Pierre Boulez
Répons
1981
1982,
1984,
Manifeste 2021
2021

ircam
Centre
Pompidou

The setup and the execution of the electroacoustic part
of this work requires a Computer Music Designer (Max expert).

Table of Contents

Work related information

Performance details

- Oct. 18, 1981, Allemagne, Donaueschingen
- Sept. 6, 1982, Royaume-Unis, Londres (première version élargie).
- Sept. 22, 1984, Italie, Turin (deuxième version).

Publisher : Universal Edition

Detailed staff

- soloists: vibraphone, glockenspiel, harp, piano, cymbalom
- 2 flutes, 2 oboes, 3 clarinets, 2 bassoons, 2 horns, 2 trumpets, 2 trombones, tuba, 3 violins, 2 violas, 2 cellos, double bass

Realisation

- Andrew Gerzso

Useful links on Brahms

- *Répons* **for six soloists, chamber ensemble, electronic sounds and live electronics (1981-1984), 45mn**
- **Pierre Boulez**

Version related information

Performance date: June 30, 2021
Documentation date: Aug. 11, 2021
Version state: valid, validation date : Nov. 14, 2023, update : Nov. 14, 2023, 1:46 p.m.

Documentalist

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You noticed a mistake in this documentation or you were really happy to use it? Send us feedback!

Realisation

- Augustin Muller (Computer Music Designer)
- Jérémie Henrot (Sound engineer)

Version length: 45 mn
Default work length: 45 mn

Upgrade Motivation

Manifeste 2021 new version.
New patch, new electronic score, new DSP

Comment

This version is a new implementation of the electronics of Repons
It has been designed in 2020-2021 from 3 main sources :
- the Universal Editions score
- the legacy patches (see other sidney version)
- the technical manual by Andrew Gerzso published by Universal

Other version(s)

- Pierre Boulez - Répons - Repons-2017-NYC (Oct. 6, 2017)
- Pierre Boulez - Répons - Repons09-10 (April 15, 2010)
- Pierre Boulez - Répons - transfert_mustica_ftp (April 14, 2010)
- Pierre Boulez - Répons - Repons Mac OSX 2006 (Dec. 1, 2006)

Electronic equipment list

Computer Music Equipment

- 1 Computer - *Computers*
  running Max 8 - in Rosetta mode !
- 1 Sound Board - *Sound Board*
  audio interface with 6 inputs and 6 outputs
- 1 MIDI Mixer - *MIDI Mixer*

Audio Equipment

- 40 Microphone - *Microphone*
  See tech rider
- 24 Loudspeaker - *Loudspeakers*
  2* 6 *2 points of diffusion. See tech rider

Files

File	Type	Author(s)	Comment
Repons_2021_Patch	Patch	muller	
UE Technical Manual	Document	A Gerzso	
Mix Guidelines A Gerzso	Document	A Gerzso	
UE Ochestra Score	Score		
Solist Annotated Manuscript	Score		old annotations on manuscript
UE Soloists score with updated annotations	Score		score to use with this version

Instructions

Repons - Documentation (2021)

Audio Configuration

- **6 audio outputs** :HP Electro 1 to 6, cf diagram
- **6 audio inputs** : Real Time treatments (Cymbalum, Piano 1, XyloGlock, Harp, Vibraphone, Piano 2)

These audio In/Outs are for the electronic system only. The overall sound sytem is much more complex.

NB This documentation does not cover the sound engineering aspects in detail (microphones/mixer/routings etc…) nor the electric organ/synthesizer part)

All the soloists have to be amplified and processed in real time.
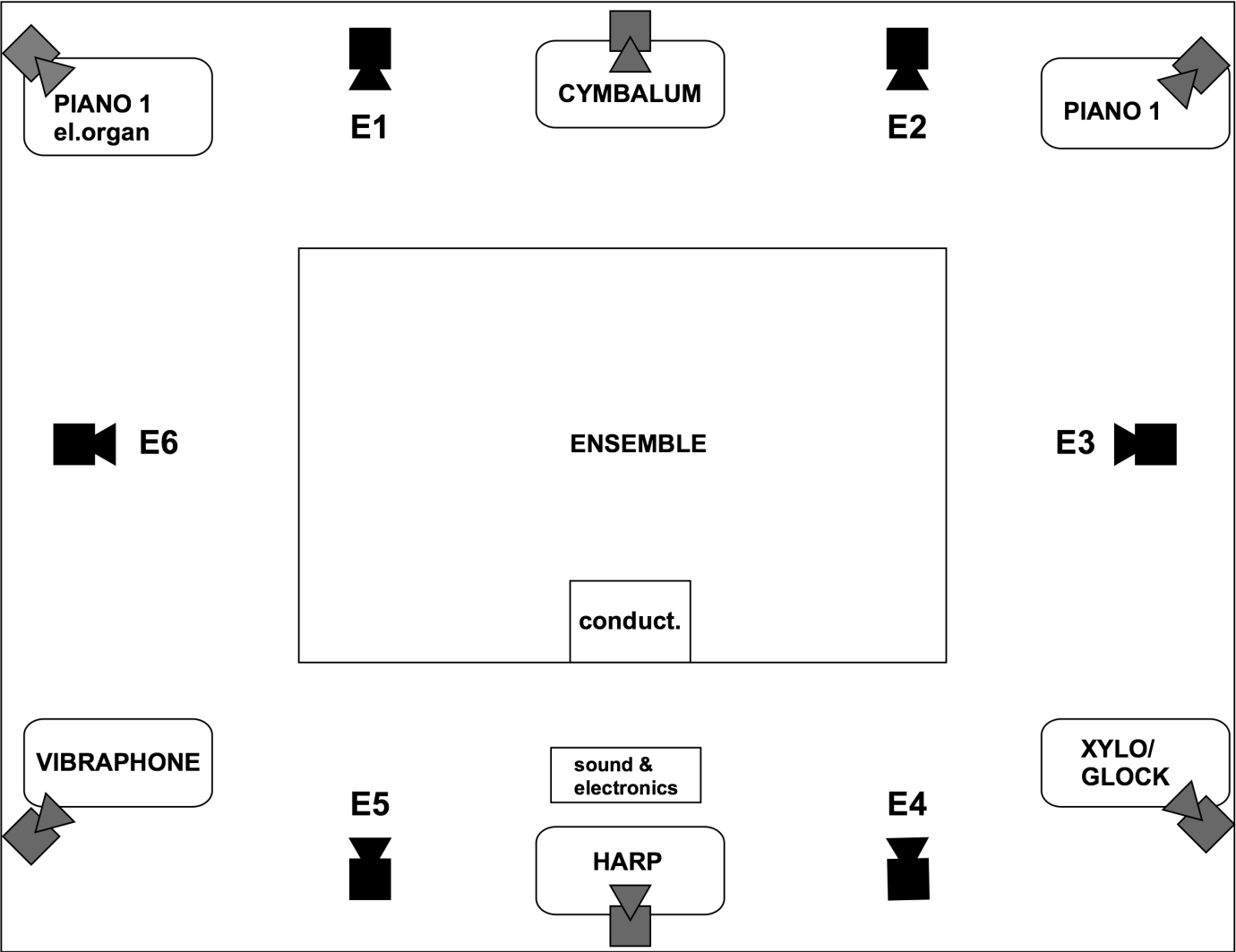
In addition to standard aerian microphones, contact microphones are used for the pianos (acusound/schertlers…)

The central ensemble is slightly amplified (one or more mic per instrument) notably for strings, with small speakers placed around the central block.

The main diffusion system is based on 2 arrays of 6 doubled speakers (so 24 speakers in total)

- each Soloist is amplified by 2 linked speakers (with an angle to get more aperture) placed in front of each instrument.
- the electronics are routed in 6 others doubled speakers (also linked) placed between each soloist.

In the following diagram, you can see the positions of each speaker couple :

PIANO 1 el.organ

E1

CYMBALUM

E2

PIANO 1

E6

ENSEMBLE

conduct.

E3

VIBRAPHONE

E5

sound & electronics

HARP

E4

XYLO/ GLOCK

Software installation

Warning : this version has been tested only on ROSETTA mode (ask IRCAM for an ARM compatible version)

Once Max8 installed:

Put the whole folder in your max file preferences. Be sure to remove any other antescofo object or Spat5 library from your path.
The patch has been played in this config: 48 kHz, IO 256, VS 128, Overdrive ON

System calibration and tests

- Check antescofo version in max window
- If you need to update the spat speakers azimuth, in [Spat_ctl] first recall the base preset (/preset/load message box), then modifying the speakers positions, and finally export the preset R21_spat-base.txt

Main Reverberance (TR) can be chosen as well, by the spatoper or by message. **Be sure to dump and save the patch before hitting Init!** *(This may change in future versions)*

Initialization routine

1. Check Max window and antescofo version.
2. Check Audio outputs config & outputs.
3. Choose the right interface in [midifaders].
4. Hit Init or just recall init score.
5. Choose the section you want to start at.

Patch presentation

This patch of *Repons* is basically DSP and control interface.
All the score elements, processes, data and cues are within the antescofo score.

The main window gives access to IO monitoring, CPU monitoring, general config and other subpatches.

In the [DSP] subpatch are all the effects and dsp engines and routing process. Transformations are organized by section. Audio inputs, process, spatialization and outputs are all located here.

In the [Transport&Score] you will find all the antescofo environment : here you can choose a section, customize the controls for transport and interact with antescofo. **If the menu of scores is empty, drag and drop the Repons_2021_Scores folder in the dropfile and save the patch** All the cues and data used in the elctronic score is there.

In the Spat_ctl there is the controls oblects (spat5.oper used for the control of spatialization) 2 systems are used :

-1 more static spat (main) holding the 6 channels final downmix.
-1 more dynamic (traj) that performs trajectories on virtual speakers : sources are rotated around circles, and permutations over outputs allow to achieve more complex trajectories.
"traj" spat should not be modified => the actual geometry, reverbs, color etc … are handled in the "main" spat (see callibration section)

In the [Fx_Ctl_Bal] you'll find the levels controls and monitoring.
Most of these controls are levels. They are automated according to a json file, r21.bal.json, that can be edited to store input levels, equalizer settings, sources input levels settings (wich are controlled with the midi mixer).
When testing/rehearsing, levels can be memorized for each cue to achieve proper balance and saved in the r21.bal.json (notably the instruments input levels as they are not individually midi mapped. possible to change).
The green faders ctl the levels of the instrument input for each process.

Caution : the blue ones are the input of the spat sources, ie the result of processes, not necessarily always in the instrumental order.

In the [Midi] subpatch is located all the midi connections used in this version (mixing and passing cues) cf Midi section
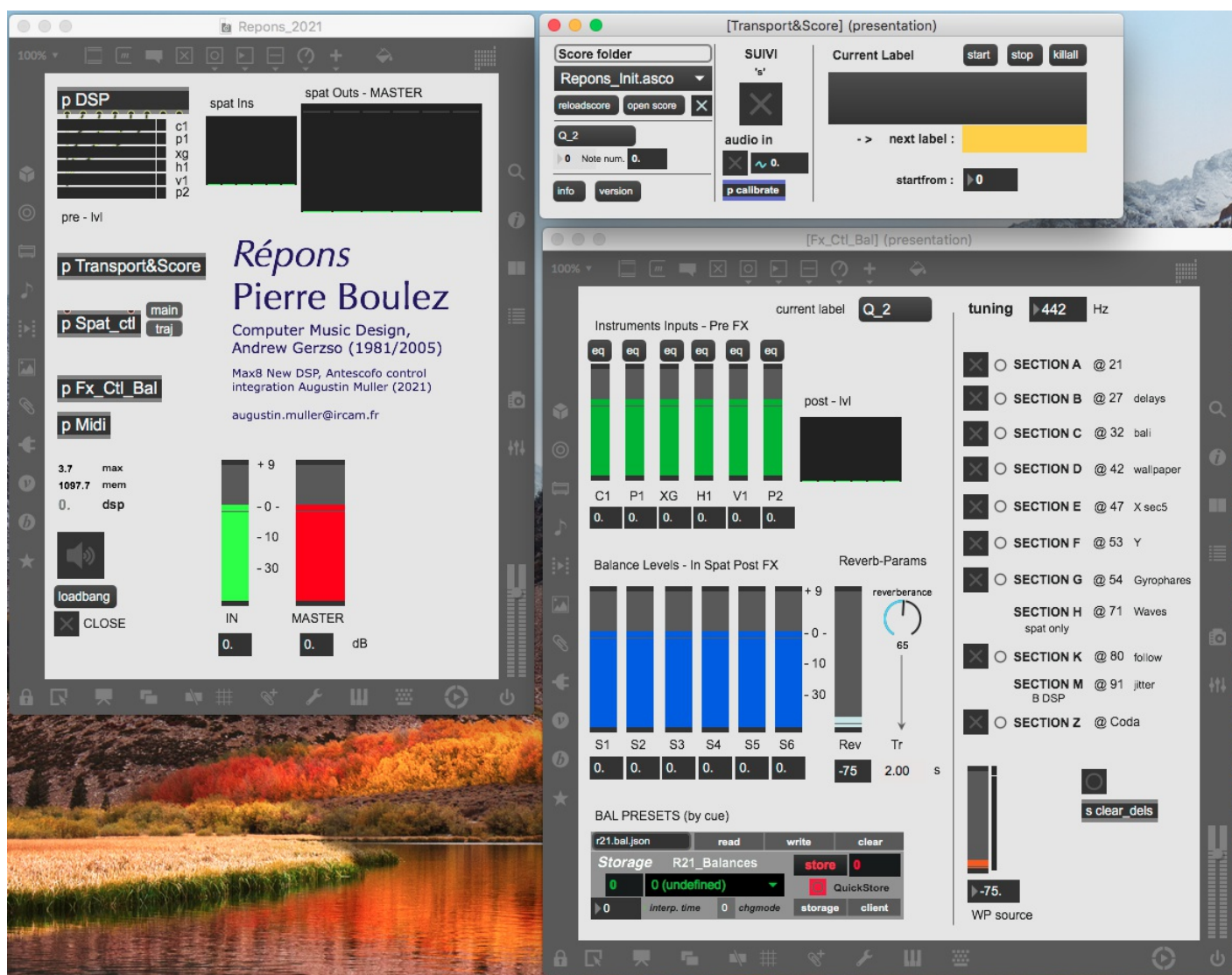
The keyboard controls for this section are the following :

- Right Arrow : nextlabel to antescofo (ie trigs next cue)
- Left Arrow : previouslabel to antescofo (no trig)

Midi Interface

The [midifaders] subpatch is where the midi controller interface can be configured and mapped. An Asparion D400 in pitchbend configuration was used in this version.

- 1 Source 1 input
- 2 Source 2 input
- 3 Source 3 input
- 4 Source 4 input
- 5 Source 5 input
- 6 Source 6 input
- 7 Instrument Input Master
- 8 Output Master
- 9 Reverb Lvl

Performance notes

Several sheet music scores are available in this distribution. Whichever is chosen to be used during the performance, it is important to have a look at the complete Universal score with all the details of the electronics and the technical manual. It will provide precise information about the content and expectations of the electronic part.

All cues are triggered by the computer music designer ; depending on your stage configuration, you may have to use a video monitor for

the computer music designer to be able to see the conductor.

The Electronics have to be first tested and configured by the computer music designer. Then it is advised to organise a rehearsal in the hall with only soloists and electronics to find proper inputs levels and balance, and to hear each effect clearly.
During perfomance, electronics have to be constantly mixed and balanced with the instrumentalists. The technical manual also gives guidelines about the mixing of the instruments and electronics.

Here follows a preview of the content electronics of each part, please refer to the technical manual for. detailed information:

• Before 21 : TACET
• Section A at 21 : trajectories for the soloists using the "traj" spat system (rotations and remapping of the outputs). *NB the rotation speed is fixed in the score, no enveloppe following contrary to the tech manual*
sequences of shifted delays after the arpeggios. as loud as soloists.
• Section B at 27 : rythmic delays
• Section C at 32 : freqshifting and reverberation on the soloists interventions
• Section D at 42 : Wallpaper music : a sound file is played and it's levels follows the enveloppe of each soloist. **NB, for the sound engineer, in this part piano 2 should be in every electronics speakers, and the electronics have to be routed to the soloists speakers** The wallpaper music should not be too loud.
• Section E at 47 : complex sequences of delay optionally with alternating spatialization or freqshift, see UE mixing notes
• Section F at 53 : delay and ring modulation, with pseudo-random rythmic patterns
• Section G at 54 : "scan" of the inputs for feeding delay lines. see UE manual. dense part, powerful.
• Section H at 71 : alternating rotations of the pianos. cut static amplification to enhance the effect.
• Section K at 80 : infinite reverb and modulation on piano samples. this passage can be tried with audio follower, but manual trigerring proved more reliable. NB : there is no "true" real-time here, the piano notes are prerecorded and fed to the input of the process.
• Section M at 91 uses B DSP : homorythmic delays
• Section Z (coda) at 99. Piano 1 is not processed but has to be more amplified and wide. The other instruments feed delay lines with important freqshift, creating metallic rythmic patterns.quite poweful in the space