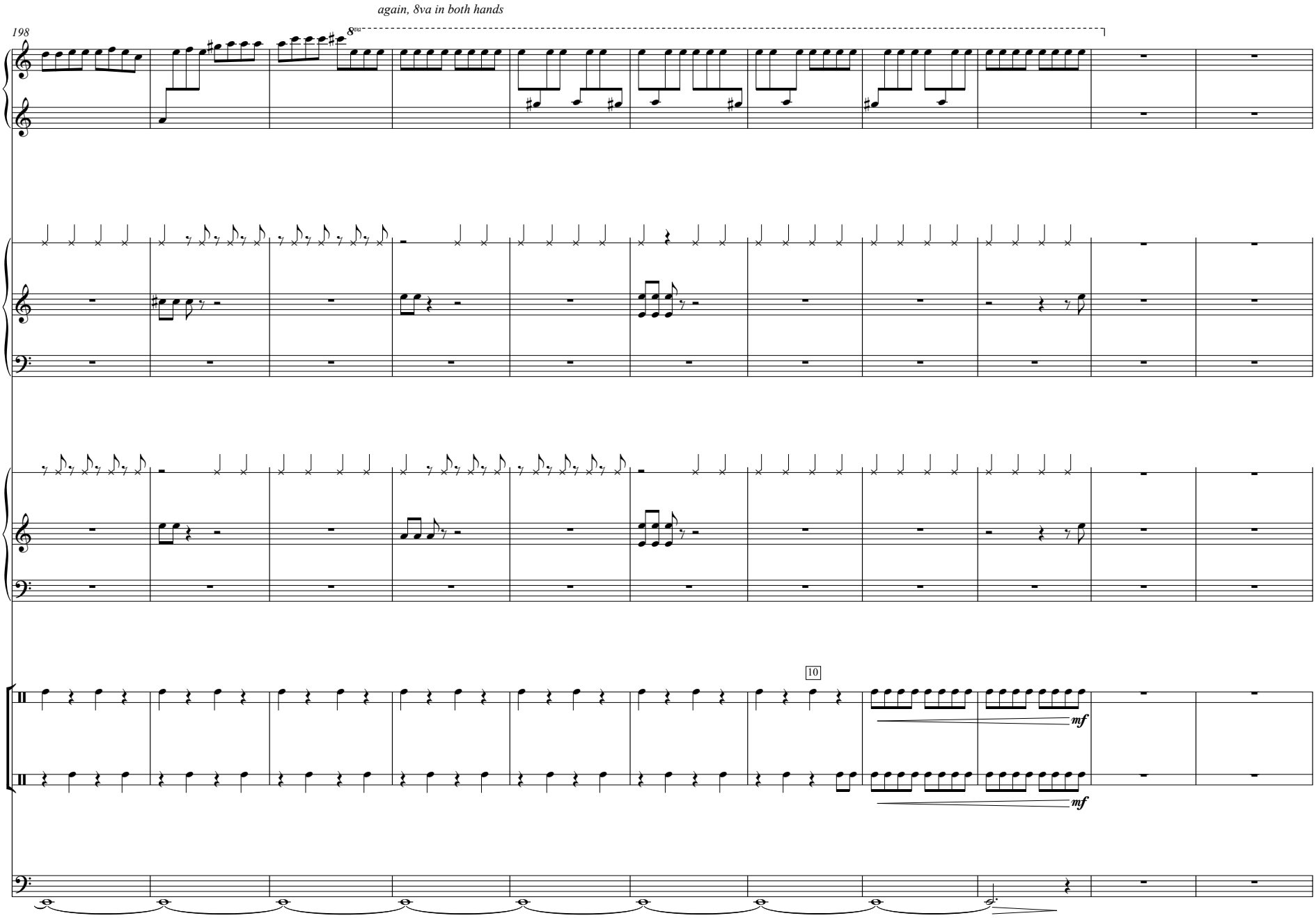
again, 8va in both hands
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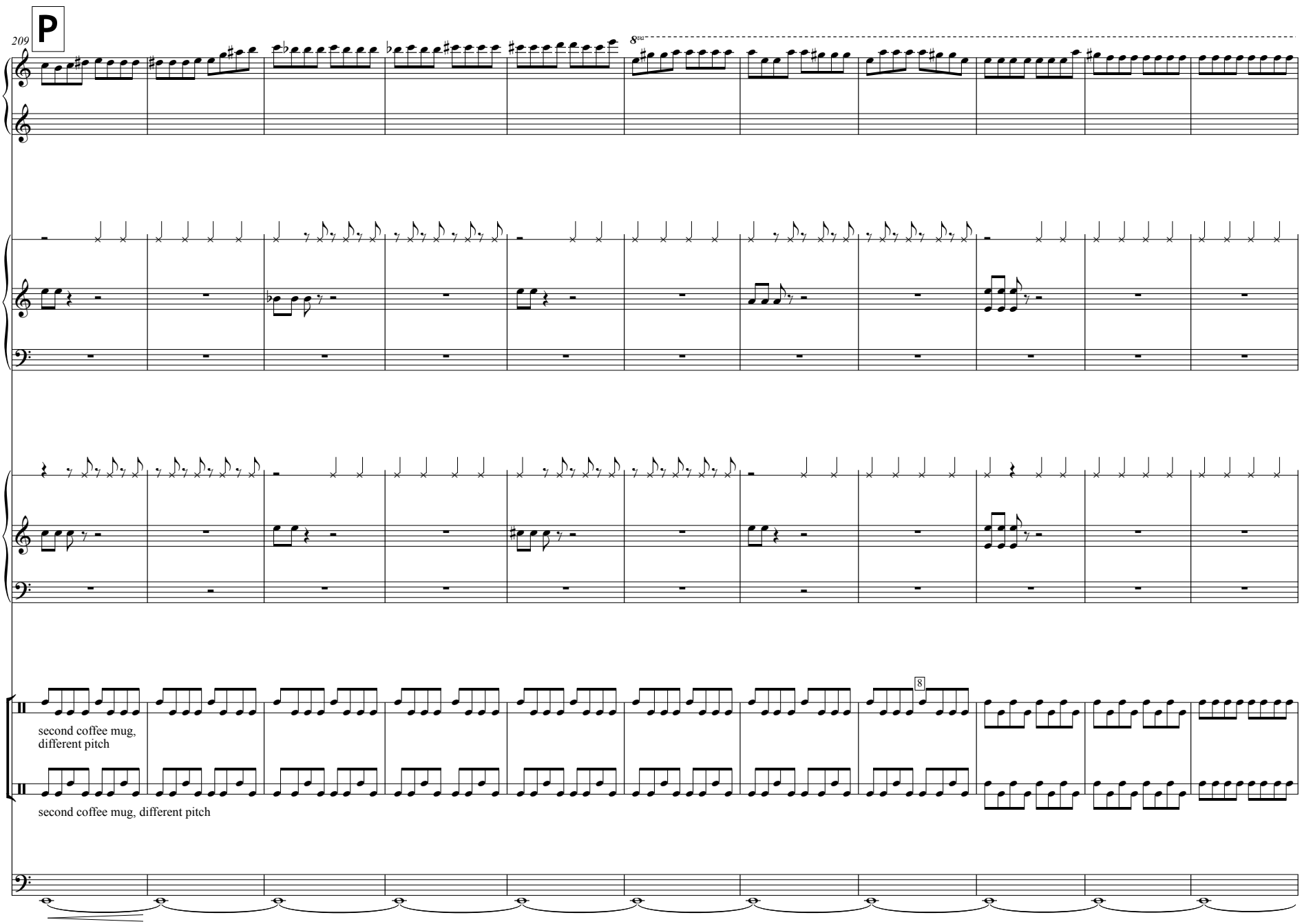
P
209
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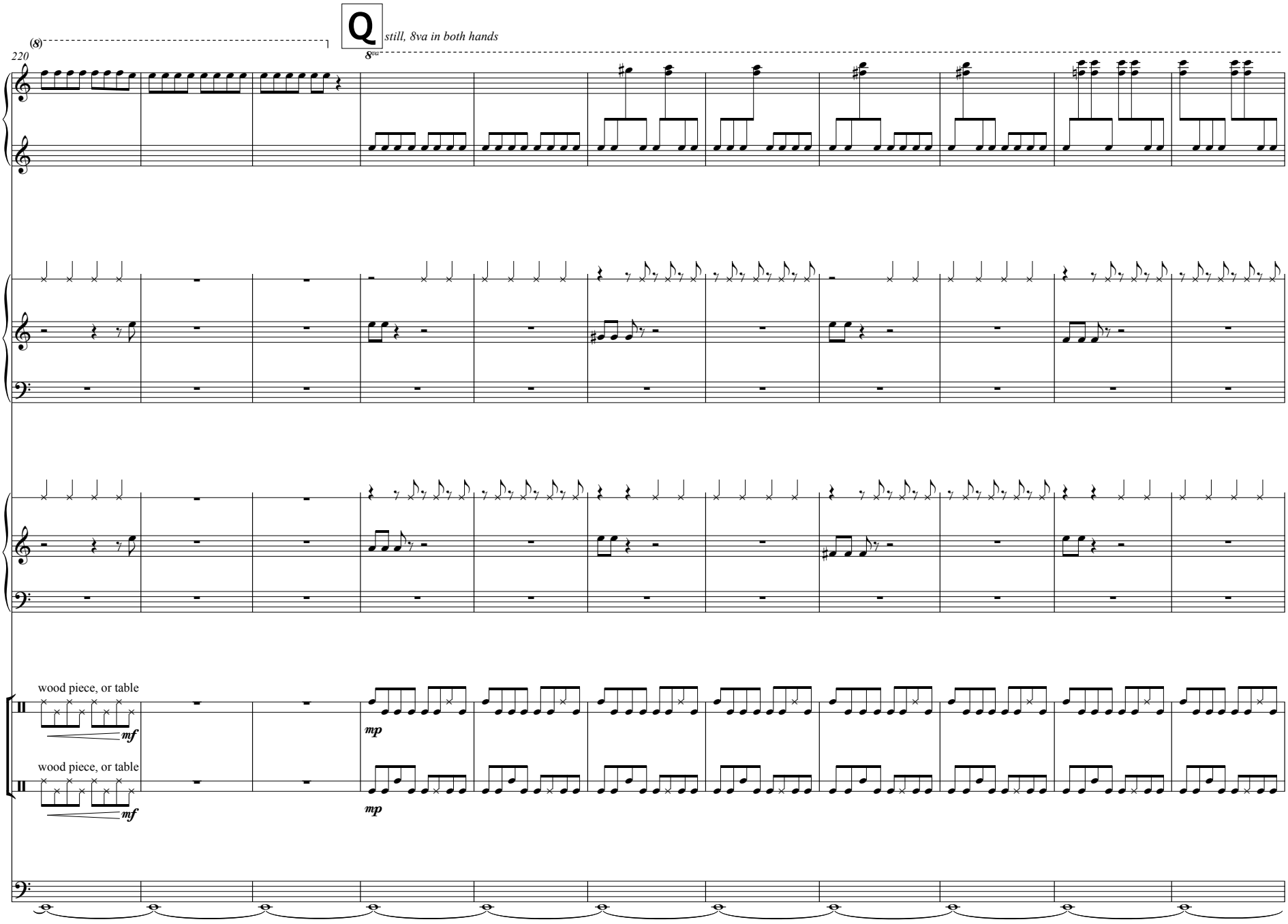
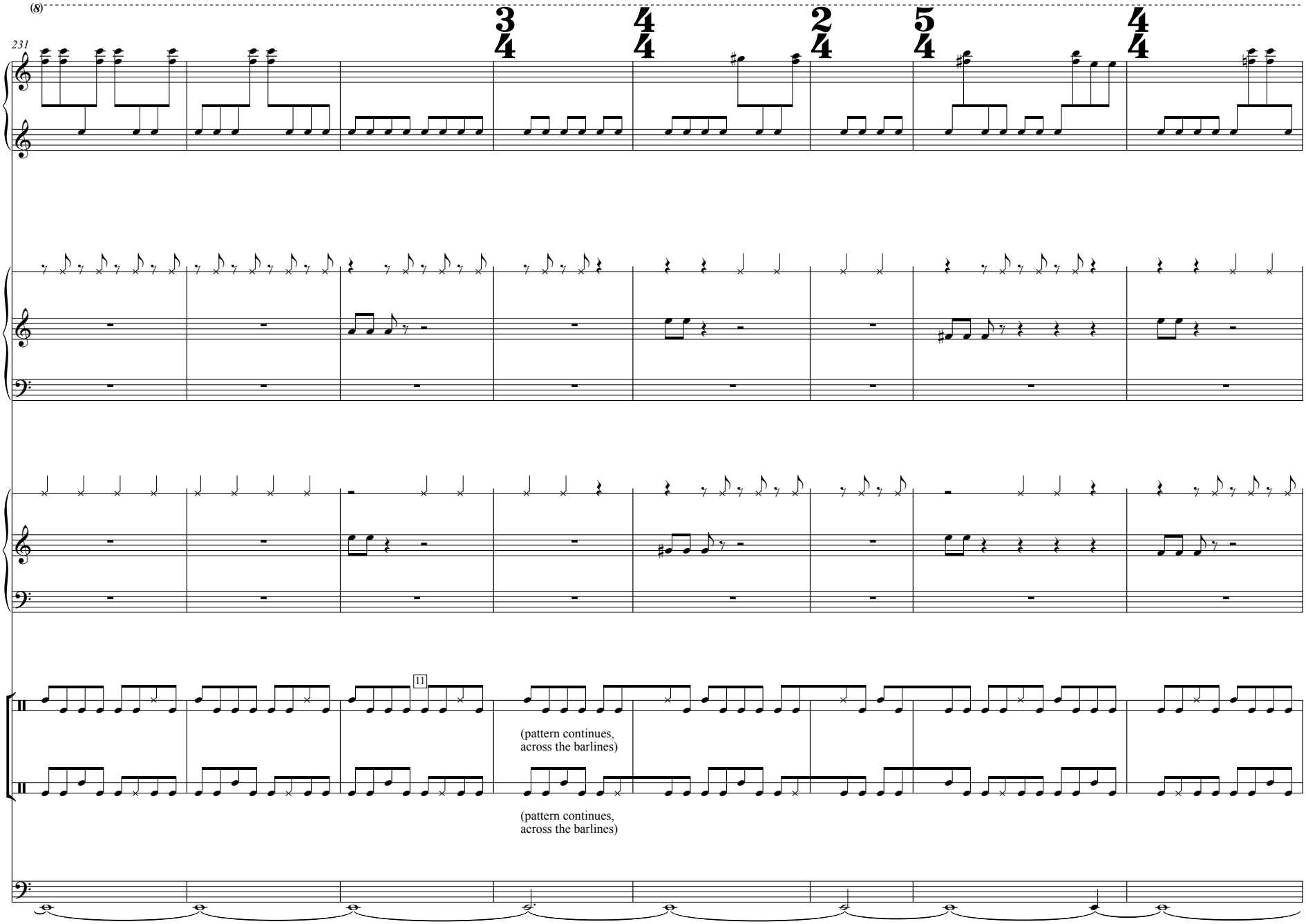
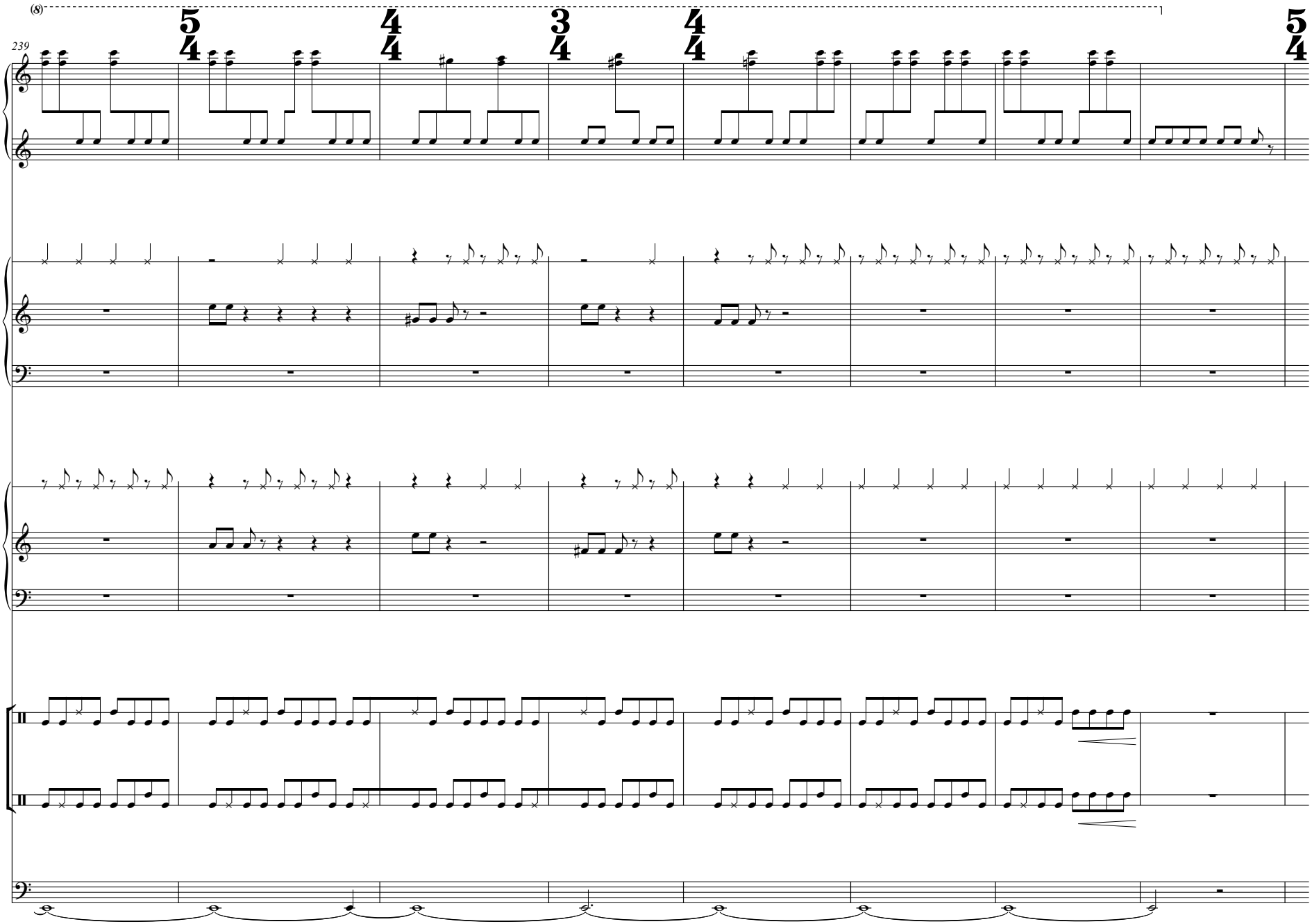
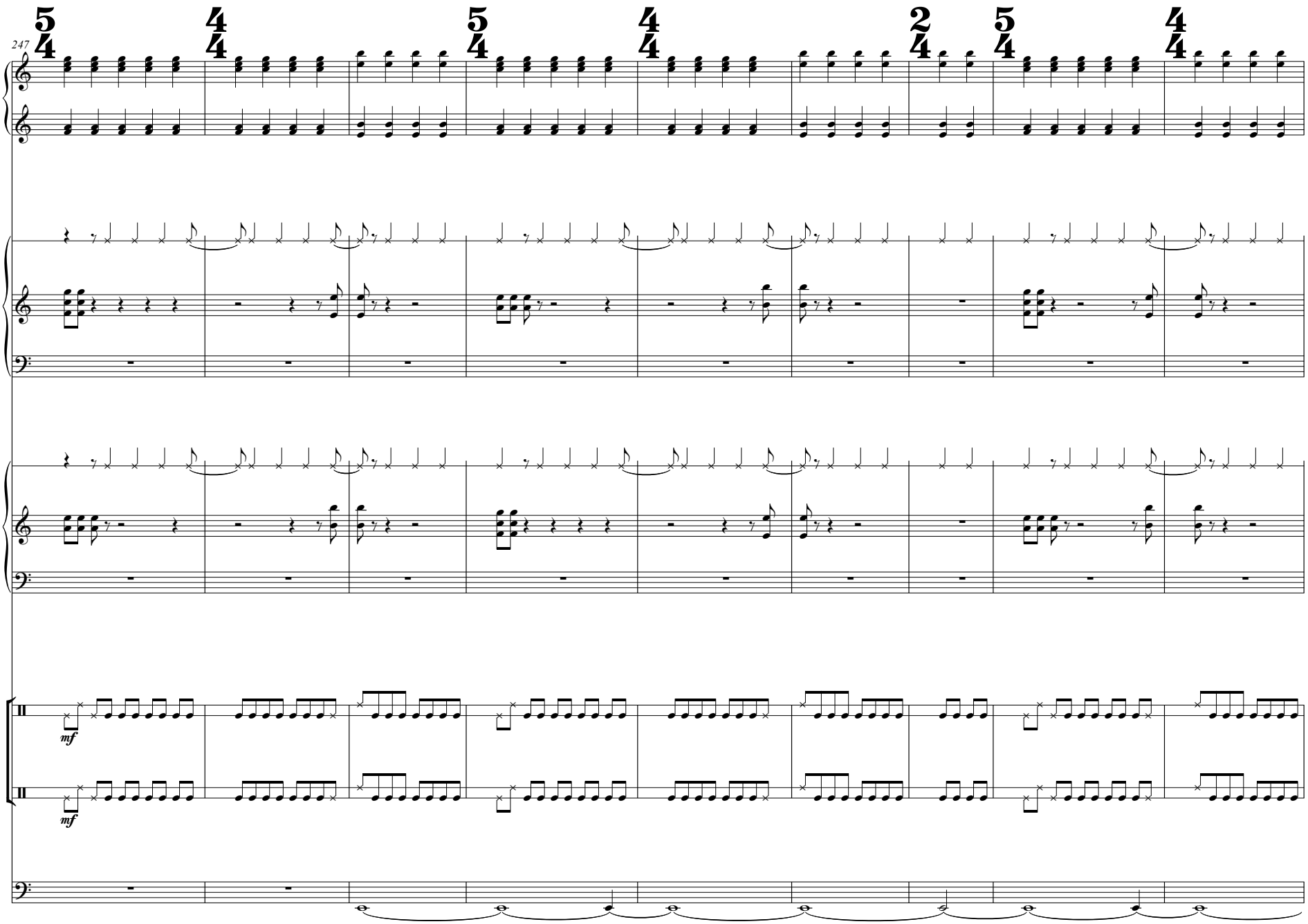
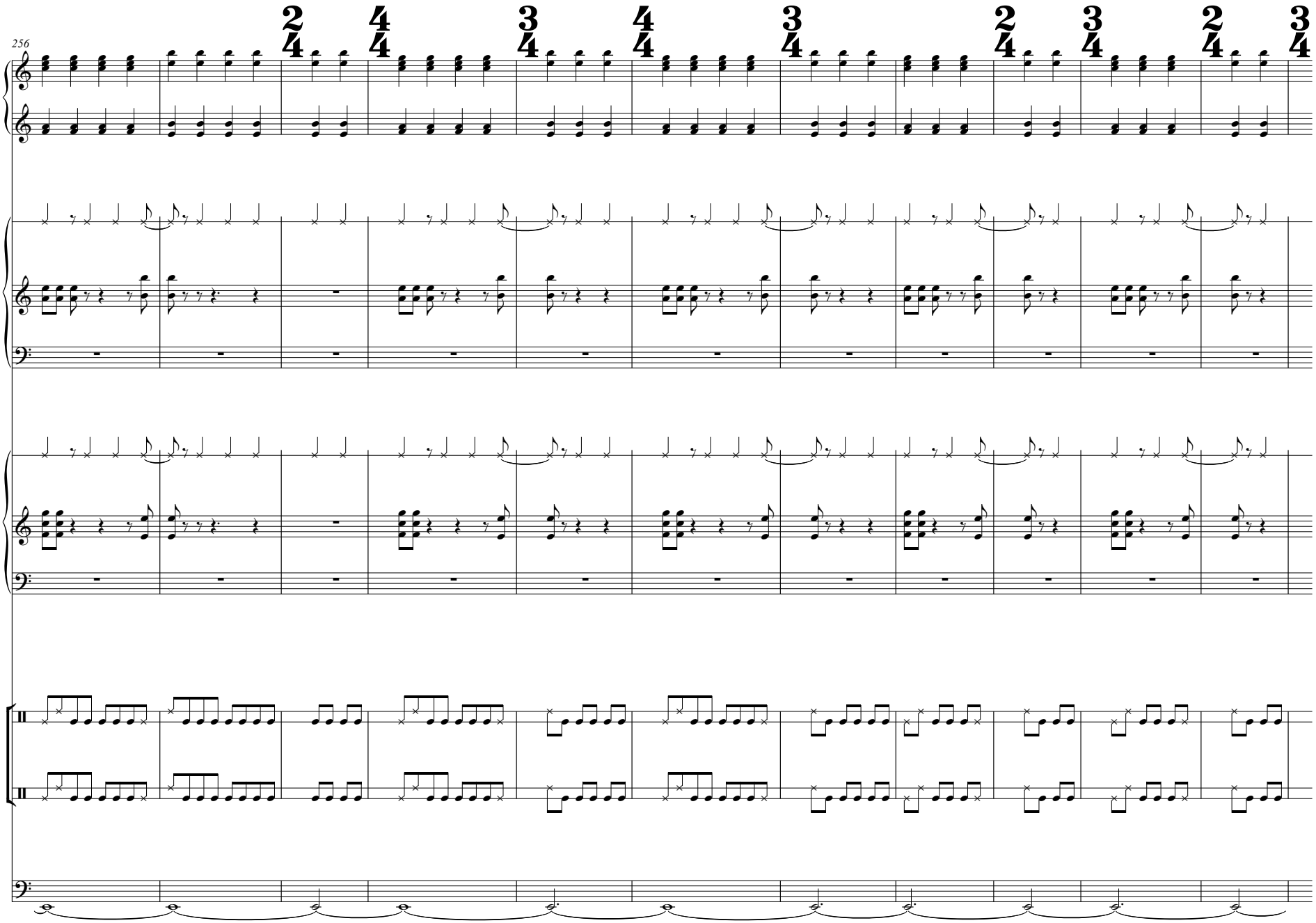
second coffee mug, different pitch
second coffee mug, different pitch

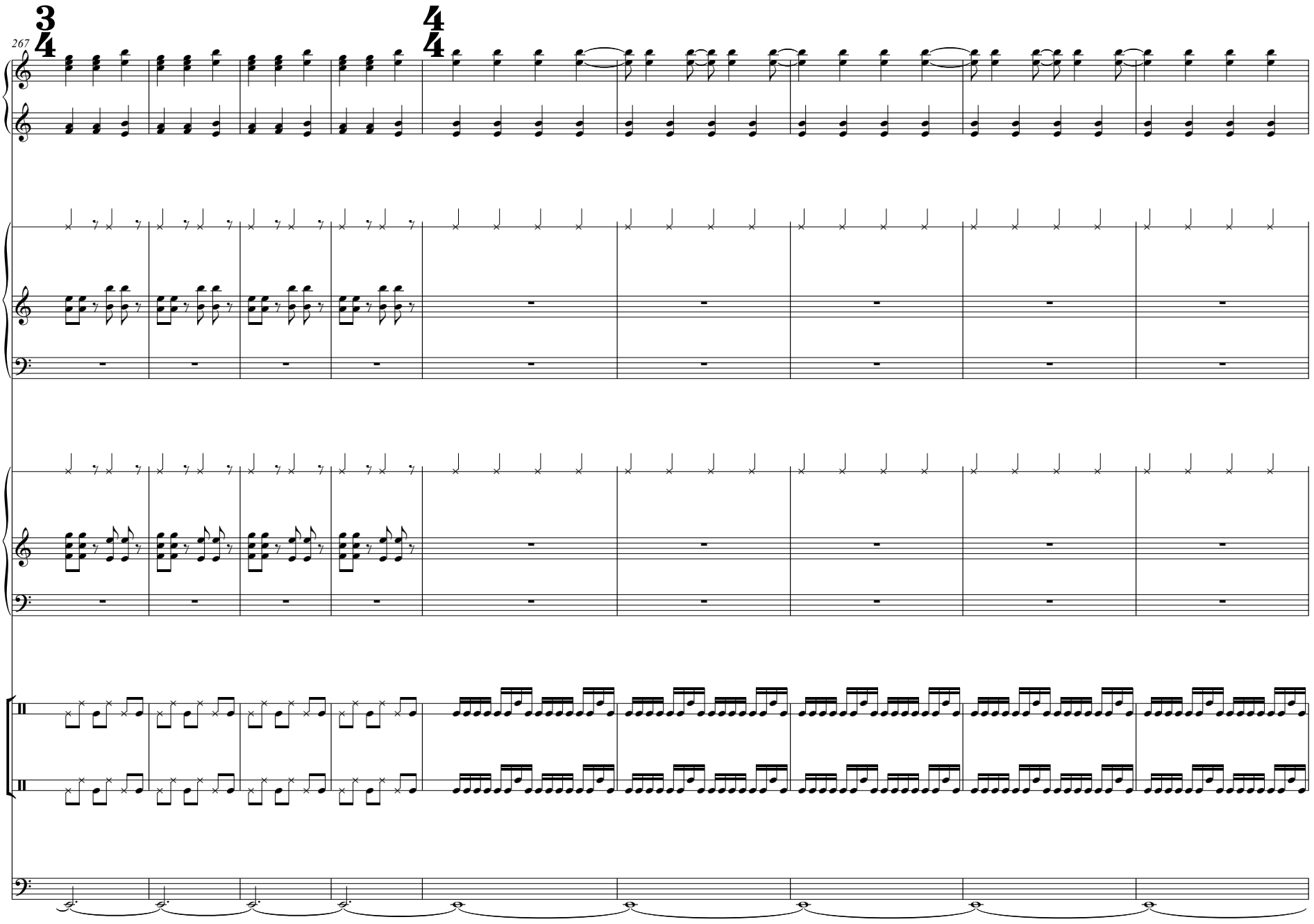

Q
still, 8va in both hands
(8)
8va
220
wood piece, or table
mf
mp
wood piece, or table
mf
mp

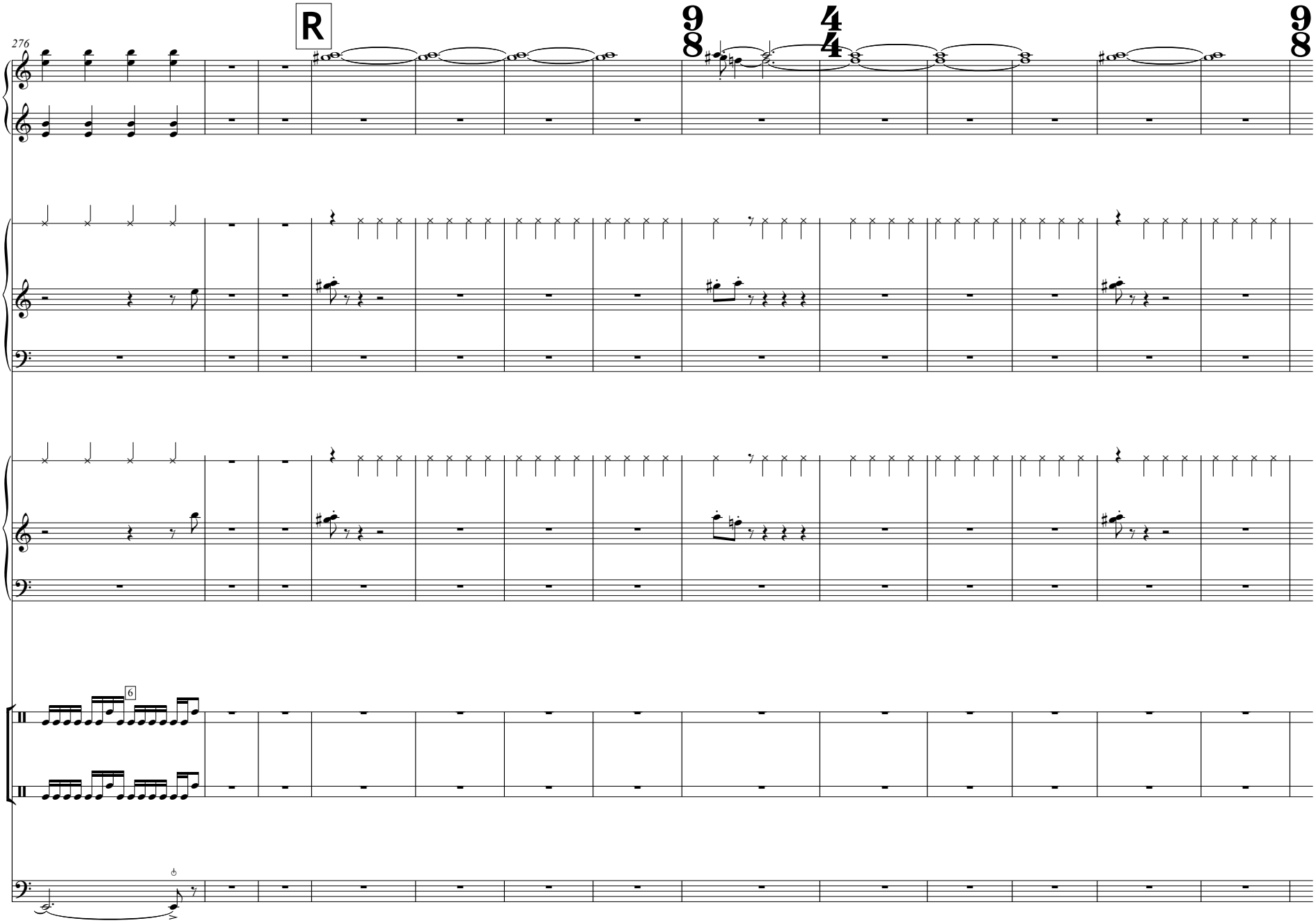

(8)
231
3/4
4/4
2/4
5/4
4/4
11
(pattern continues, across the barlines)
(pattern continues, across the barlines)

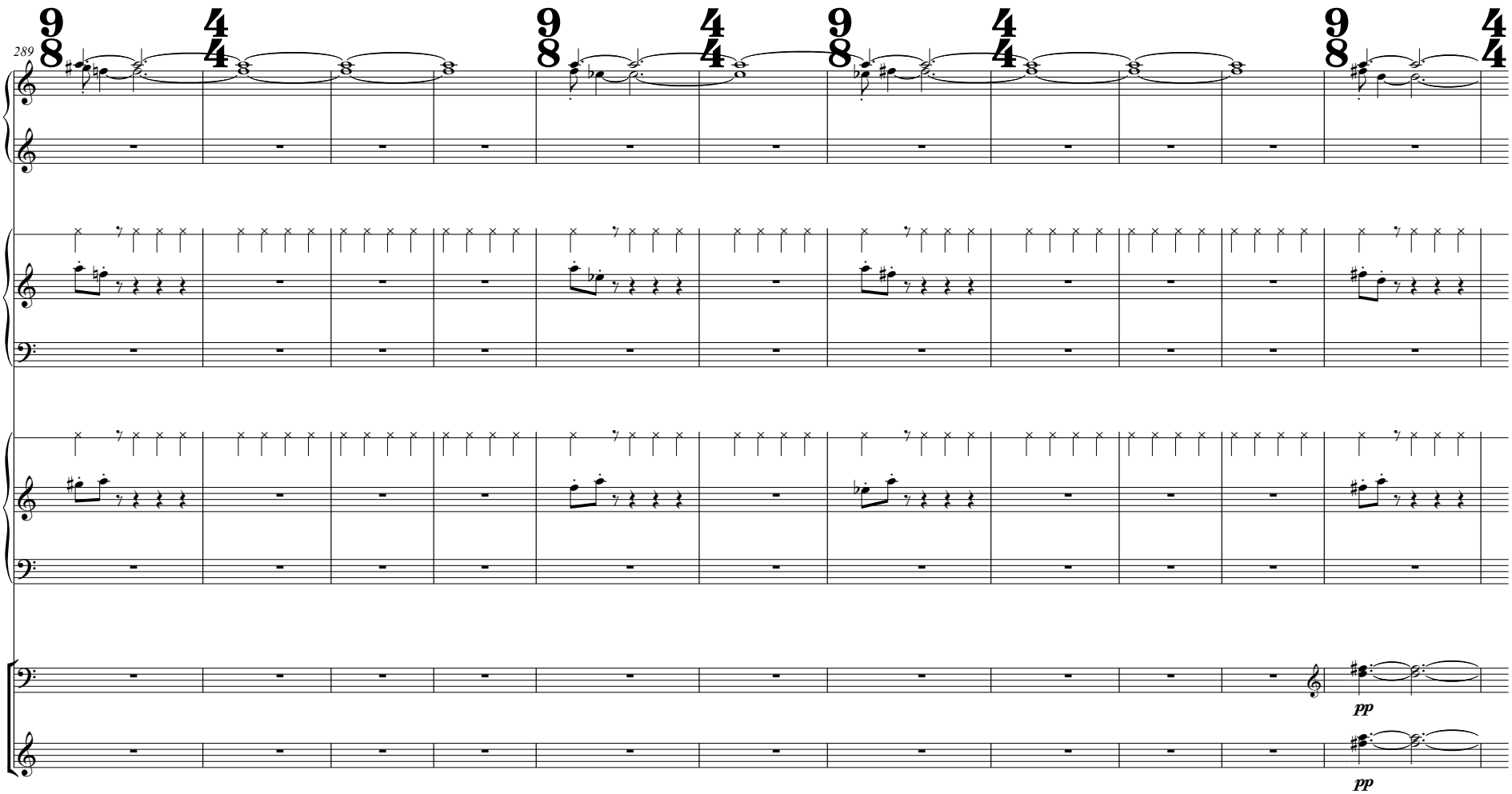

(8)
239
5/4
4/4
3/4
4/4
5/4

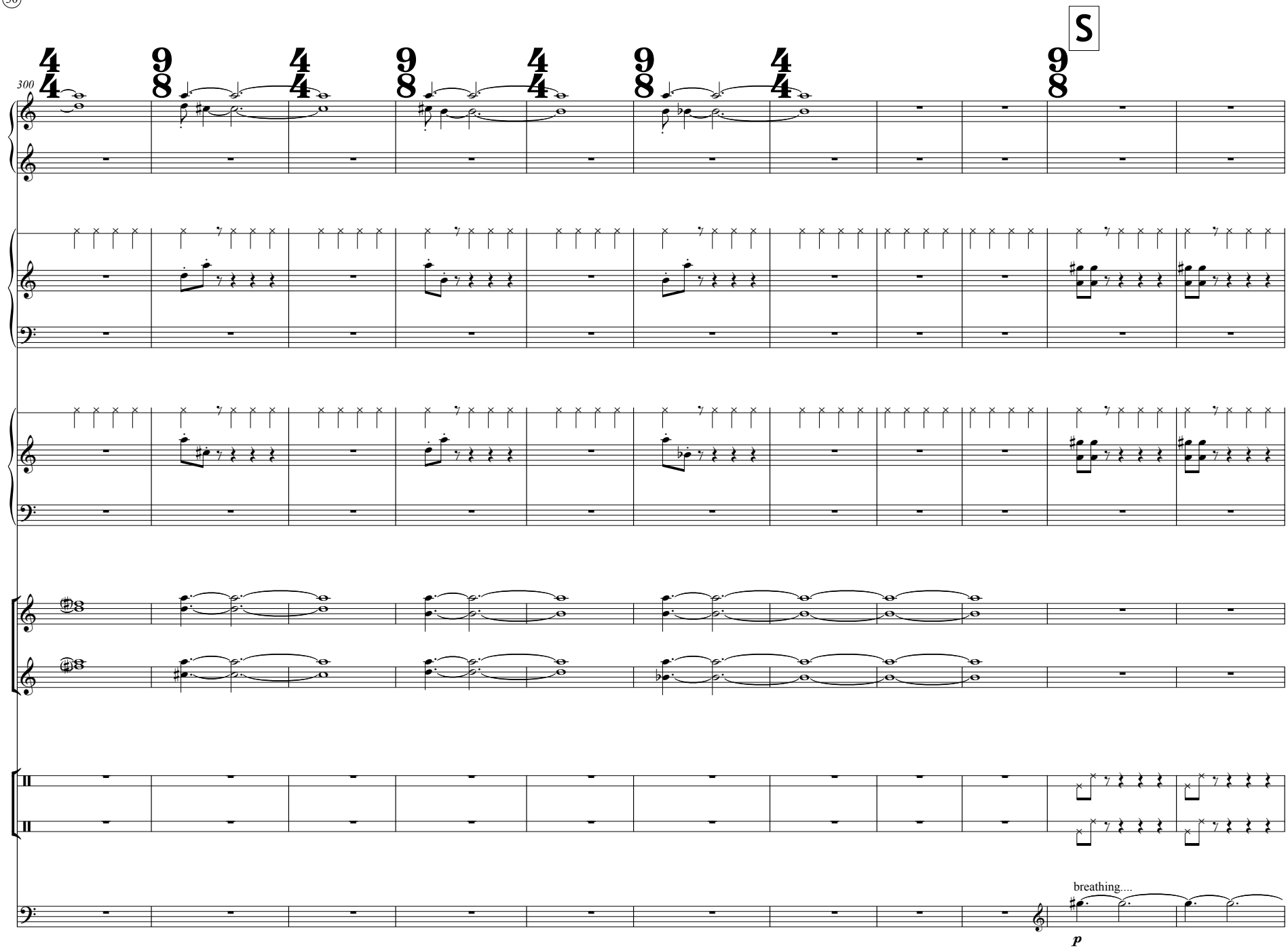

247
5/4
4/4
5/4
4/4
2/4
5/4
4/4
mf
mf

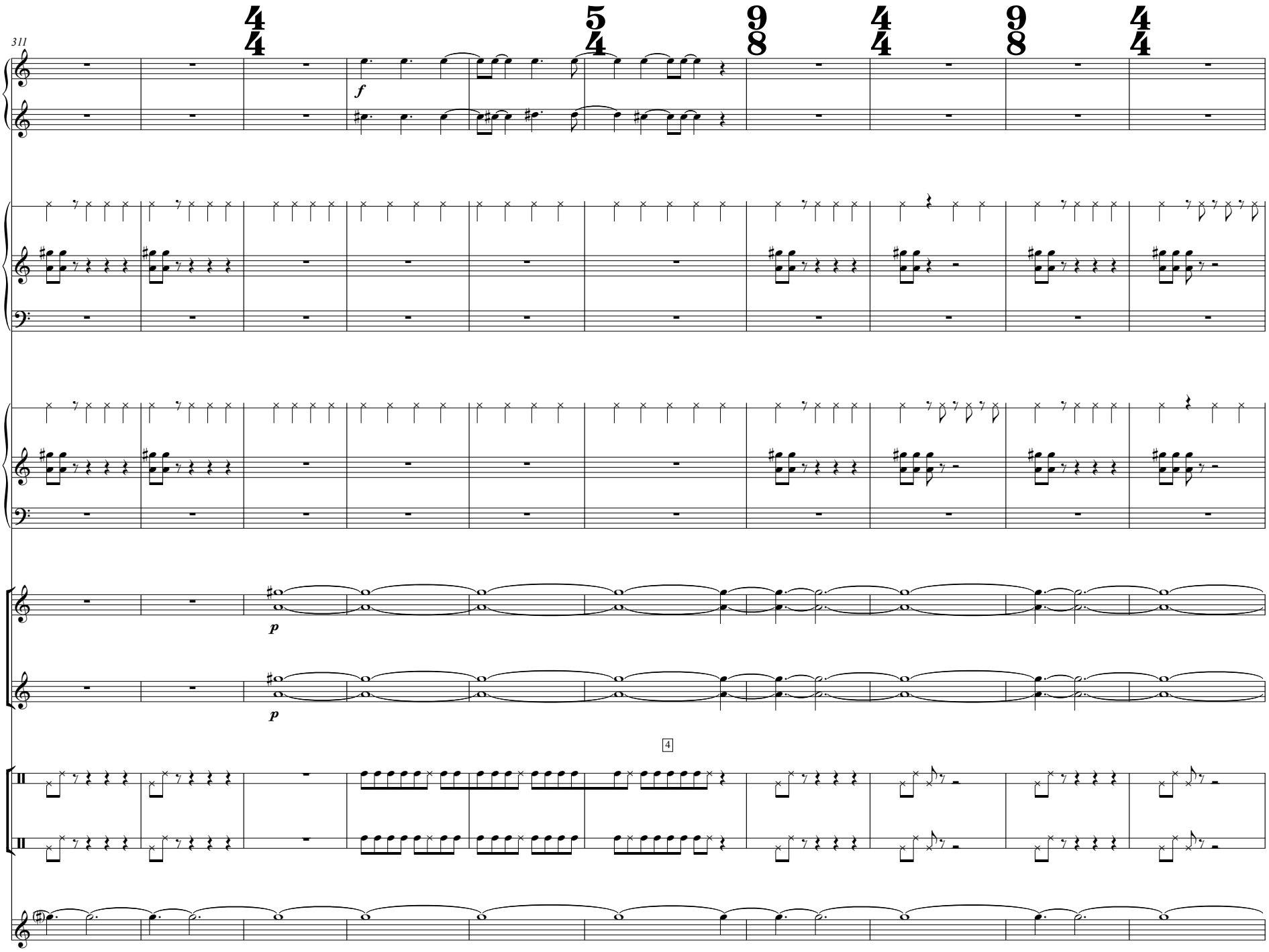

256
2/4
4/4
3/4
4/4
3/4
2/4
3/4
2/4
3/4

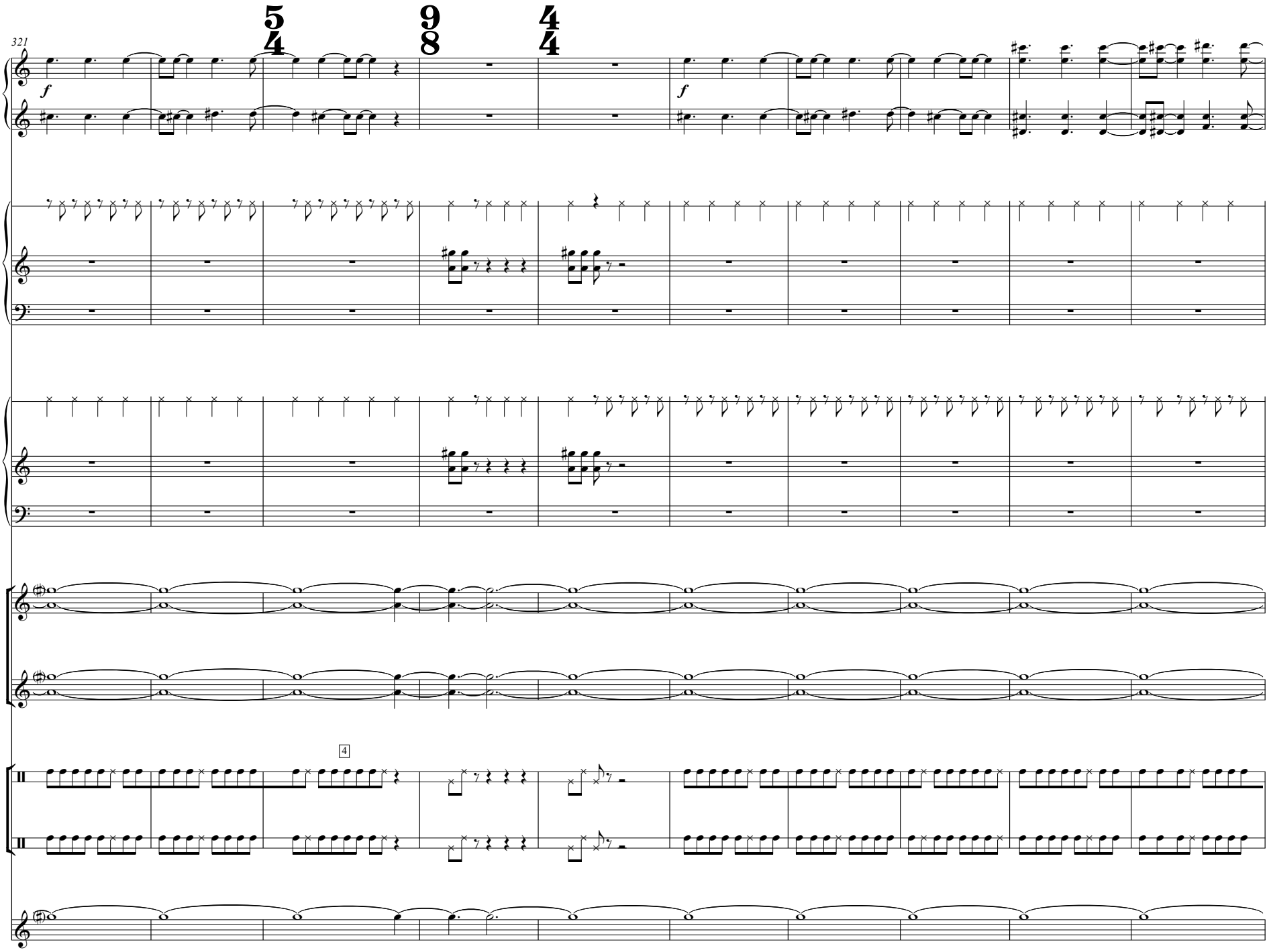

267
3
4
4
4

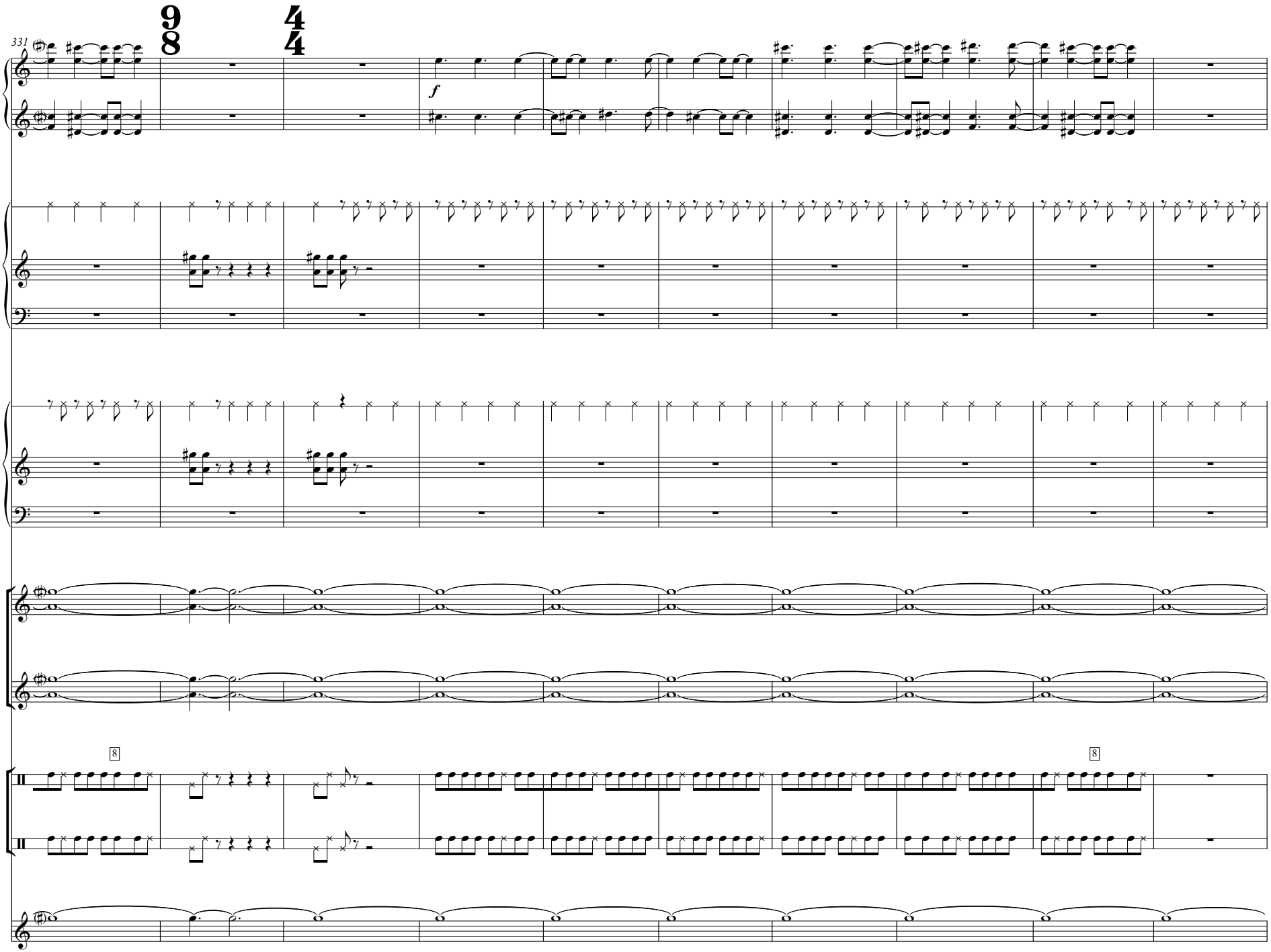

276
R
9/8
4/4
9/8
6

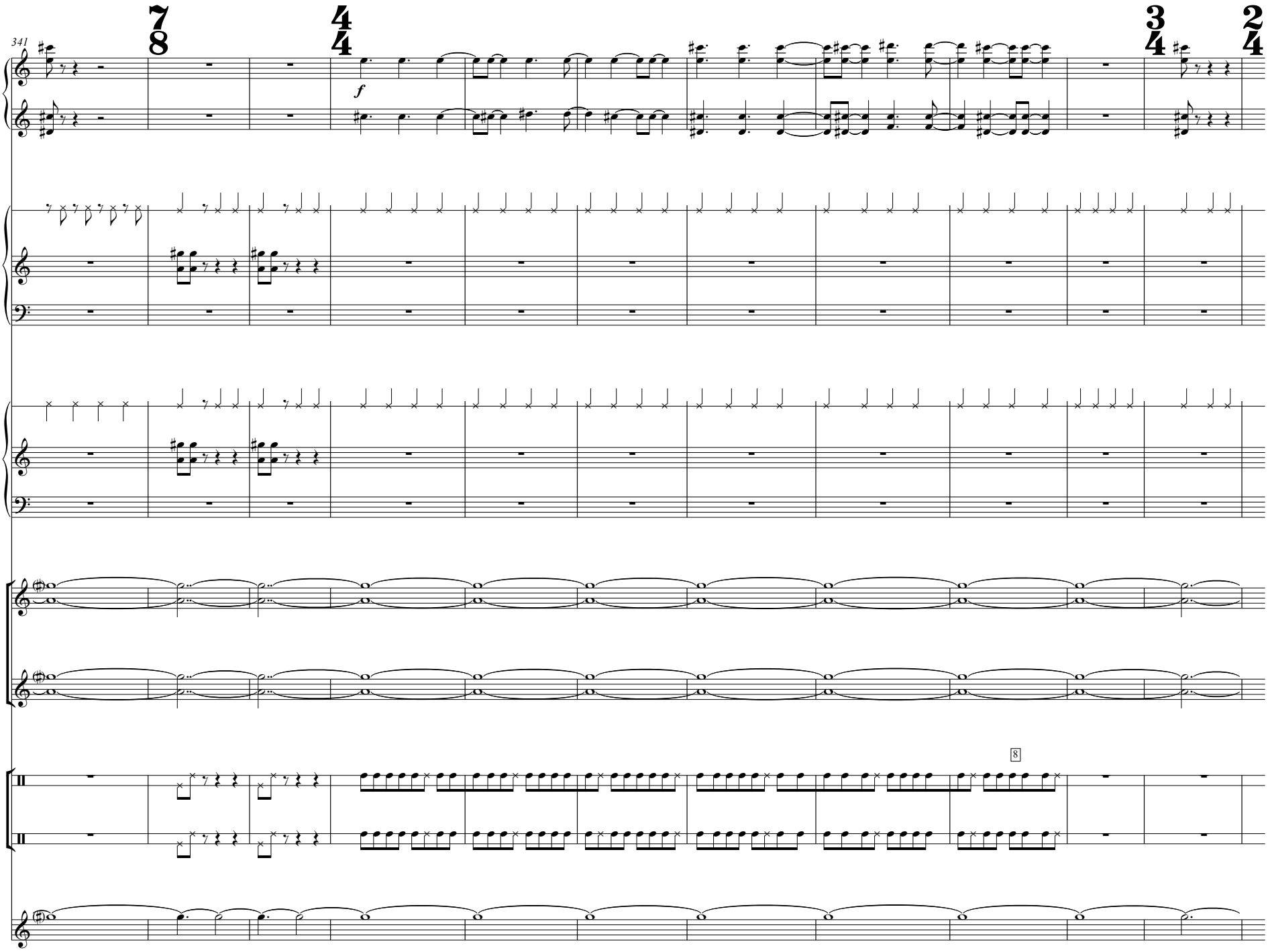

289
pp
pp

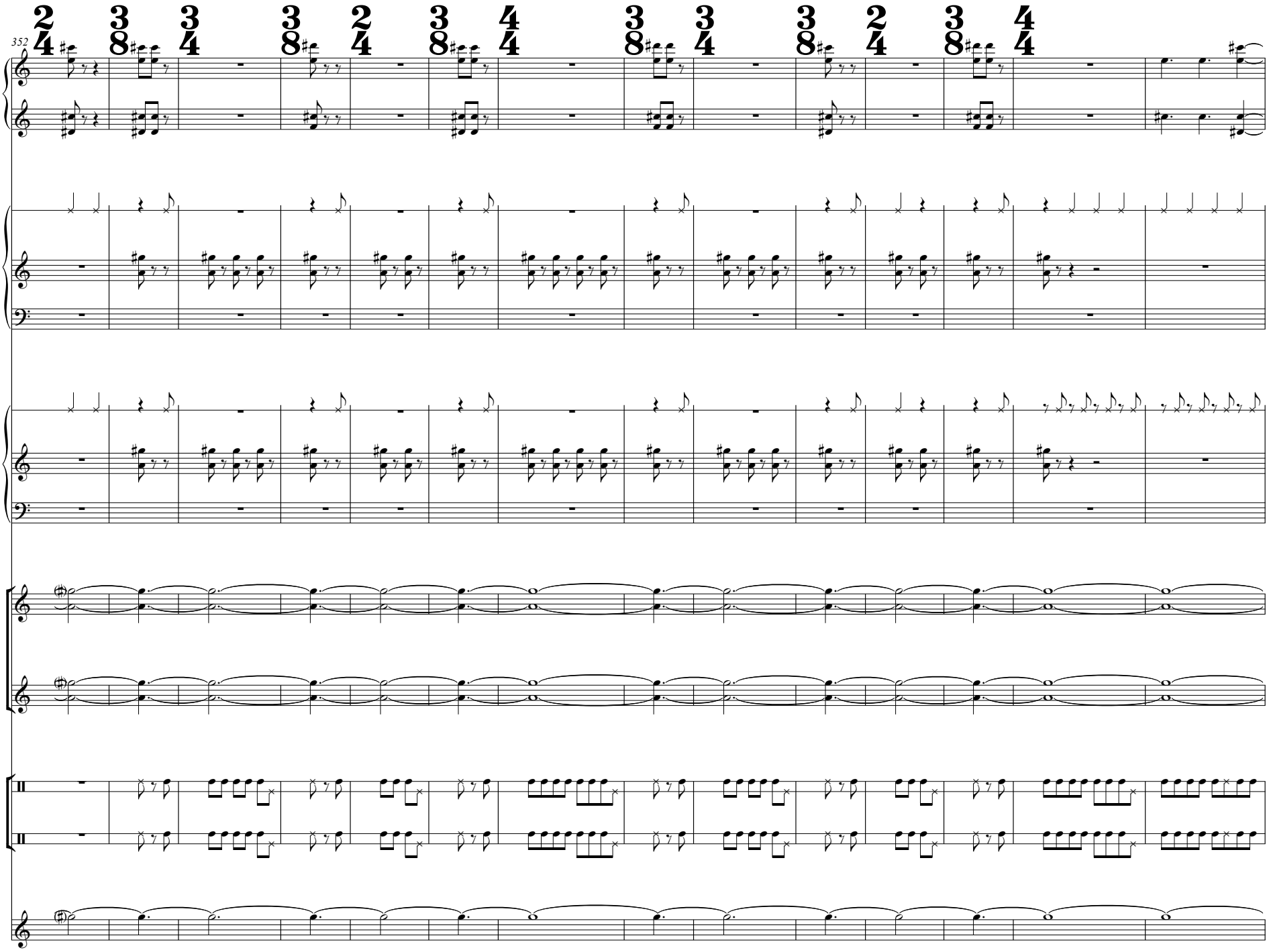

S
300
breathing....
p

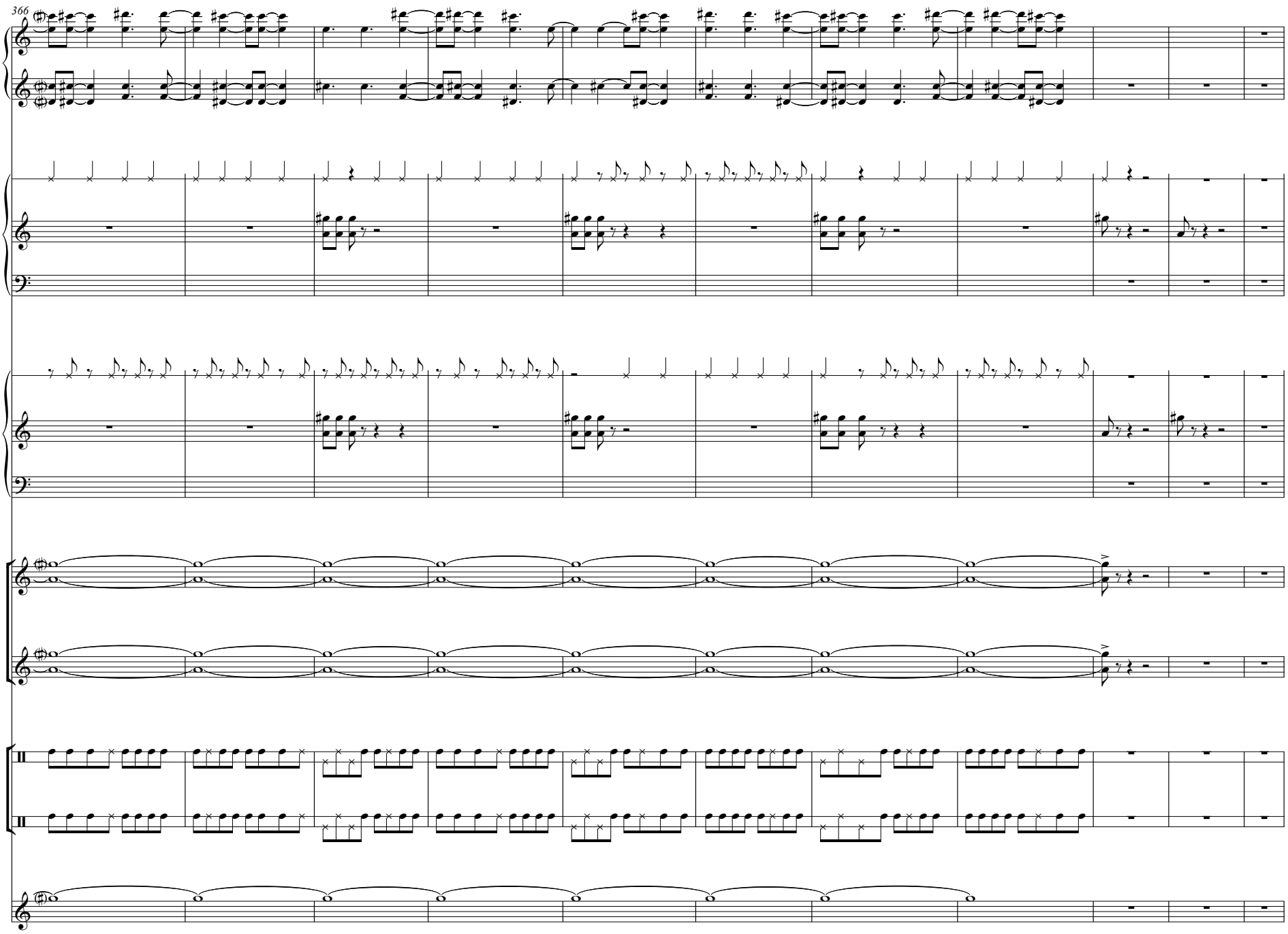

311
4/4
5/4
9/8
4/4
9/8
4/4
f
p
p
4

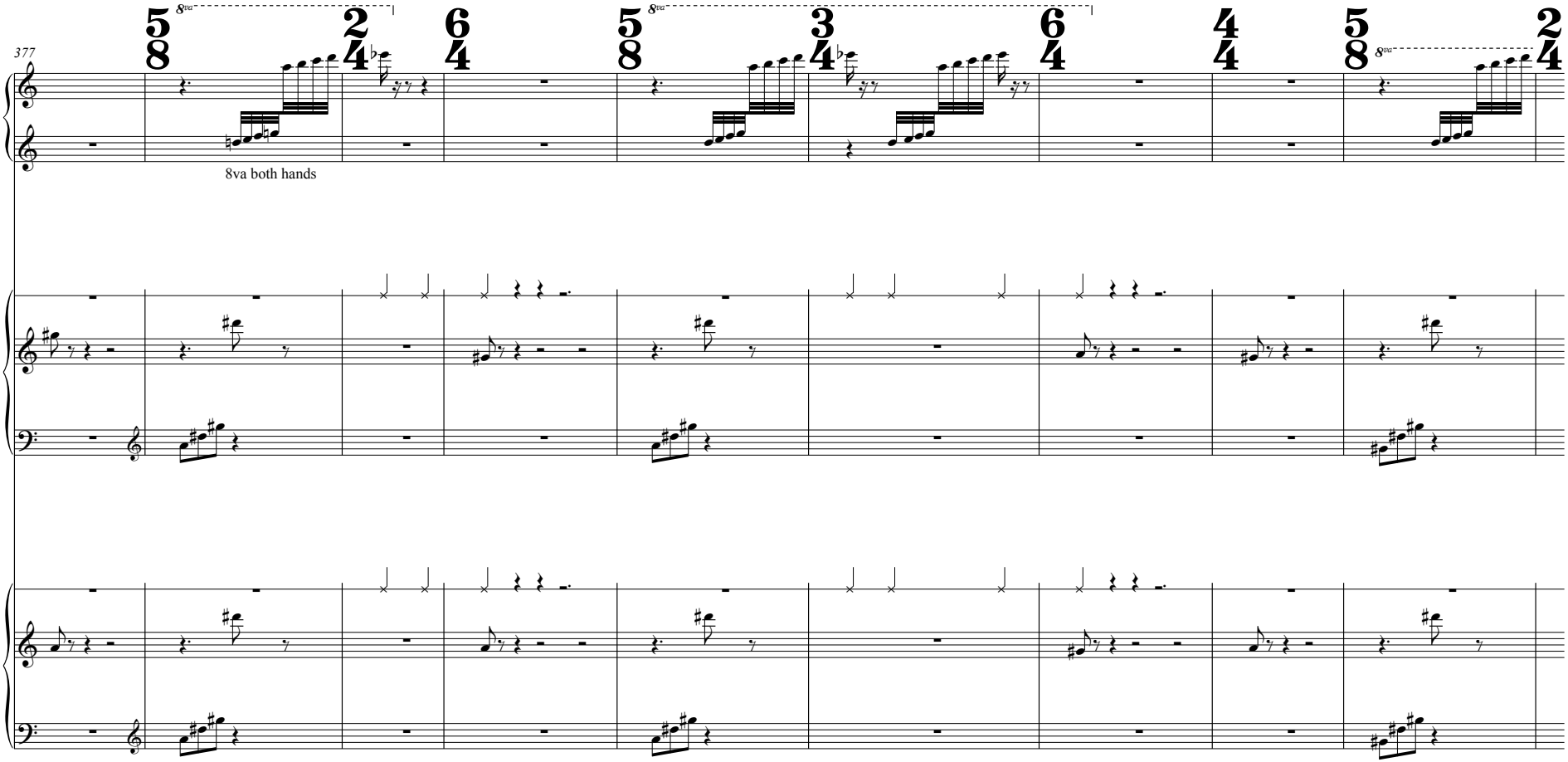

321
5/4
9/8
4/4
f
f
4

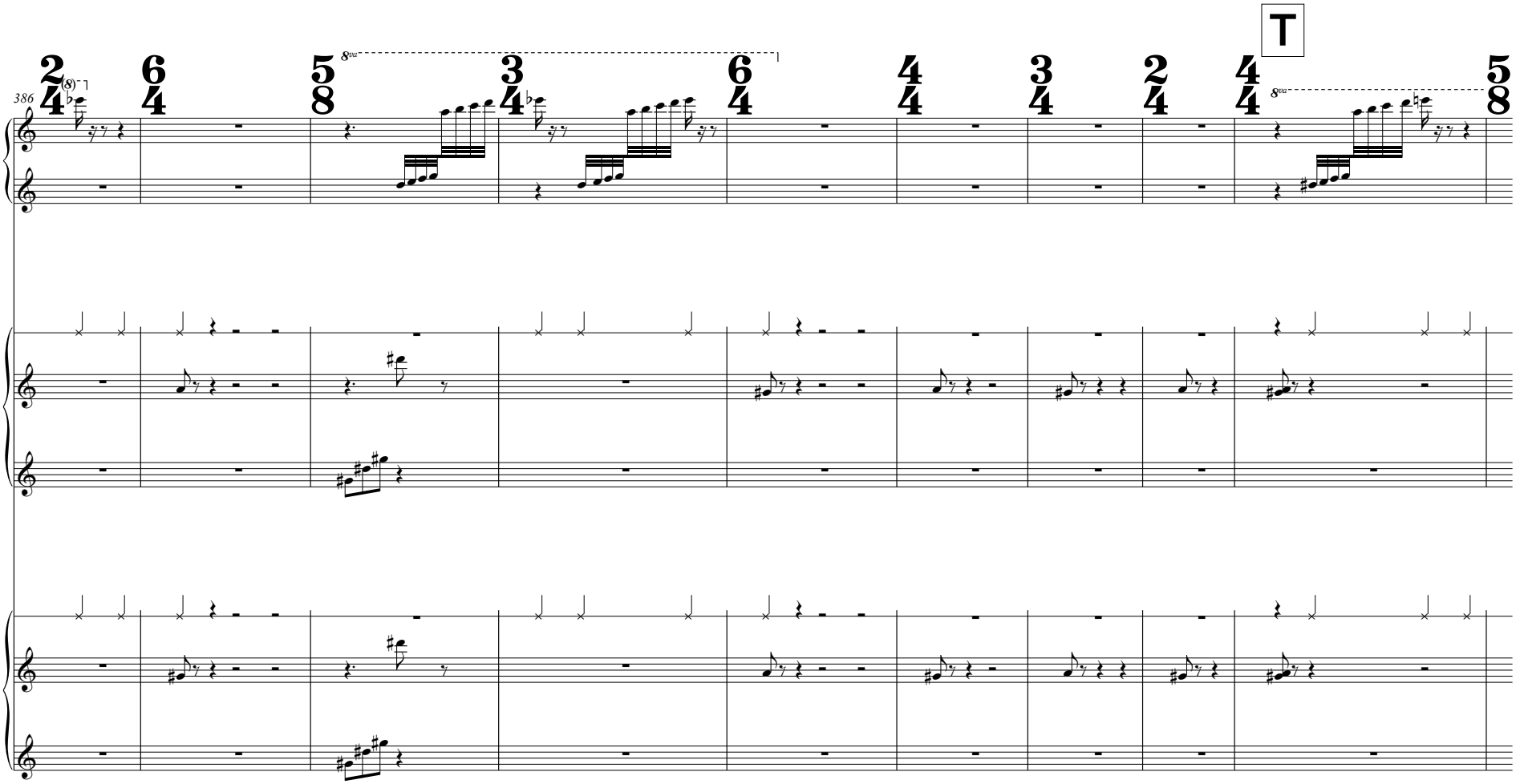

331
9
8
4
4
f
8
8

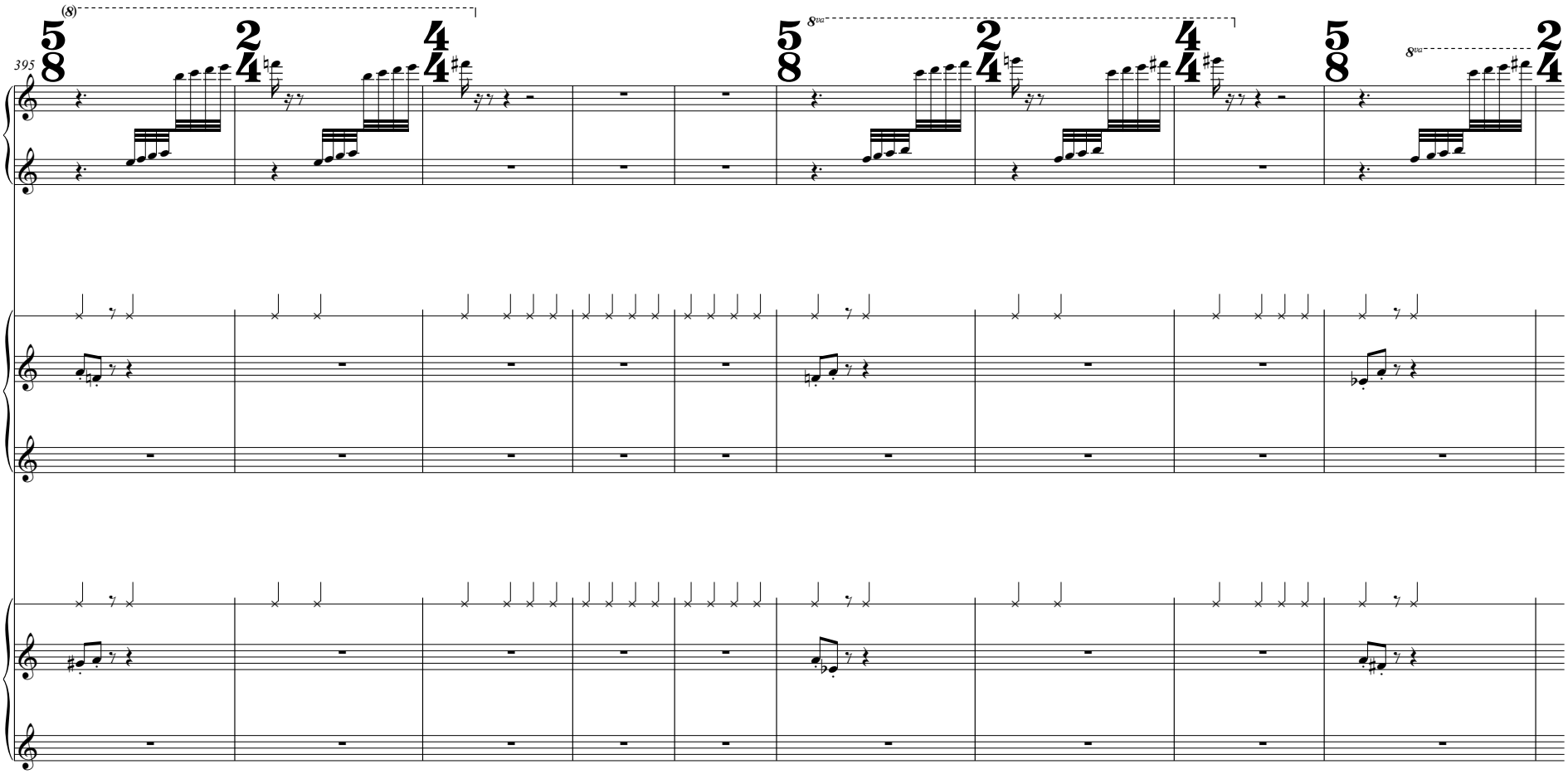

341
7/8
4/4
f
3/4
2/4
8

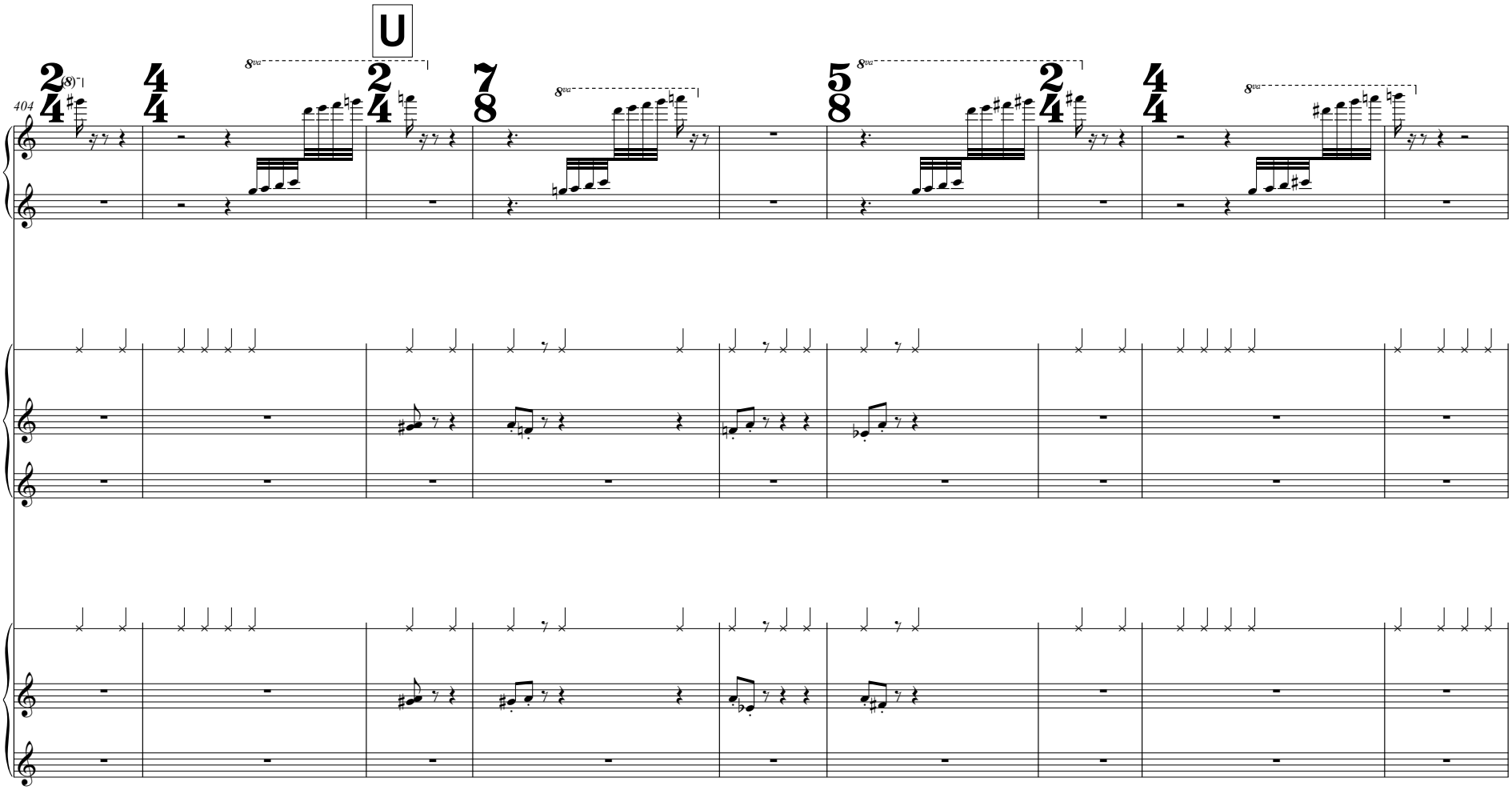

352

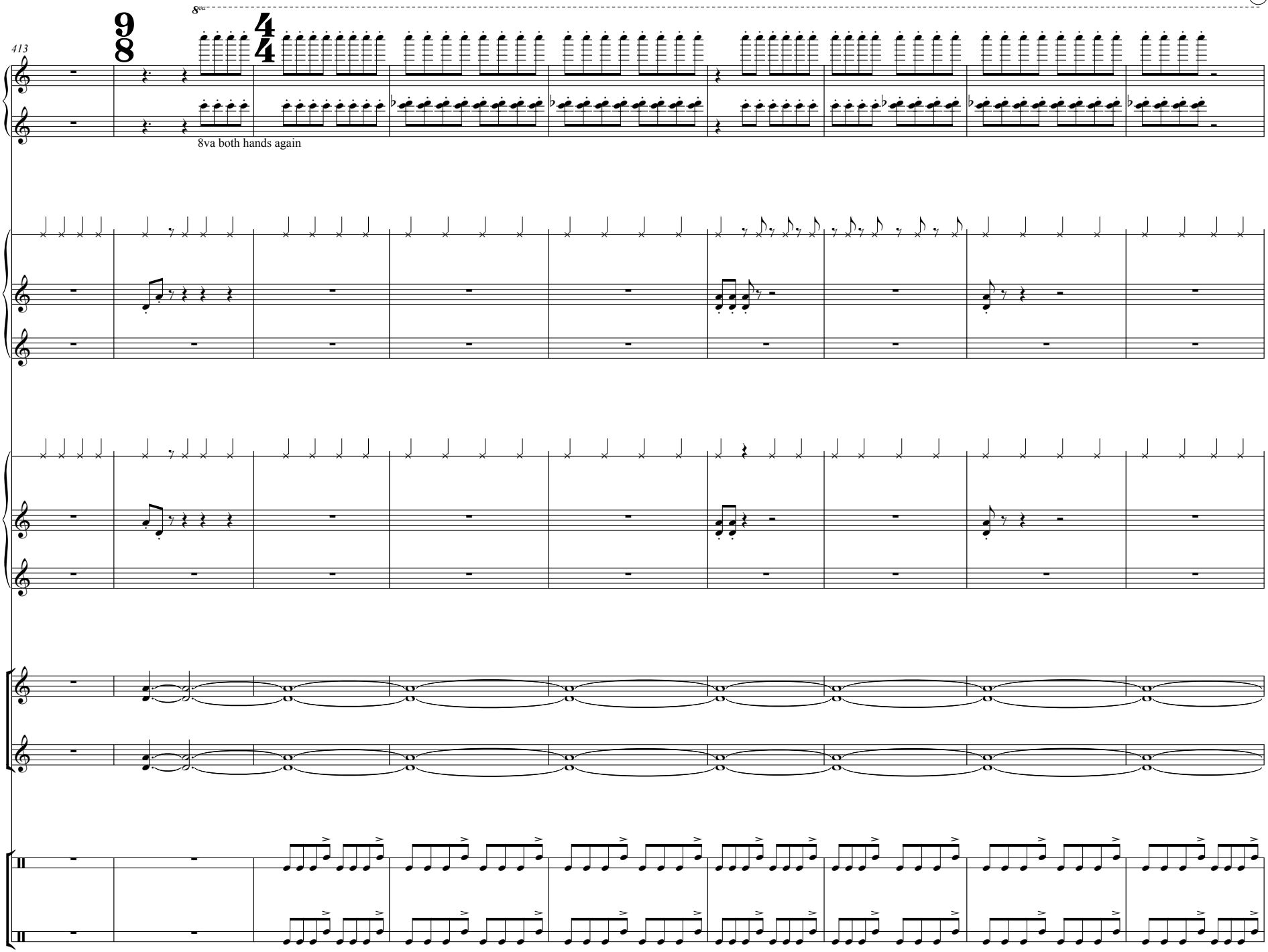

366

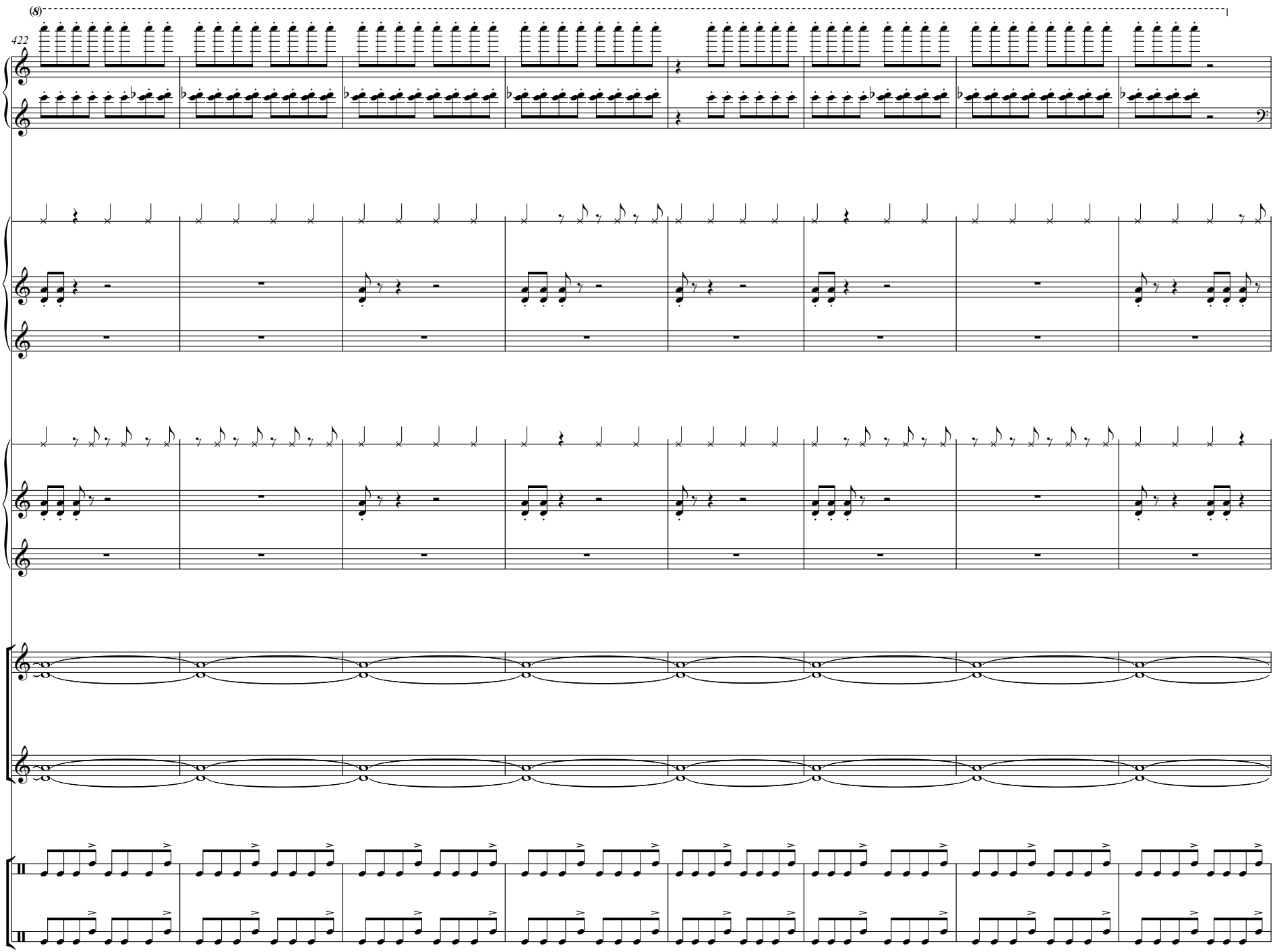

377
8va
8va both hands

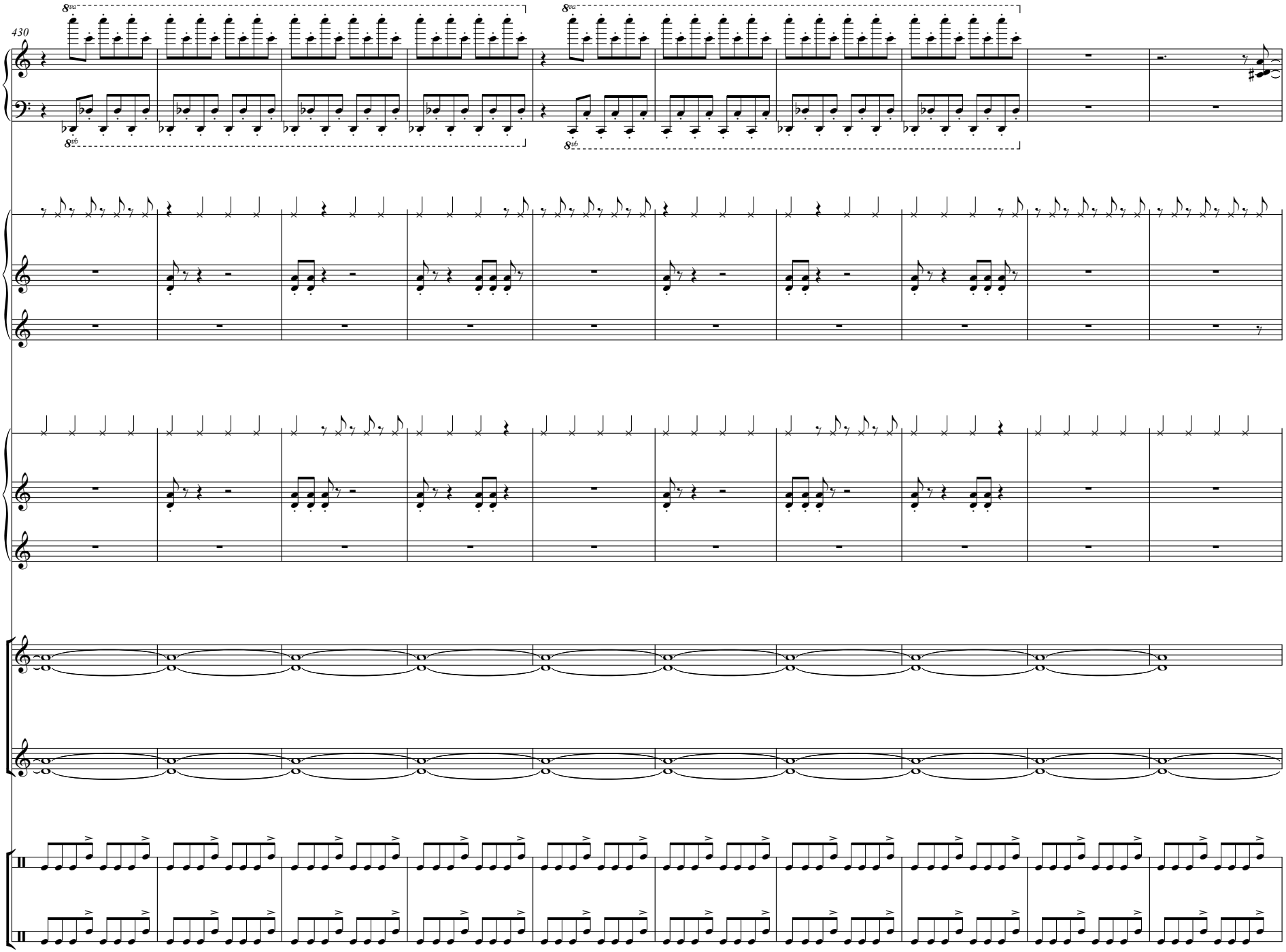

386
T

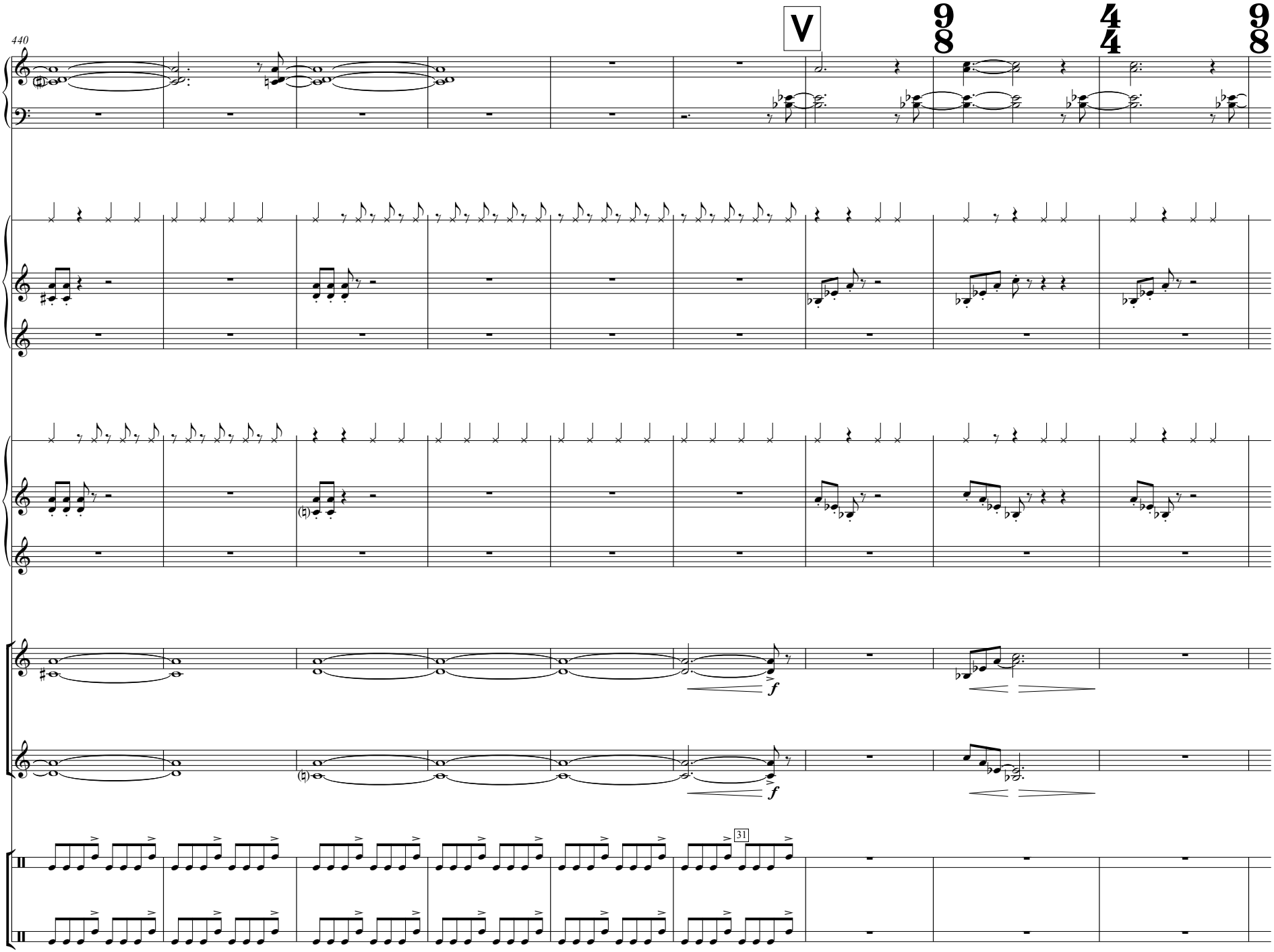

395
(8)
8va
8va

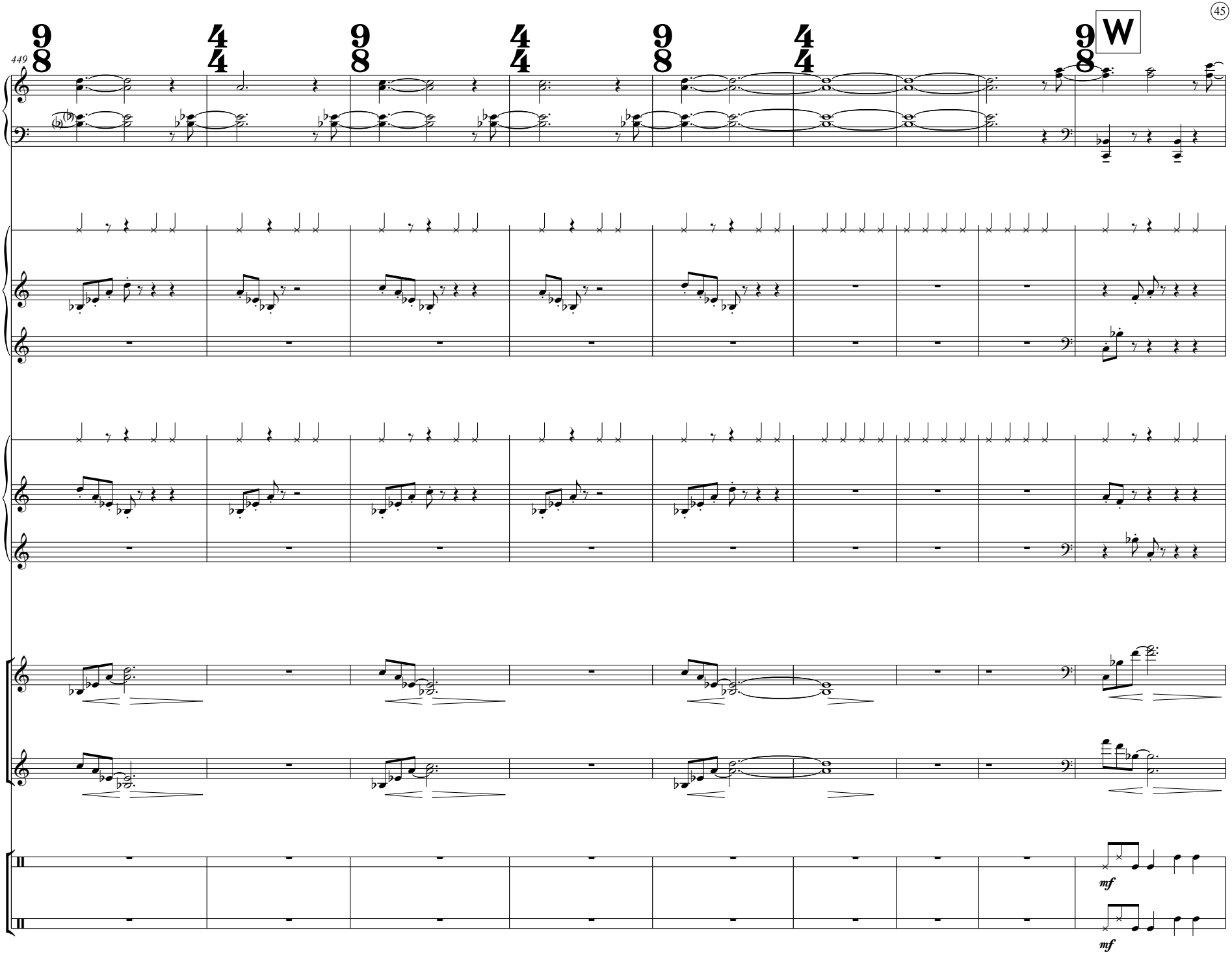

U
404
8va
8va
8va
8va

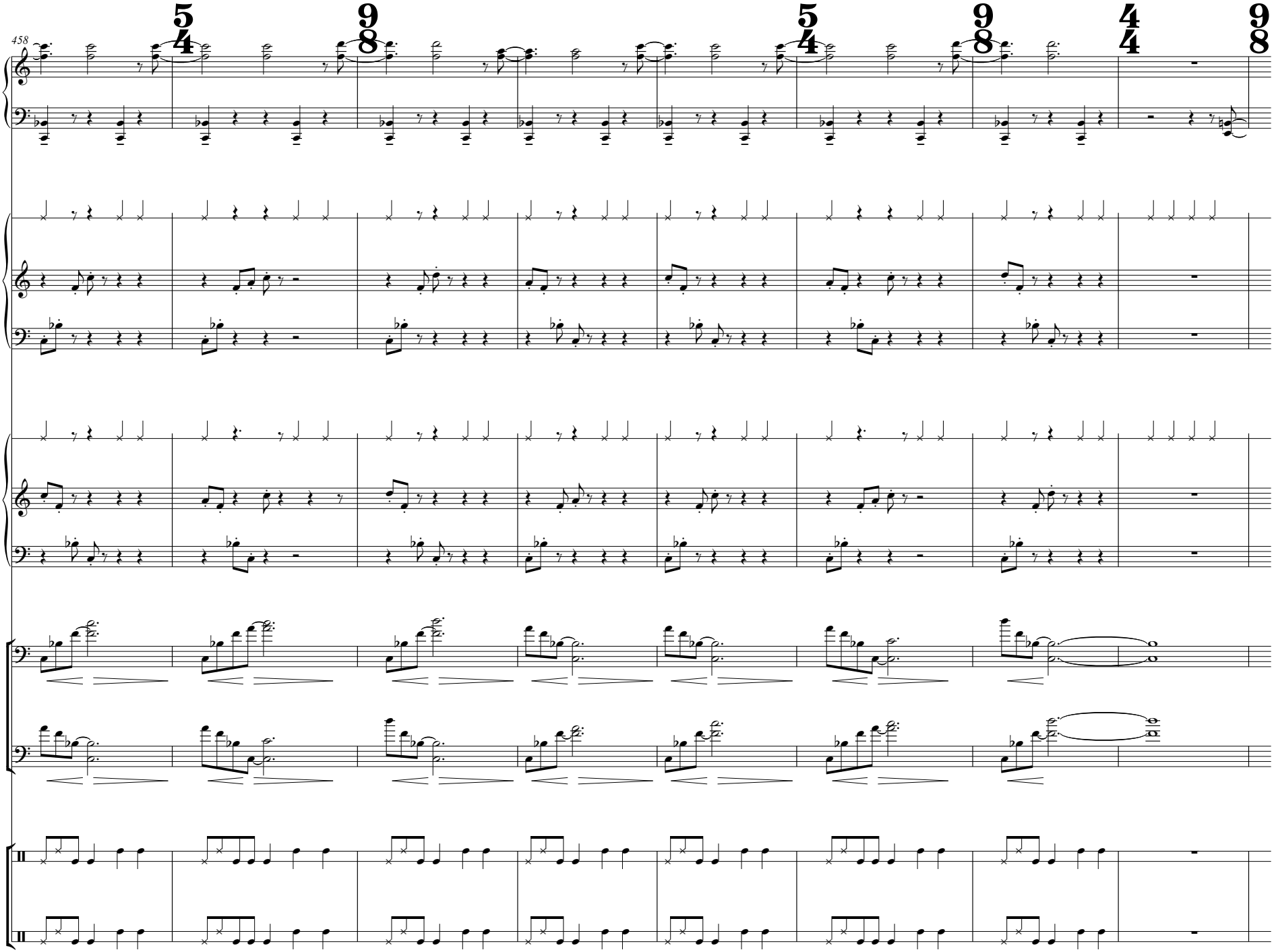

413
8va
8va both hands again

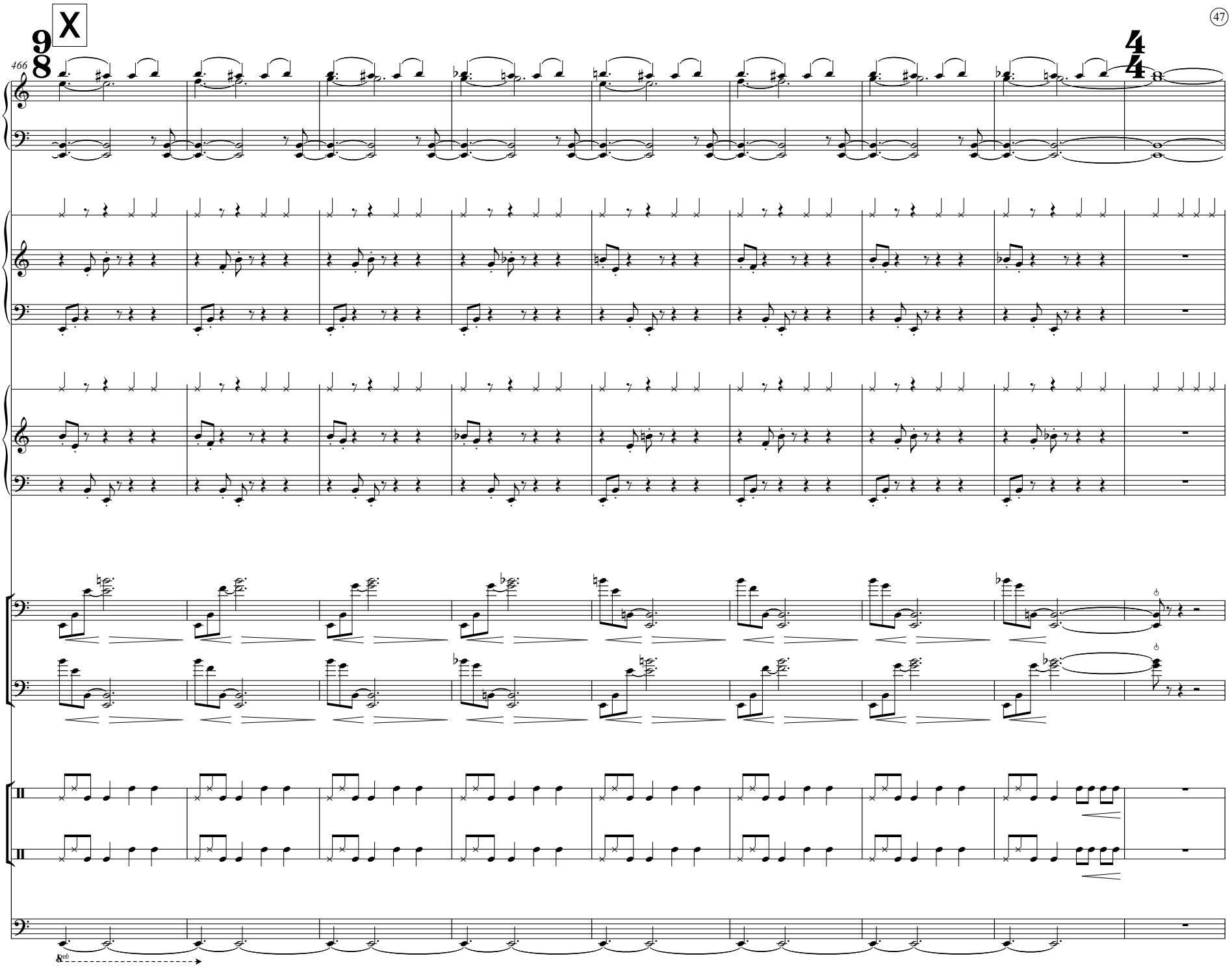

(8)
422

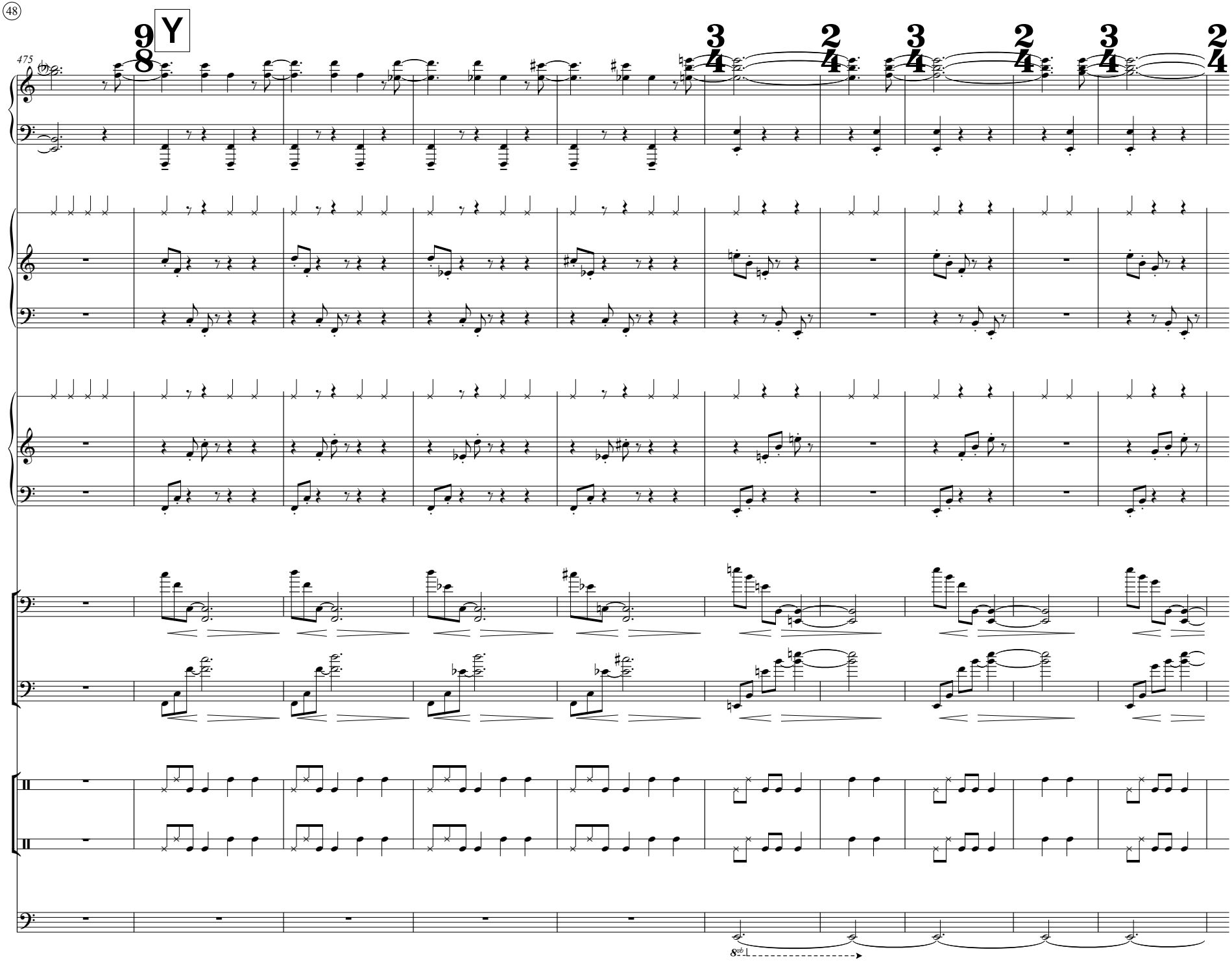

430
8va
8vb

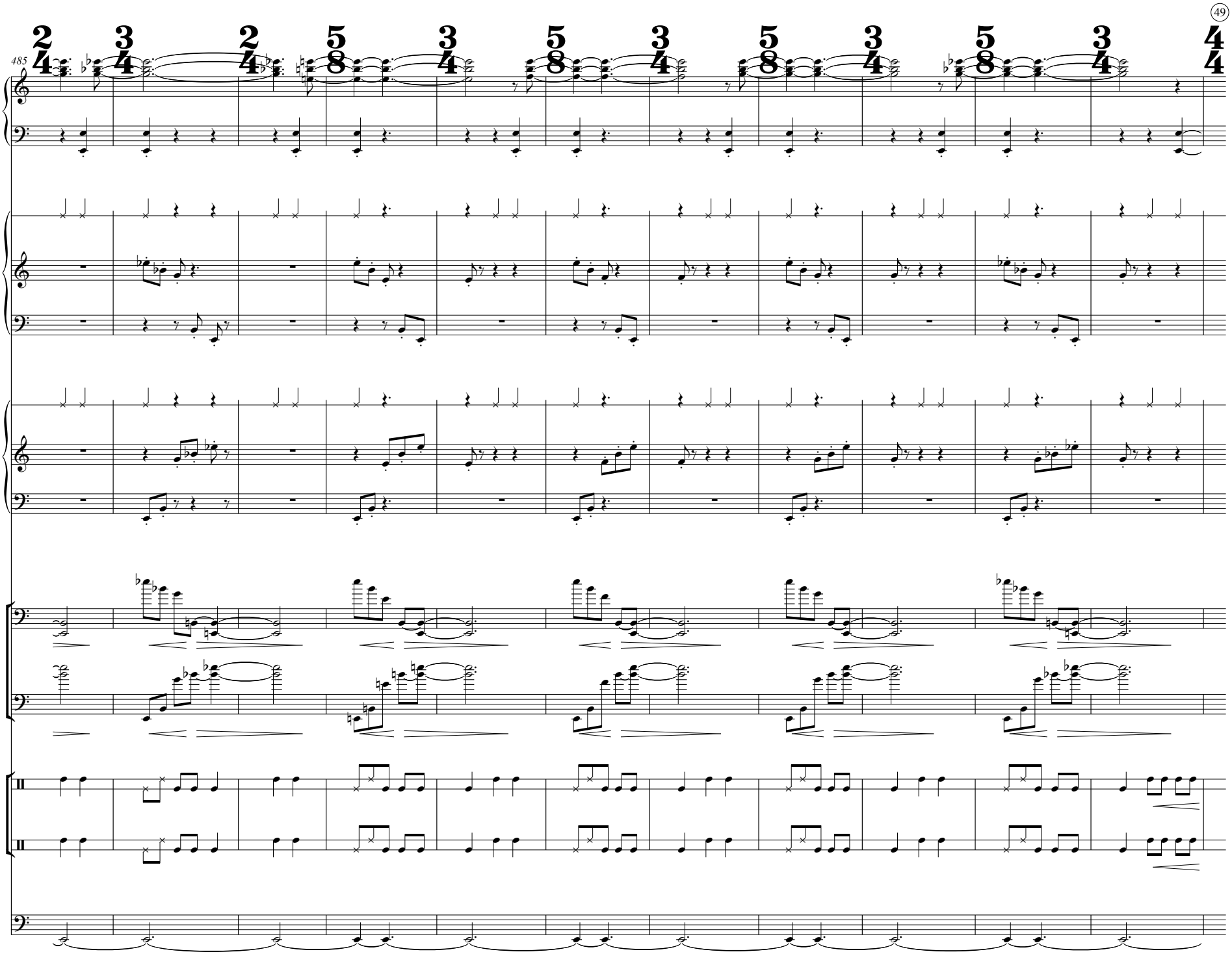

440
V
9/8
4/4
9/8
f
f
31

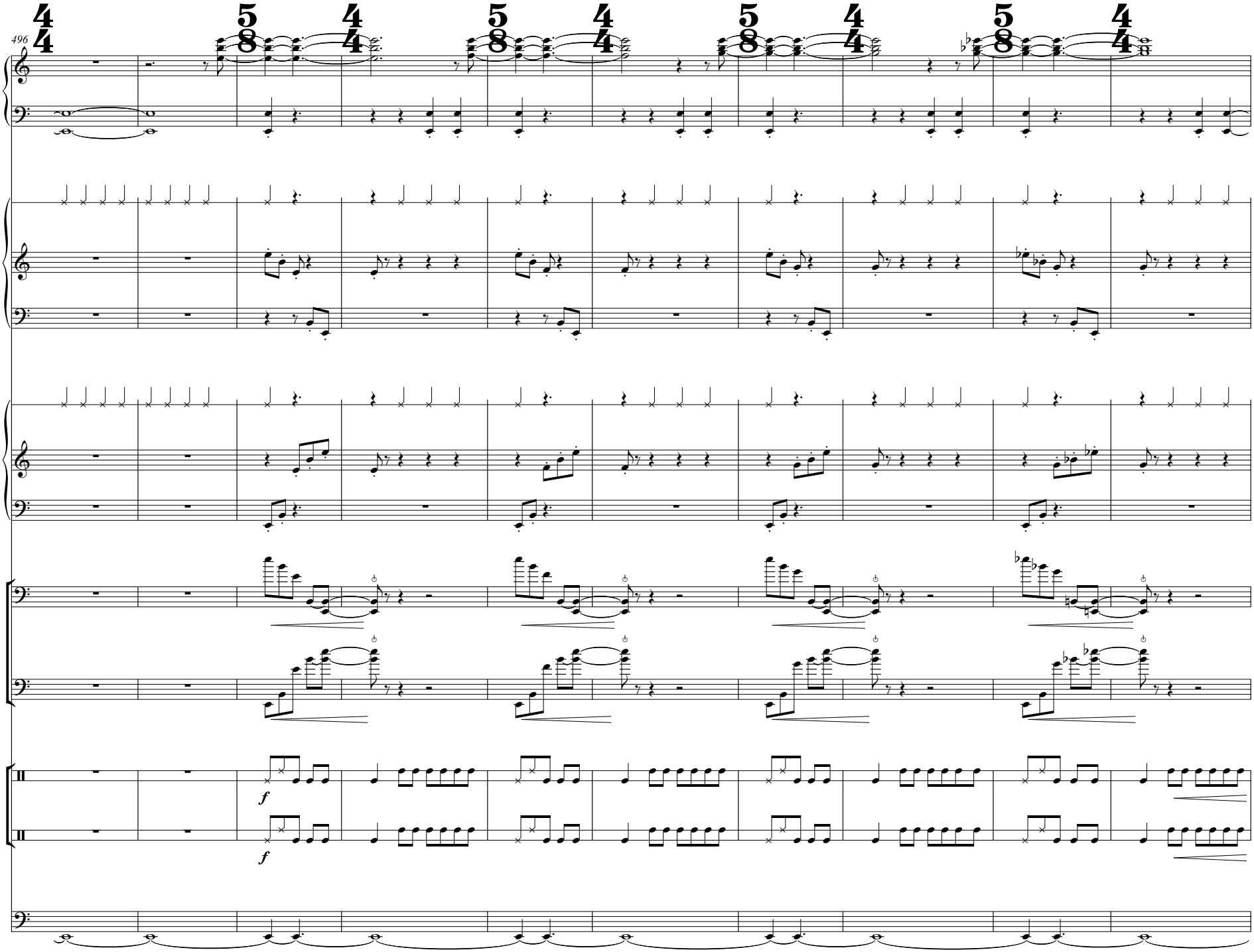

449
W
mf
mf

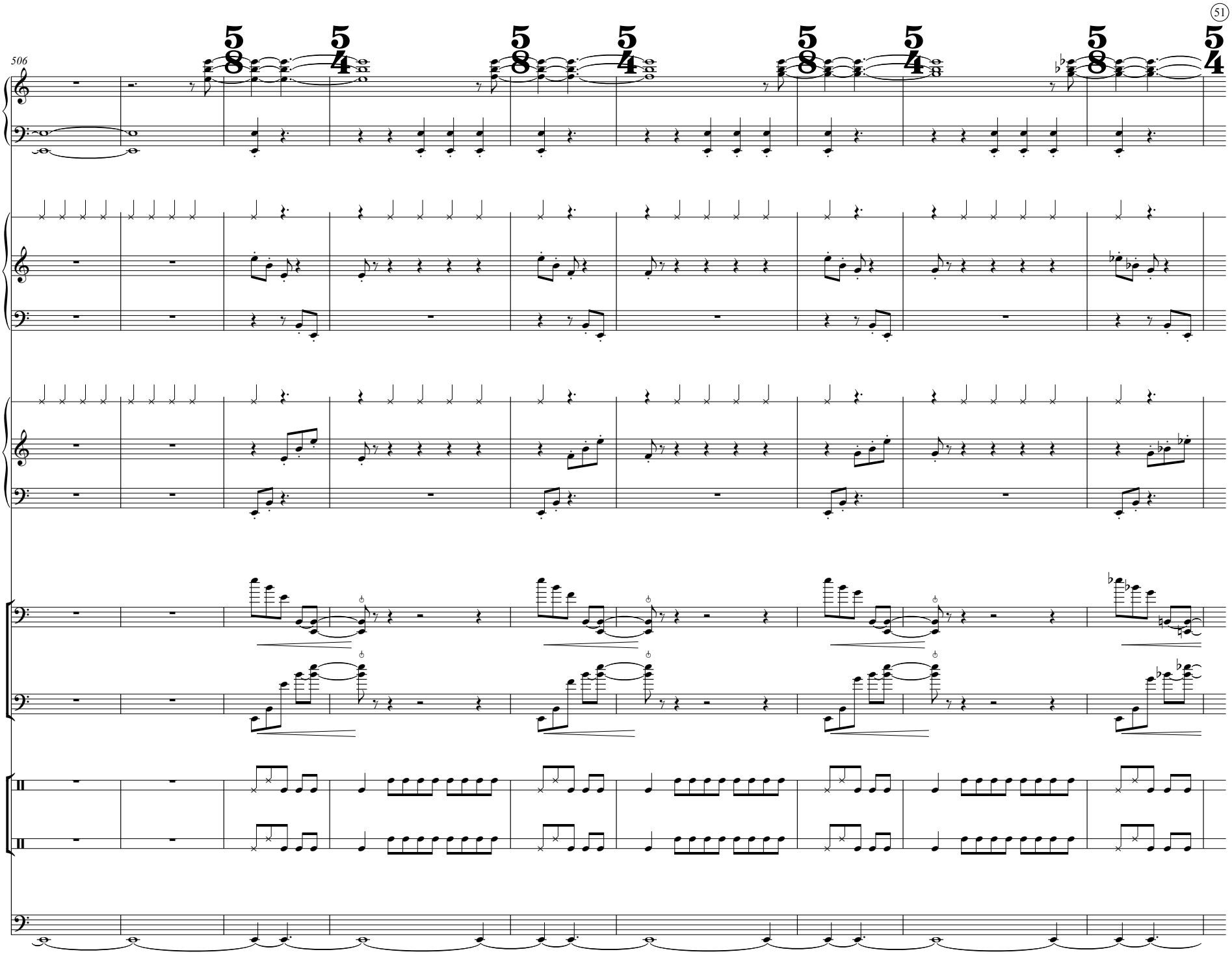

458
5/4
9/8
5/4
9/8
4/4
9/8

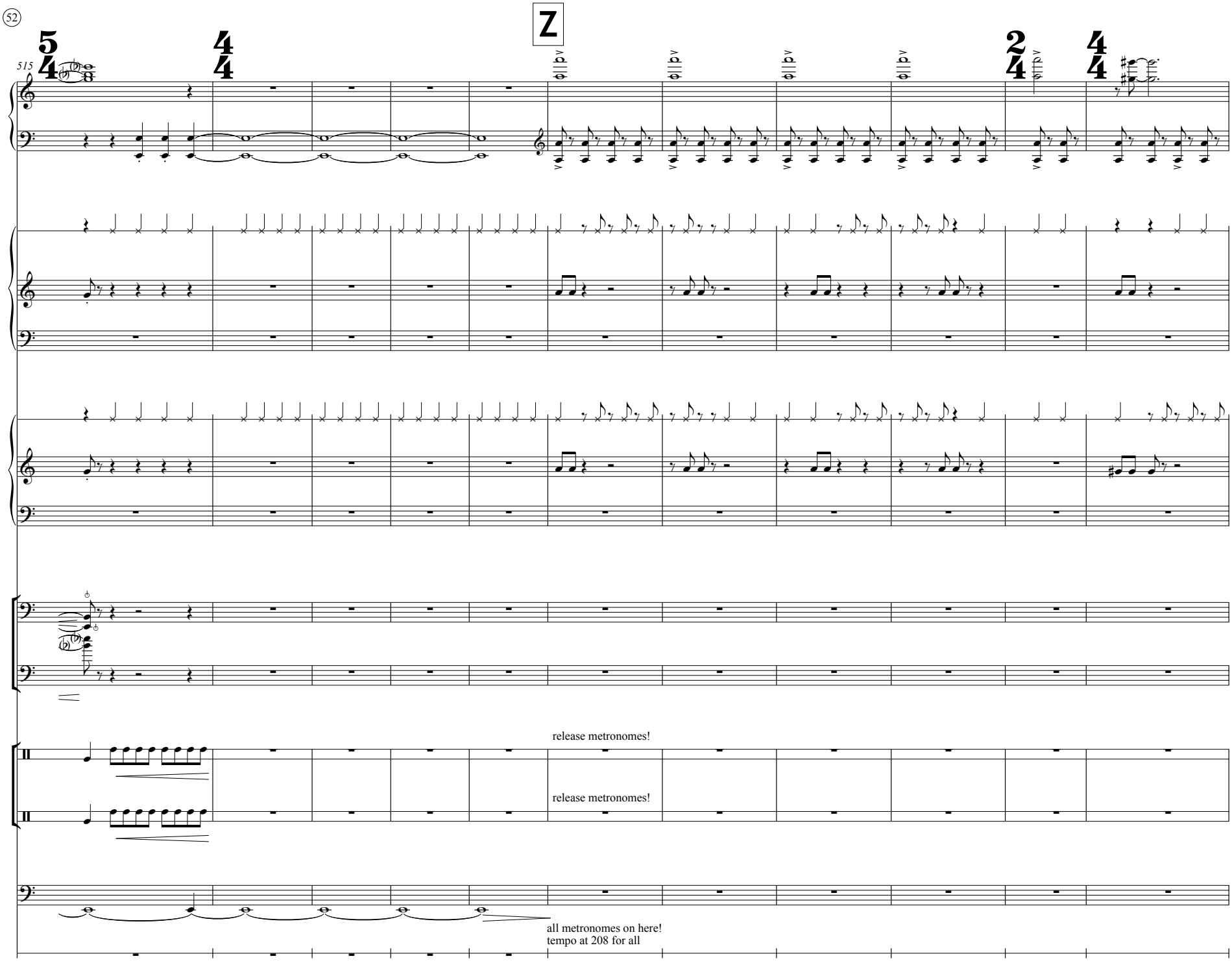

X
9/8
4/4
466

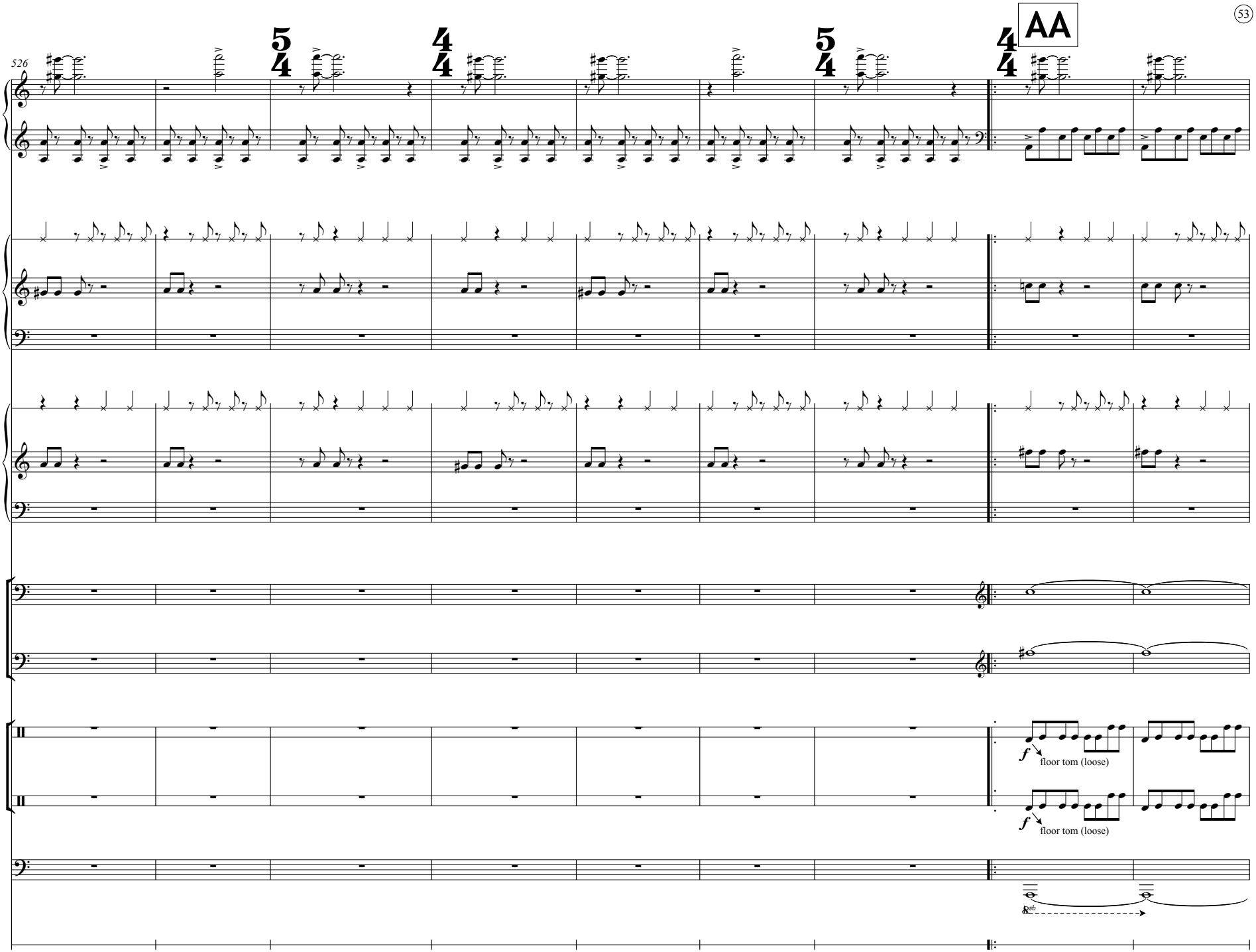

Y
475
9/8
3/4
2/4
3/4
2/4
3/4
2/4
8vb

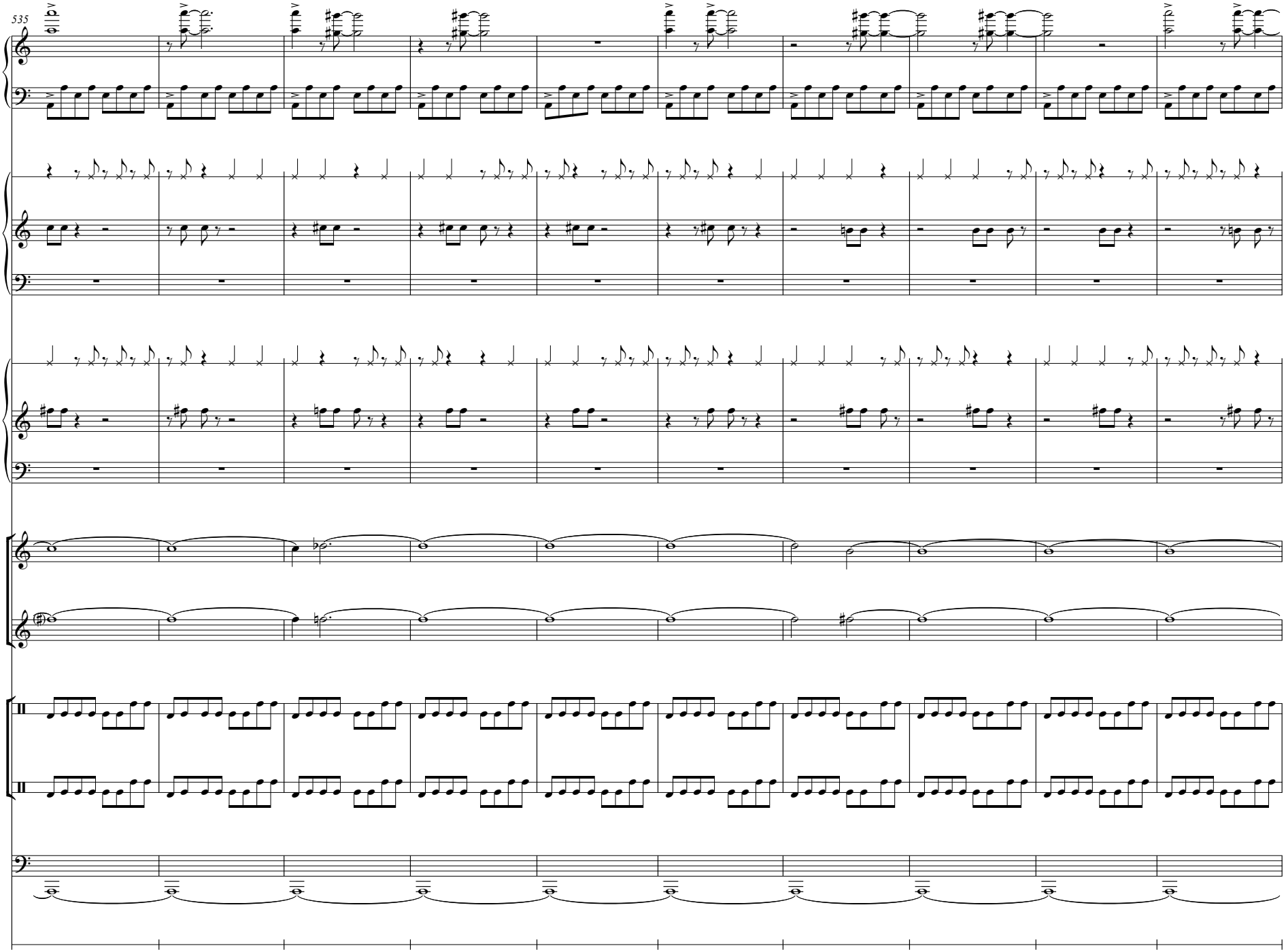

485
2/4
3/4
2/4
5/8
3/4
5/8
3/4
5/8
3/4
5/8
3/4
4/4

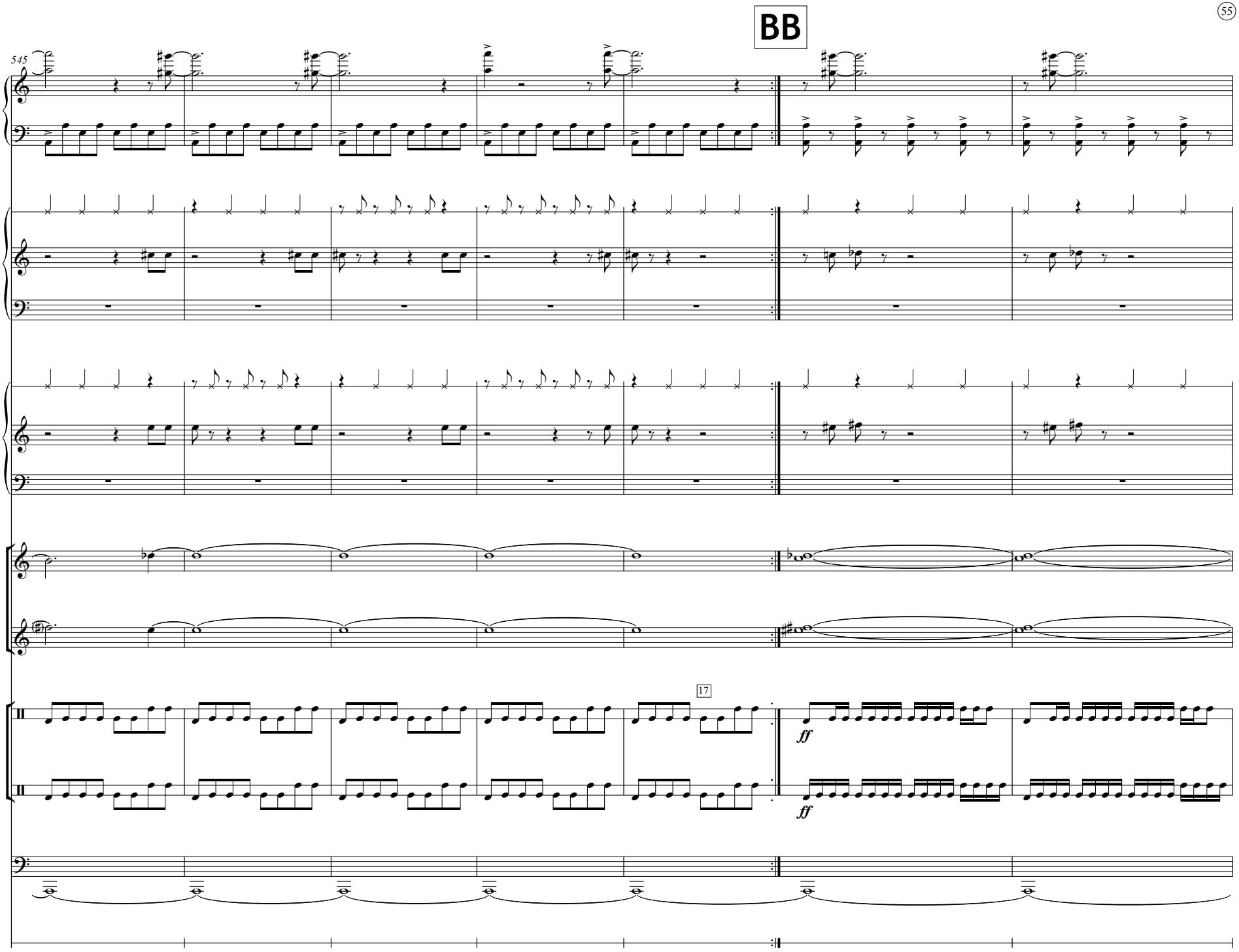

496
4/4
5/8
4/4
5/8
4/4
5/8
4/4
5/8
4/4
f
f

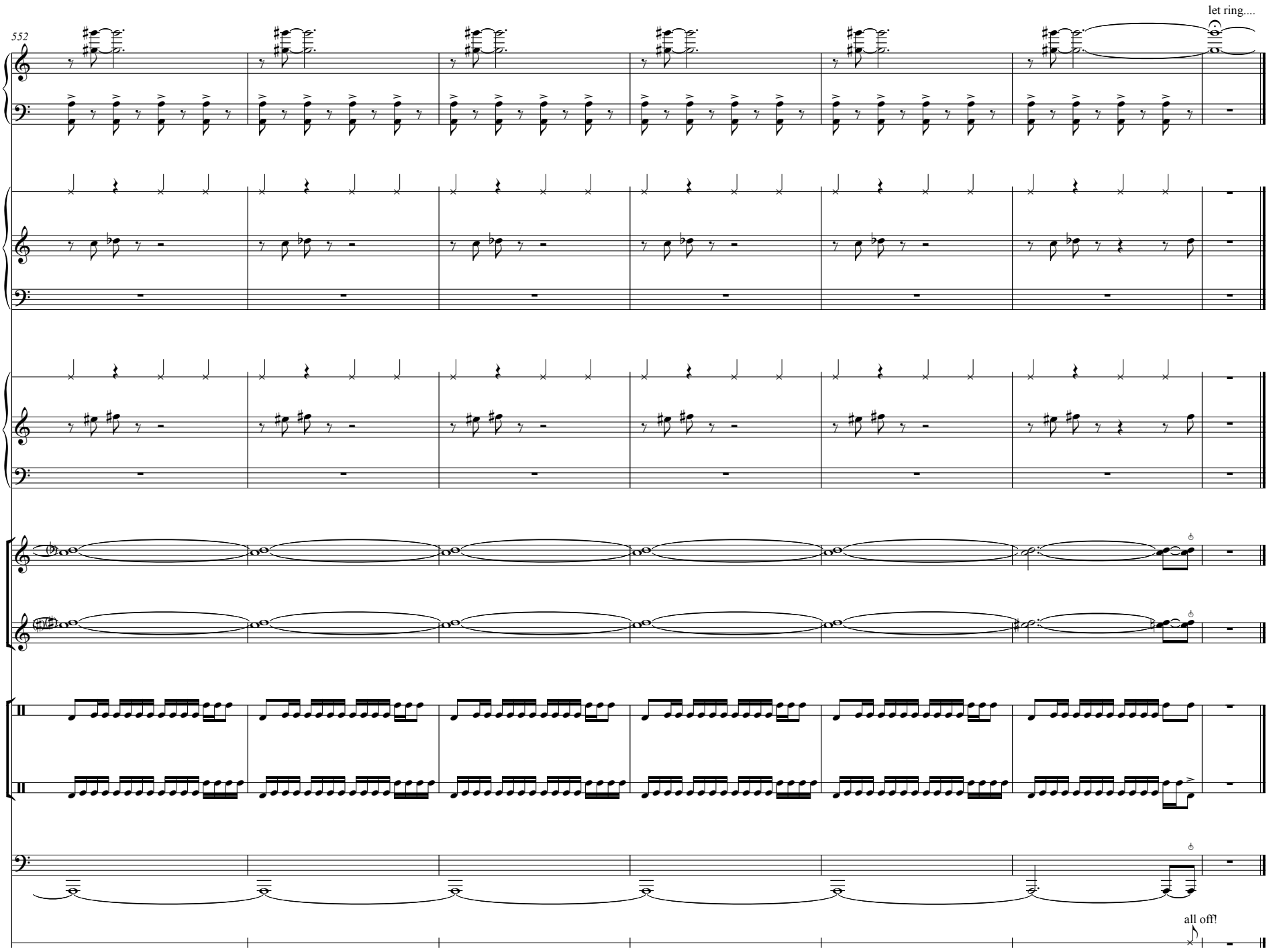

506
5/8
5/4


Z
release metronomes!
release metronomes!
all metronomes on here!
tempo at 208 for all


526
5/4
4/4
4/4
5/4
4/4
AA
f
floor tom (loose)
f
floor tom (loose)
8vb


535


BB
545
17
ff
ff


552
let ring....
all off!