

Carmine-Emanuele Cella

*I am in blood*

2023

ESPRO 2023  
2023



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

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## Work related information

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### Performance details

- Feb. 16, 2023, France, Paris, Ircam, Espace de projection

Publisher : Suvini Zerboni

### Realisation

- Étienne Démoulin

### Useful links on Brahms

- [\*I am in blood\*](#) for fifteen instruments and live electronics (2023), 30mn
- [Carmine-Emanuele Cella](#)

## Version related information

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First performance

Performance date: Feb. 16, 2023

Documentation date: April 5, 2023

Version state: valid, validation date : May 8, 2023, update : May 8, 2023, 6:24 p.m.

## Documentalist

Etienne Demoulin (Etienne.Demoulin@ircam.fr)

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

## Realisation

- Jérémie Bourgogne (Sound engineer)
- Etienne Démoulin (Computer Music Designer)

Version length: 35 mn

Default work length: 30 mn

## Upgrade Motivation

Premiere documentation

## Comment

The output number of channel is only for information

## No other version available

## Electronic equipment list

### Computer Music Equipment

- 3 Macintosh - *Apple Desktops* (Apple)
- 1 Reaper - *Music Software* (Cockos)
- 1 Max 8 - *Max* (Cycling74)
- 1 Ircam Spat - *Library* (Ircam)
- 1 mcfx Convolver - *Audio Plugin* (matthiaskronlachner.com)  
custom version by Angelo Farina (<http://www.angelifarina.it/X-MCFX.htm>)
- 1 IEM plugin suite - *Audio Plugin* (IEM)
- 6 Digiface Dante - *Sound Board* (RME)
- 2 BCF 2000 - *MIDI Mixer* (Behringer)

### Audio Equipment

- 23 Microphone - *Microphone*
- 11 contact microphone - *Contact Microphones* (Accusound)  
K&K small piezo-mic
- 6 Amplifier - *Amplification*  
SMSL SA36Apro
- 100 Loudspeaker - *Loudspeakers*
- 11 Transducer - *Transducers*  
Tectonic TEAX25
- 2 Digital Mixing Desk - *Digital Mixers*
- 1 Reverberation Processor - *Reverberation*

Files

File	Type	Author(s)	Comment
<a href="#">Patch</a>	Patch	Etienne Démoulin	
<a href="#">Old score</a>	Score	Carmine Cella	

## Instructions

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### Audio setup

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The main idea of the piece is to place all musicians around the audience to create a physical space and combine this to the virtual space (loudspeaker array).

*I am in blood* combine a lot of technical configurations that have to be linked together.

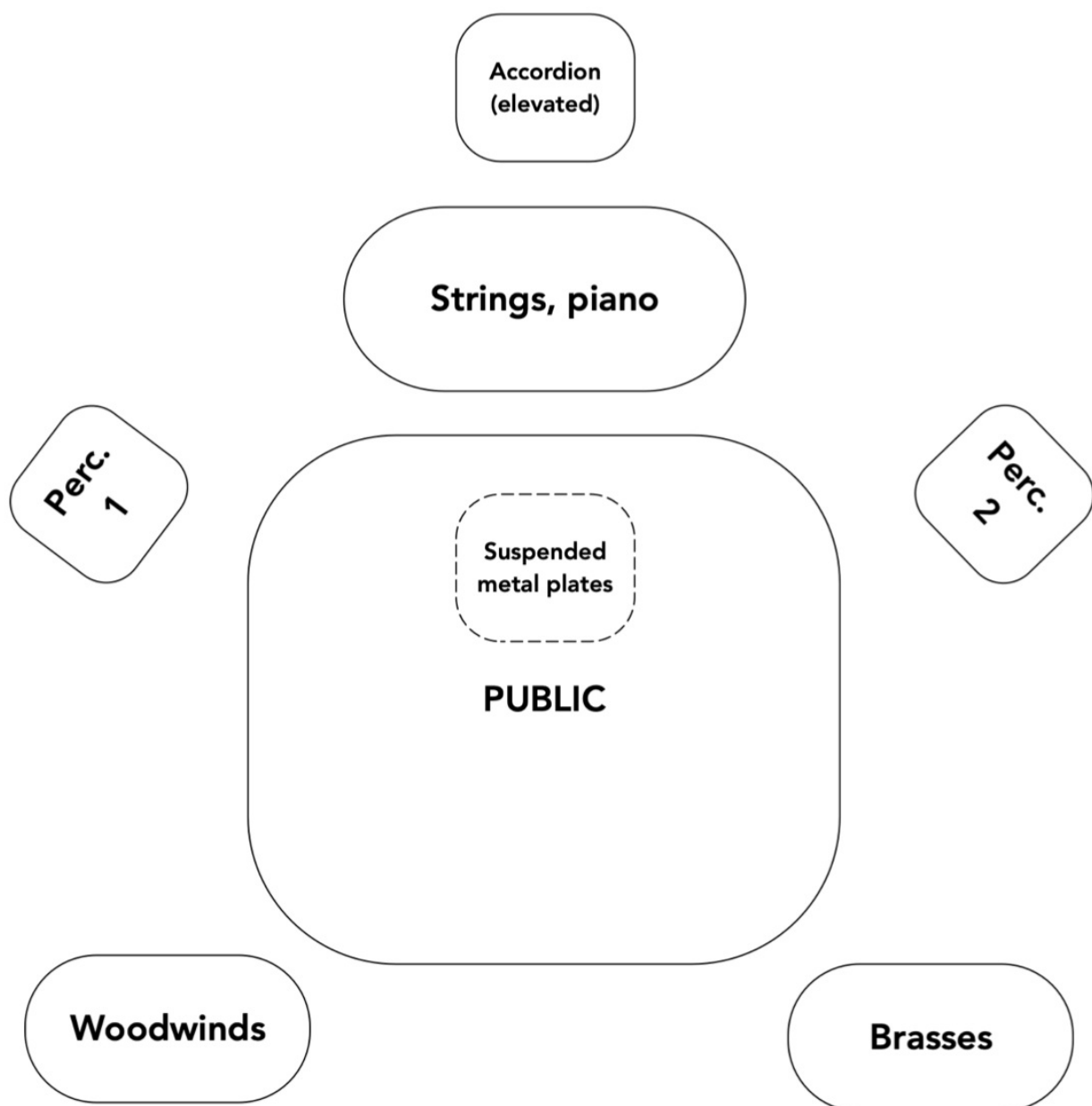
Some instruments from the ensemble should have a transducer and a piezo microphone for feedback purpose.

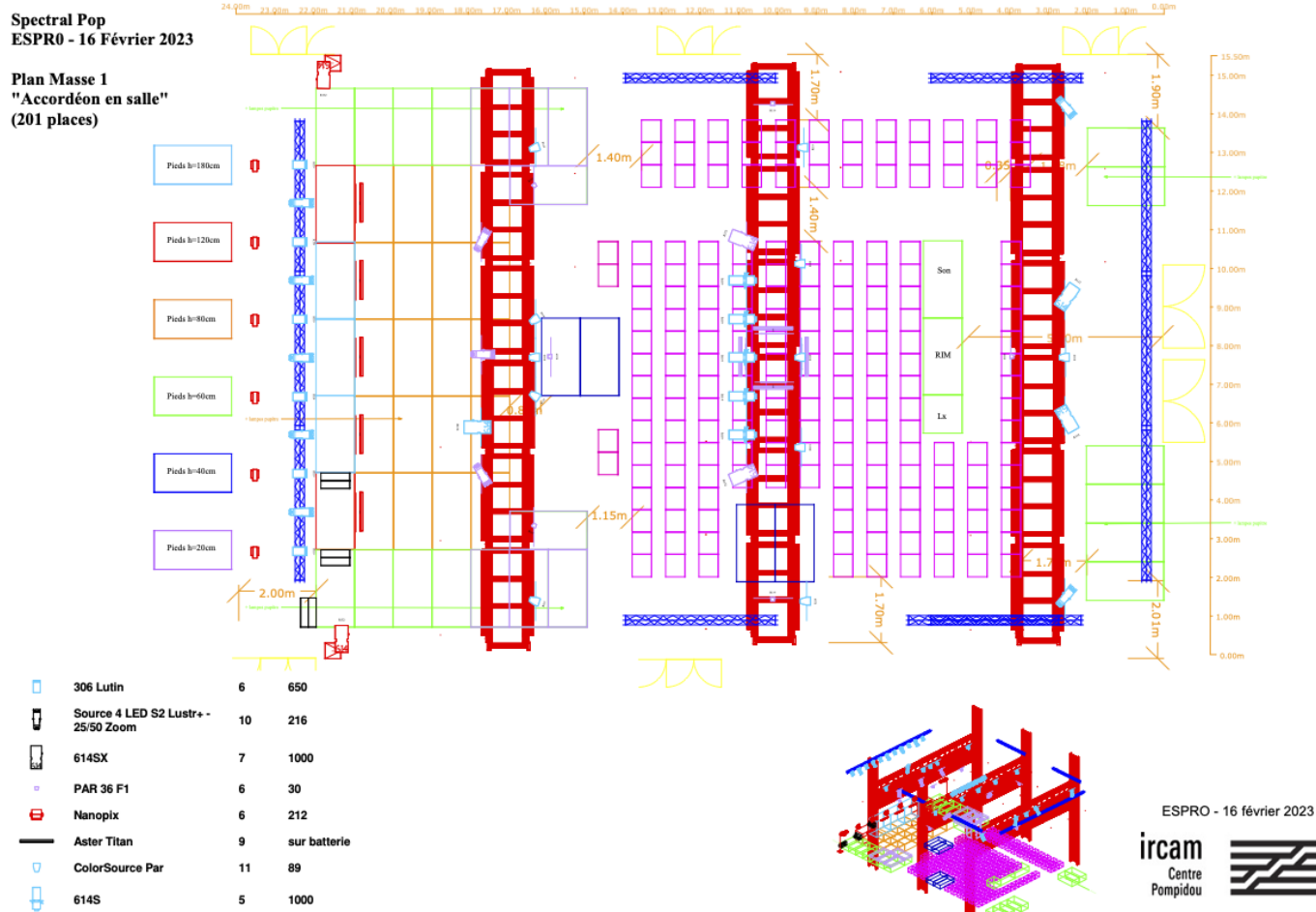
All instruments from the ensemble should have a microphone for audio treatments.

Some extra instruments are also needed (4 thundersheets).

The piece was premiered at ESPRO the 16th of February 2023.

We used the ambisonic dome (89 Amadeus PMX5) combined to a 12 speakers ring of D&B E12. Please note that this setup can be reduced depending on concert hall.





## Physical space

All musicians are spatialized around the audience, in 7 groups.

- Group 1, on stage : Piano, Violin 1, Violin 2.
- Group 2, on stage : Alto, Cello, Double Bass.
- Group 3, side left and right : Percussion 1 and 2.
- Group 4, rear left : Flute, Oboe, Clarinet, Bassoon.
- Group 5, rear right : French Horn, Trombone.
- Group 6, ideally on top of the audience, was front on stage, elevated for the premiere : Accordion.
- Group 7, on top of the audience : 4 Thundersheet.

## Transducers and piezo

Transducers and amplifiers used at IRCAM are Tectonic TEAX25, piezo-microphone are from K&K. We use Schertler putty to fix them on the surface. Please have a look at Inside-out documentation for extra informations.

For physical treatments, we need to put a transducer and a piezo-microphone on all musicians from group 2, 3 and 7.

For strings, the transducer can be fixed at the back of sounding board, and the piezo-microphone under the bridge.

For percussions, we need to equip bass-drums and thundersheets. Please try to have enough distance between piezo and transducer on the surface.

In general, it is a good practice to put the transducer third of the radius of the surface.

You'll need to use a low-cut filter at 100Hz on the output of every transducers to avoid overload.

## Microphones for ensemble

Input	Musician	Group	Instrument	Microphone
1	none	7	Thundersheet 1	Piezo
2	none	7	Thundersheet 2	Piezo



Input	Musician	Group	Instrument	Microphone
3	none	7	Thundersheet 3	Piezo
4	none	7	Thundersheet 4	Piezo
5	Percussion 1	3	Large bass drum	Piezo
6	Percussion 1	3	Large metal plate	Piezo
7	Percussion 2	3	Large bass drum	Piezo
8	Percussion 2	3	Large metal plate	Piezo
9	Alto	2	Alto	Piezo
10	Cello	2	Cello	Piezo
11	Double bass	2	Double bass	Piezo
12				
13	Flute	4	Flute	DPA4099
14	Oboe	4	Oboe	DPA4099
15	Clarinet	4	Clarinet	DPA4099
16	Bassoon	4	Bassoon	DPA4099
17	Horn	5	French Horn	DPA4099
18	Trombone	5	Trombone	DPA4099
19	Perc 1	3	Overhead	C414
20	Perc 2	3	Overhead	C414
21	Piano	1	Piano	DPA4099
22	Accordion	6	Accordion	DPA4099
23	Violin	1	Violin 1	DPA4099
24	Violin	1	Violin 2	DPA4099
25	Alto	2	Alto	DPA4099
26	Cello	2	Cello	DPA4099
27	Double bass	2	Double bass	DPA4099

Speakers

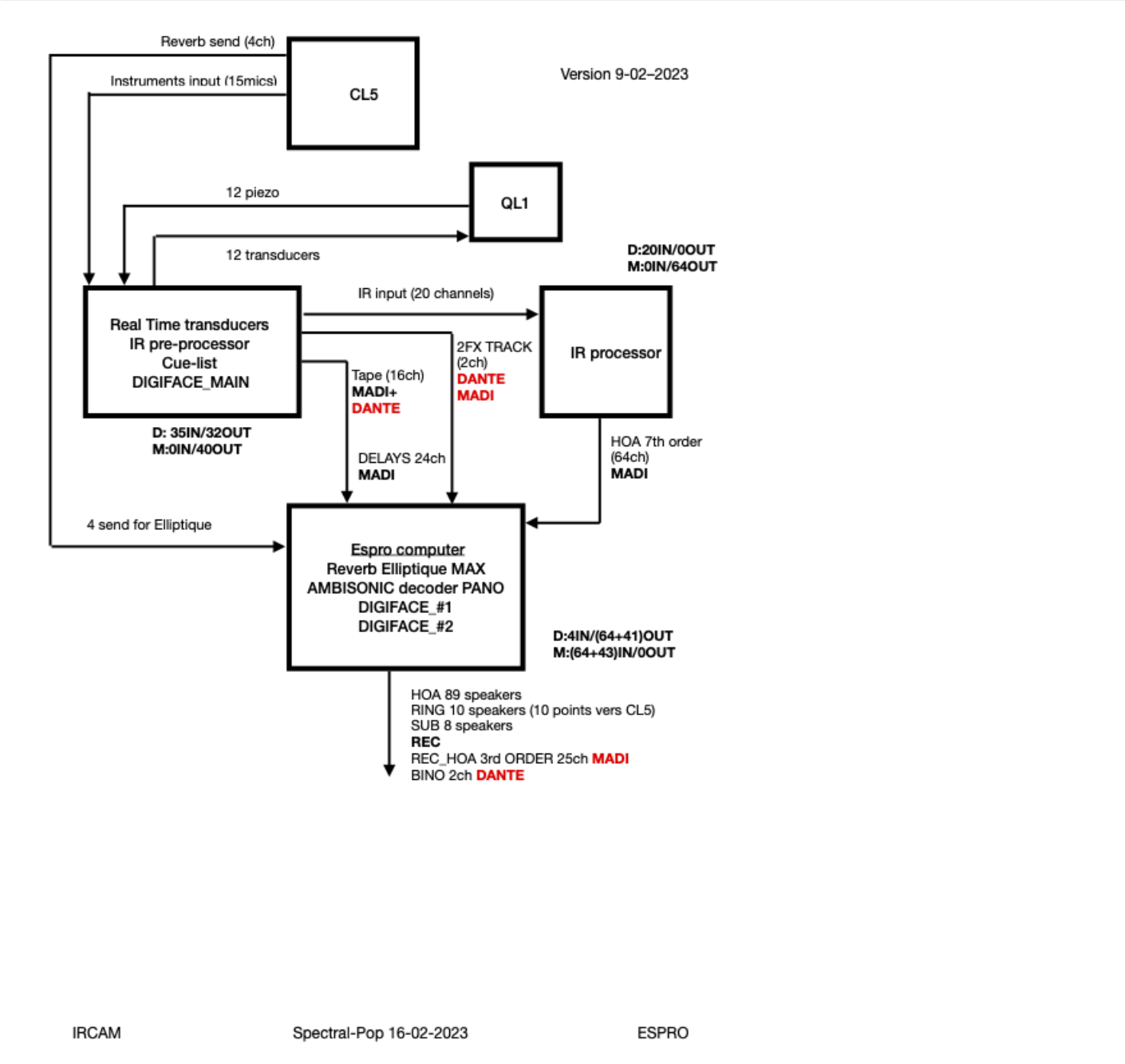
Severals differents outputs are needed.  
Ambisonic dome, which was used for the premiere, the 89 Amadeus PMX5 from ESPRO, can be replaced by a ring of speaker in a “normal” concert hall. An elevation array is appreciated.  
The following table show the transducers outputs :

Output	Musician	Group	Instrument	Speaker
1	none	7	Thundersheet 1	TEAX25
2	none	7	Thundersheet 2	TEAX25
3	none	7	Thundersheet 3	TEAX25
4	none	7	Thundersheet 4	TEAX25
5	Percussion 1	3	Large bass drum	TEAX25
6	Percussion 1	3	Large metal plate	TEAX25
7	Percussion 2	3	Large bass drum	TEAX25
8	Percussion 2	3	Large metal plate	TEAX25

Output	Musician	Group	Instrument	Speaker
9	Alto	2	Alto	TEAX25
10	Cello	2	Cello	TEAX25
11	Double bass	2	Double bass	TEAX25

Please note that you’ll need on top of that outputs for your loudspeaker system.

## Computer setup



3 computer were used for the premiere due to the particular configuration at ESPRO. Please adapt according to the concert hall. The **MAIN** computer is used for the electronic score, physicals effects (phydrum, vdrum, noiser), delays, harmonizers, tape, routing for IR processing. This computer host the compositional part of the electronic. The **IR** computer is used to compute several 7th order ambisonic impulse response. The **SPAT** computer is used as a “decoder” for all our effects, tape and IR according to our speaker setup. Patches and configuration files can’t be used “as it is” for a performance.

Please use the lower buffer size and signal vector size you can achieve. For the premiere we used 128IOVS/128SIGVS on each computer. Sampling rate 48kHz mandatory.

## Midi setup

For the premiere, a BCF2000 was used to control **MAIN** computer according this configuration.

Fader	Control	Type
1	sound files master	volume
2	delays	volume
3	spectral freeze	volume
4	harmonizer	volume
5	impulse response send	volume
6	sound files layer 1	volume
7	sound files layer 2	volume
8	sound files layer 4	volume

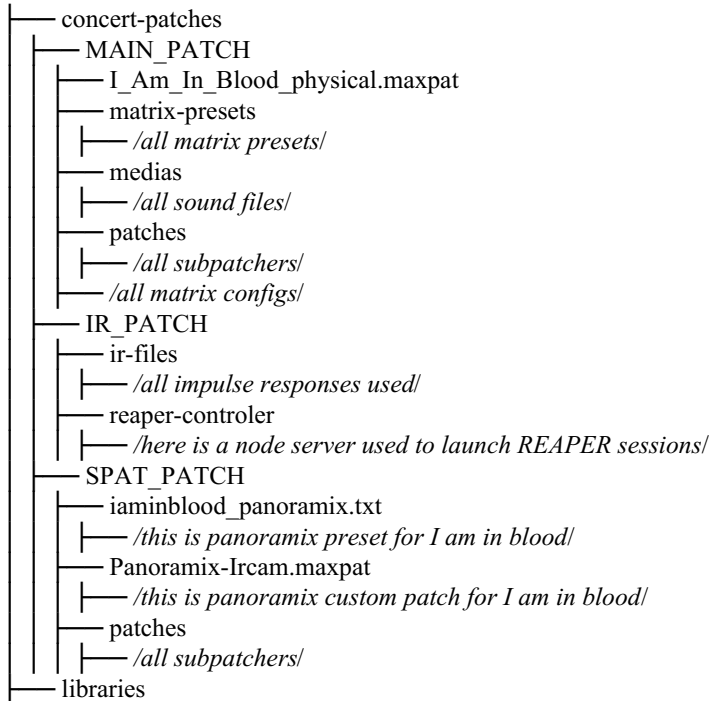
a ASPARION D400 was used to control **SPAT** computer according this configuration.

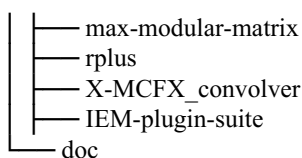
Fader	Control	Type
1	reverb instance 1	volume
2	reverb instance 2	volume
3	reverb instance 3	volume
4	reverb instance 4	volume
5	impulse response return	volume
6	subwoofers	volume
7	ring of E12 master	volume
8	ambisonic PMX5 master	volume

Please feel free to change this configuration in *p MIDI*.

## Software installation

The architecture of the folder is presented as following :





## Main computer

- download Max 8
- download SPAT5
- copy `_MAIN_PATCH` folder on the desktop
- Put `_MAIN_PATCH` into your Max File Preferences
- open `I_Am_In_Blood_physical.maxpat`

Please copy `max-modular-matrix` and `rplus` from Github (or from the `libraries` folder) into your `~/Documents/Max 8/Library`. Max will ask you to restart the patch the first time modular-matrix is open.

## IR computer

We use X-MCFX plugin into REAPER to convolve our instruments with 7th order HOA IR.

At the moment of the premiere we were unable to use `spat5.conv~` to convolve 4 \* 64 7th order HOA IR at the same time.

The workflow would be simplified a lot using `spat5.conv~`. Please try.

- download REAPER
- download command line tools `xcode-select --install`
- clone the repo
- install x-mcfx [http://www.angelofarina.it/Public/X-MCFX\\_convolver/](http://www.angelofarina.it/Public/X-MCFX_convolver/)
  - copy plugins to `~/Library/Audio/Plug-Ins/VST & VST3`
  - authorize with `sudo xattr -d -r com.apple.quarantine .`
- install node18 <https://nodejs.org/en/download/>
- install IEM-plugin-suite <https://plugins.iem.at/download/>
- copy ir-files to `~/Library/x-mcfx/filter_library`
- open terminal on reaper-controler and `npm install`
- `node index.js` to launch server (will open REAPER session on OSC input)

## SPAT computer

- download Max 8
- download SPAT5
- Put `SPAT_PATCH` into your Max File Preferences
- open `Panoramix-Ircam.maxpat`

## System calibration and tests

Try physical synthesis first, route an instrument into a phydrum ( `p PROCESSORS` ) and increase level. Then, do the same with `vdum`, and noiser.

Try section G with musicians because it is the hardest section of the piece.

Then you can try to play cue G13, this is the first solo of electronic (soundfile), it should sound well.

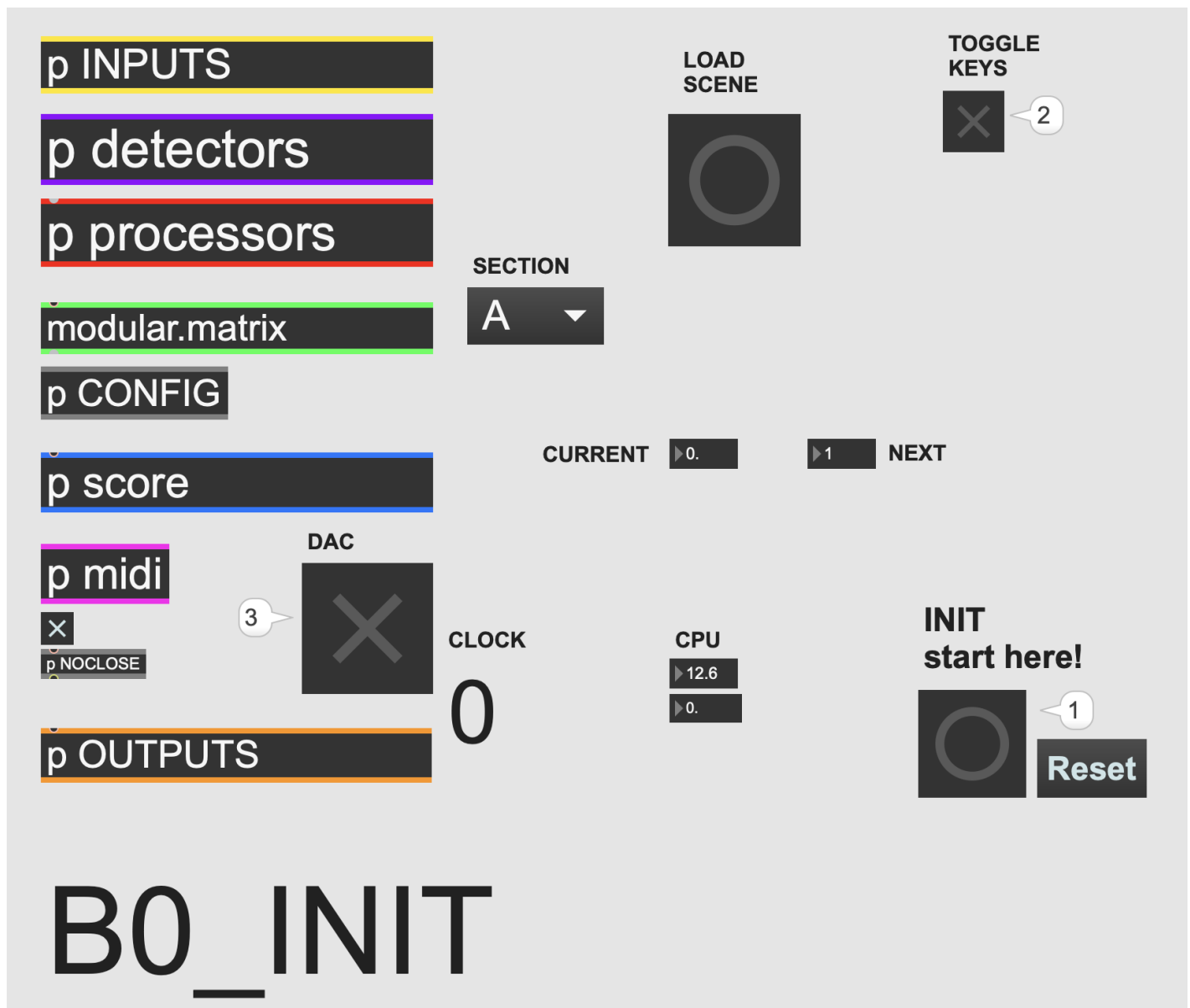
Then, try impulse responses on section I, acoustic sound should melt well with IR. Try to avoid feedback ;)

All cues written with `#` contains some delays (10s max), be careful to be sure everything is triggered.

## Initialization routine

- Press INIT
- Press Toggle Keys
- DAC ON
- Enter is for next cue, Esc is for DAC OFF

## Patch presentation



Let's present the patch :

## INPUTS

Here's all incoming signals

## DETECTORS

Used for section G, will map the intensity of the signal to the frequency of phydrum

## processors

All processors are listed here, divided in subcategories. You'll find vdram, phydrum, noiser, delays, sinux, lissgrain, harmonizers, spectral freeze, sound files players and save preset.

### Sound File Player

The sound file player is divided in 5 layers, with 4 different soundfiles at the same time per layers. You can adjust layers volume by sending to `L[1-5]_lvl`.

Layers 1 to 3 are routed in Panoramix for direct diffusion. Layer 4 is routed into the matrix, layer 5 is routed to the mixing desk reverberator (not used).

All soundfiles match the following channel map :

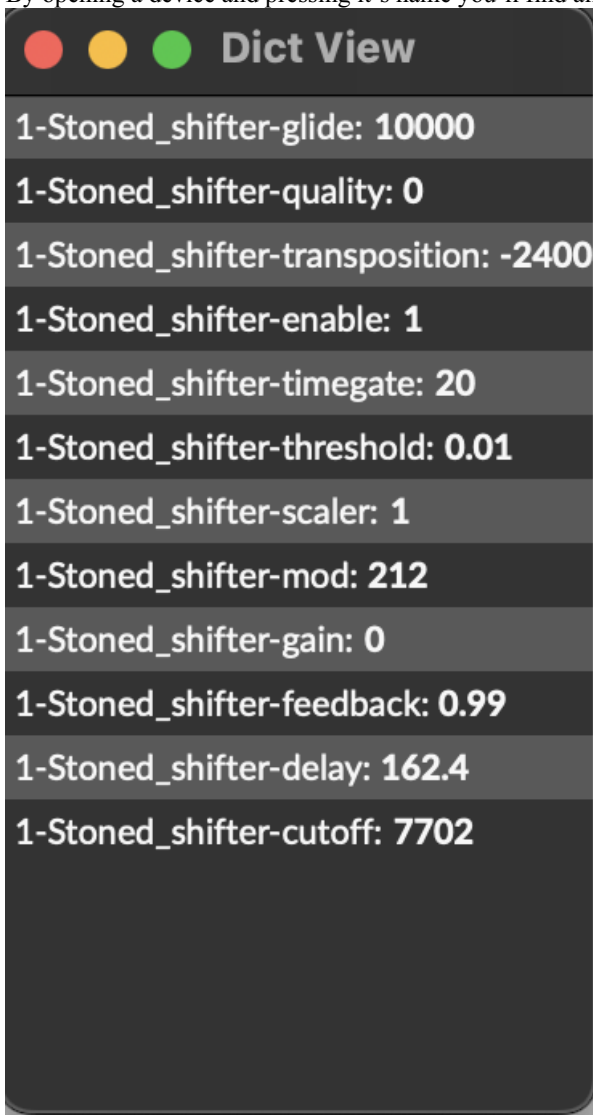
1. Front Left
2. Front Right
3. Front Center

4. Side Left
5. Side Right
6. Back Left
7. Back Right
8. Top Front Left
9. Top Front Right
10. Top Side Left
11. Top Side Right
12. Top Back Left
13. Top Back Right
14. Zenith (not used)

### Save presets

All Carmine's effect's bpatchers use the same namespace.

By opening a device and pressing it's name you'll find all parameters and current values.



For rehearsal purpose, you can create a message box with current device parameters using the save\_preset subpatcher.

### Spectral freeze and harmonizer

These FXs goes to the matrix.

### Sinix and lissgrain

These FXs goes to the matrix.

### Delays

Stoned-shifter is a delay/transposer FX. The input signal is routed according to a threshold in a random output channel from 1 to 24. In the **SPAT** computer, these 24 delay channels are positioned randomly.

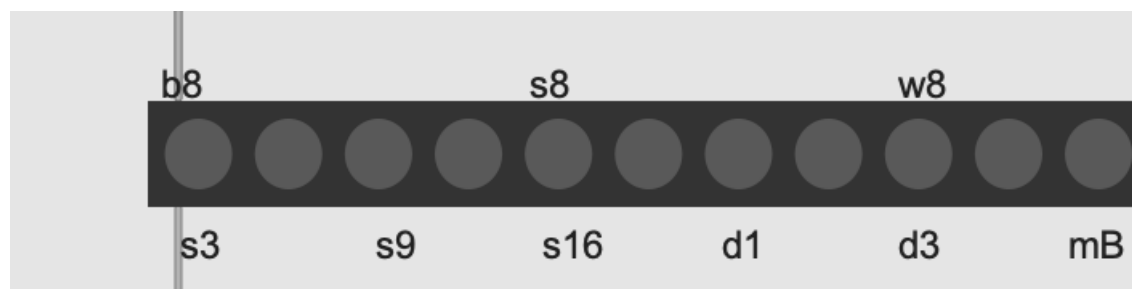
### Phydrum, vdrum, noisers

These FXs goes to the matrix.

### IRs

This is a routing matrix for merging inputs to the **IR** computer.  
The subpatch is divided in 2 parts :

- The routing matrix, with recalled presets
- The activation of IR processing



When a box of matrixctl is highlighted, the processing for the IR is ON.  
Technically, we send an OSC message to REAPER to enable the processing of the plugin.

### modular.matrix

Please see modular.matrix.maxhelp and [github](#) for more help.

### Config

You'll find here the OSC configuration for communicating between **MAIN** computer and **IR** computer.

### Score

Here is the electronic score of I am in blood. No Antescofo here, we just trigger some message boxes.  
For clarity the score is divided in subsections.

### midi

Here is the midi configuration (in presentation mode, sorry!), please feel free to change according to your needs.

### outputs


Here is the output routing as it was at the premiere. This will change according to your performance.  
What is important :

- Transducers outputs
  - Chateau are the 4 thundersheet at the top of the audience
  - Percs are the 2 bass drum and 2 metal sheets on the percussion stand.
  - Strings are the augmented strings.
  - IR are the 20 channels used as input for the **IR** computer.
  - sfplayer is a separate output for soundfiles, as described above.
  - delays are the 24 separate lines for delays, as described above.
  - additional stereo fx should go directly to the PA, front left and right.
  - forElliptique is not used anymore.

Please feel free to arrange outputs according to your needs.

### Performance notes

Everything is described precisely into the score, please listen and mix electronic accordingly in conjunction with the sound engineer. An external reverberator is needed, this has to be discussed with the sound engineer. For the premiere we used `spat5.elliptique~`, an unfinished prototype from IRCAM EAC team who can be found in Spat5 Packages. I won't attach it to the electronic material because it's not needed to play the piece but feel free to contact me for any questions.

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## Program note

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L'année 2020 a été difficile, pour tout le monde. J'ai vécu le premier confinement aux États-Unis. Je vivais alors à Berkeley, dans une petite maison sans jardin. On ne pouvait pas sortir pendant la journée et on avait le sentiment que la fin du monde approchait. La loi martiale est également entrée en vigueur dans la région de la baie de San Francisco pendant quelques semaines : il n'était alors plus possible de sortir, de jour comme de nuit. Les soldats sillonnaient les rues de San Francisco. L'ambiance était surréaliste et nauséabonde. Le recours à la loi martiale avait été motivé par une série d'émeutes en réaction aux meurtres racistes perpétrés par la police à la mi-2020, dont celui de George Floyd.

Au cours de ces mois, j'ai souffert de la situation globale mais aussi de diverses contrariétés plus personnelles. Contrairement à de nombreux artistes qui, au cours de ces mois, ont réussi à transcender l'épreuve, la situation que je vivais m'a conduit à une fermeture totale au monde. Je n'ai pas été en mesure d'élaborer de transfiguration cathartique des événements et n'ai fait qu'intérioriser. La convergence de ces souffrances « sociétale » et personnelle m'a fait vivre une épiphanie. Me sentant « compromis », en tant qu'individu et membre de notre société, quelques vers du Macbeth de Shakespeare me sont venus à l'esprit :

*I am in blood*

*Stepped in so far that, should I wade no more,*

*Returning were as tedious as go o'er.*

(dits par Macbeth, Acte III, Scène 4, 136–8)

*J'ai marché si loin dans le sang que, si je ne traverse pas le gué, j'aurai autant de peine à retourner qu'à avancer.*

(Traduction de François-Victor Hugo, Livre de Poche)

Ces vers m'ont fait penser à Derek Chauvin, le policier qui a étranglé George Floyd en posant son genou sur son cou pendant dix minutes. Il a fallu dix minutes pour le tuer, dix minutes pendant lesquelles George Floyd a imploré grâce, disant qu'il ne pouvait plus respirer, appelant sa mère à l'aide. Alors je me suis demandé si Derek Chauvin s'était un instant, au cours de ces dix minutes, dit qu'il était allé trop loin et que revenir en arrière lui était désormais aussi difficile que de continuer à tuer. Je me suis demandé s'il avait continué à tuer parce qu'il se sentait d'ores et déjà trop impliqué, compromis.

Deux ans plus tard, j'ai ressenti le besoin d'exprimer ces sensations : cette pièce en est le résultat.

Carmine-Emanuele Cella, note de programme du concert du 16 février 2023 à l'Espace de projection de l'Ircam.

Version documentation creation date: April 5, 2023, 5:07 p.m., update date: May 8, 2023, 6:24 p.m.