

Yan Maresz  
*Metallics*

1995

2001,

Metallics 2020-max8-48kHz  
2020



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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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## Table of Contents

Table of Contents	2
Work related information	3
Performance details	3
Detailed staff	3
Realisation	3
Useful links on Brahms	3
Version related information	4
Documentalist	4
Realisation	4
Upgrade Motivation	4
Comment	4
Other version(s)	4
Electronic equipment list	5
Computer Music Equipment	5
Audio Equipment	5
Files	6
Instructions	7
ABOUT THE PIECE AND THE SETUP	7
Audio setup	7
Loudspeaker setup	8
CONFIGURING THE MAC	9
Triggering modes:	11
First versions	14
Program note	16
Note pour la version ADAT ou Protools	16
Note pour la version temps réel Macintosh-Max/MSP	16

## Work related information

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### Performance details

- Jan. 14, 1995, Paris, Ircam, Espace de projection, concert Cursus (création partielle)
- May 2, 2001, (version en temps réel MSP) Paris, Ircam

Publisher : Durand

### Detailed staff

- trumpet

### Realisation

- Xavier Chabot
- Manuel Poletti

### Useful links on Brahms

- [Metallics](#) for trumpet and electronic device (1995), 11mn
- [Yan Maresz](#)

## Version related information

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Performance date: Jan. 16, 2015

Documentation date: Sept. 11, 2020

Version state: valid, validation date : Oct. 18, 2020, update : May 20, 2021, 3:53 p.m.

## Documentalist

Benoit Meudic (Benoit.Meudic@ircam.fr)

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

## Realisation

- Serge Lemouton (Computer Music Designer)
- Benoit Meudic (Computer Music Designer)

Version length: 11 h

Default work length: 11 mn

## Upgrade Motivation

Max8 version with different modes "real-time with click track", "real-time with pedal", "tape" "simulation" and "real-time with partial click-track and pedal".

## Comment

not played in concert yet

## Other version(s)

- [Yan Maresz - Metallica - Concert Lausanne 13th March 2023 \(March 14, 2023\)](#)
- [Yan Maresz - Metallica - Taiwan Octobre 2022 \(Feb. 6, 2023\)](#)
- [Yan Maresz - Metallica - March2022 \(March 10, 2022\)](#)
- [Yan Maresz - Metallica - METALLICS\\_November2021 \(Nov. 25, 2021\)](#)
- [Yan Maresz - Metallica - Metallica 2021-max8-48kHz-64bits \(May 20, 2021\)](#)
- [Yan Maresz - Metallica - Metallica 2015-max6 \(Oct. 2, 2015\)](#)
- [Yan Maresz - Metallica - Metallica 2015 Philharmonie \(Jan. 21, 2015\)](#)
- [Yan Maresz - Metallica - Metallica 2014-10-01 Musica \(Oct. 6, 2014\)](#)
- [Yan Maresz - Metallica - Metallica Max6 \(March 7, 2014\)](#)
- [Yan Maresz - Metallica - Metallica TR 2013 \(Oct. 2, 2013\)](#)
- [Yan Maresz - Metallica - Tape+clac version \(Oct. 22, 2012\)](#)
- [Yan Maresz - Metallica - transfert\\_mustica\\_ftp \(April 14, 2010\)](#)

## Electronic equipment list

### Computer Music Equipment

- 1 MacBook Pro - *Apple Laptops* (Apple)  
Apple 2.8 GHz or more - Mac OS 10.15.5 ok
- 1 Digital Performer - *Music Software* (MOTU)
- 1 Max 8 - *Max* (Cycling74)  
version 8.1.1 or above
- 1 Hammerfall - *Sound Board* (RME)  
1 soundboard with at least 1 input and 5 outputs
- 1 BCF 2000 - *MIDI Mixer* (Behringer)  
recommended to mix the electronic part
- 1 Footswitch / Sustain Pedal - *Footswitch / Sustain Pedal*  
optional sustain pedal for triggering events
- 1 Midi interface - *MIDI Interfaces*  
optional, if use of pedal

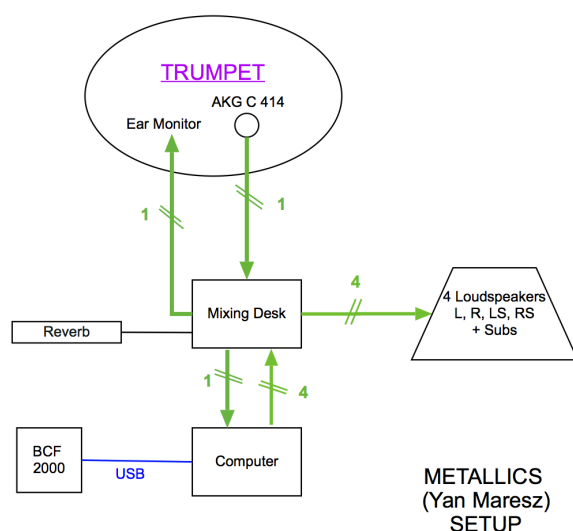
### Audio Equipment

- 1 Microphone - *Microphone*  
for trumpet
- 4 Loudspeaker - *Loudspeakers*
- 1 subwoofer - *Subwoofers*
- 1 ear-monitor - *Headphones*  
for the player, in-ear click-track
- 1 Mixing Console - *Mixing Console*  
Min 5 outputs

Files

File	Type	Author(s)	Comment
<a href="#">Metallics2020.dmg</a>	Patch	Max patch and simulation files	
<a href="#">ADC-ClementSaunier</a>	Simulation files		

# Instructions



## ABOUT THE PIECE AND THE SETUP

The trumpet is playing through a microphone. The microphone signal is sent both to the four loudspeakers and to the sound inputs of the Mac, where it will pass through various effects such as delays, reverbs, filters, harmonizers, spatializers, chorus...then it is sent back to the four loudspeakers and mixed together with the trumpet signal. The effects signals are processed in real time under the Max 8.1 software. Max calculates the effects signal and the antescofo object sends events to the effects, in order to modify their behavior all along the piece.

The writing of the piece brings a constant interaction between the player and the electronics, so the electronics are calculated according to what he's playing. If required by technical constraints it is also possible to play a tape instead of live electronics (triggering mode 'click+bande').

For best results it is recommended for the player to play the written rhythm as "sharp" as possible.

The composer wishes that the trumpet player is located on the back of the stage (as far as possible from the audience).

## Audio setup

**YAN MARESZ - METALLICS (1995) for solo trumpet and live electronics**

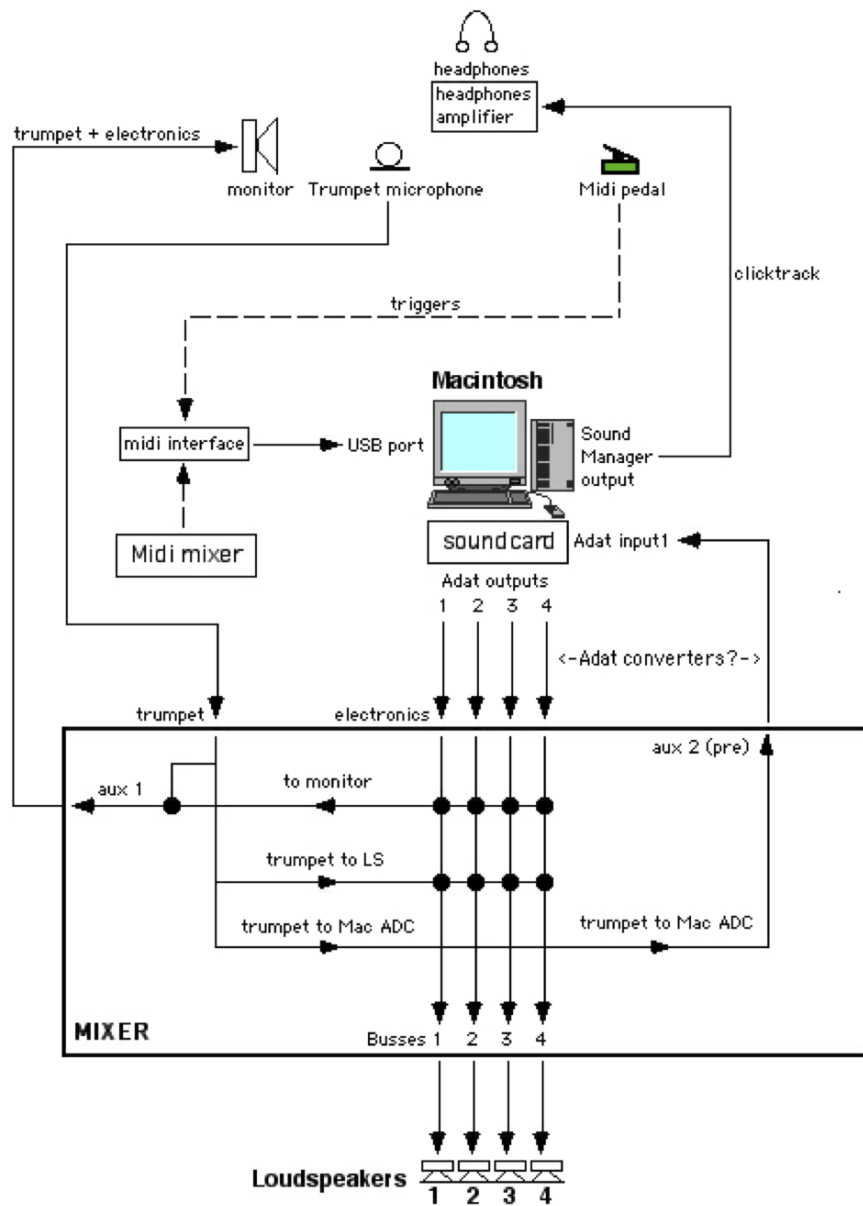
Production: IRCAM

Real time version running under Apple Macintosh

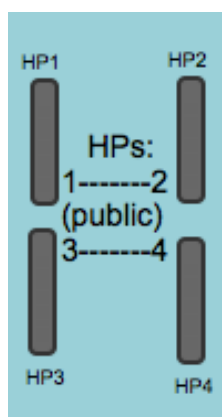
- first patch version on NEXT/IRCAM-ISPW by Xavier Chabot
- ported to Cycling74 Max/MSP by Manuel Poletti (2001) - contact: <manuel.poletti@ircam.fr>

**Yan Maresz - Metallica (2001)**

Audio &amp; Midi connections

**Loudspeaker setup**





## CONFIGURING THE MAC

MAX calculates a complex set of real time sound signals, with multi inputs/outputs sound routing, receives and sends midi events, displays graphics, etc... All this takes a lot of the power of the CPU of the Mac processor when playing large patches such as Metallica.

That's why it's always a good idea, when performing a live piece in front of a public audience, to minimize the risk of crashes of the machine, due to CPU overload, or extensions conflicts. We recommend to :

- deactivate BlueTooth and unrequired Wifi.
- deactivate automatic launch of Screen Savers,
- deactivate automatic suspension of hard Drives and put every activity suspension to "never". (Mac OS X : see System Preferences > Energy Saver)

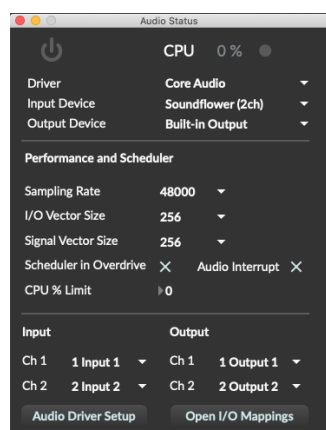
## INSTALLING

- Download "Metallica-2020-Max8.dmg", open it and copy everything in a folder on your computer.
- Launch MaxMSP 8.1 (or above) before everything. Select this folder (and only this one) in the 'file preferences' menu.

Check your audio outputs with the max audiotester.

The max patch will set vector sizes and other preferences automatically when you reset.

Sampling rate must be 48khz



There are 5 outputs: dac 1..4 respectively on loudspeakers 1-front-left, 2-front-right, 3-middle-left, 4-middle-right, and dac 5 for click-track.

- Launch the patch "Metallica-2020-Max8". Check the Max Window : you should see something like this, which means that everything is fine :

```

Max Console

antescofo- • Antescofo- - Score Following and Real-time Programming
antescofo- • by Arshia Cont, Philippe Cuvillier, Jose Echeveste, Jean-Louis
antescofo- • Glavitta © Antescofo™ 2016-2018
antescofo- • release compilation-des-méthodes - 1.0-143, Compiled on Oct 7 2018
antescofo- • 23:13:12
antescofo- • documentation at http://support.ircam.fr/docs/Antescofo/manuals
antescofo- • OSC Listener Stopped!
udpreceiver • binding to port 7002
udpreceiver • binding to port 7000
soundfiles • preload 2 003-metalx01_Paf.aif
soundfiles • preload 3 007-metalx02_Opens.aif
soundfiles • preload 4 010-metalx03_Cups.aif
soundfiles • preload 5 013-metalx04_Straights.aif
soundfiles • preload 6 019-metalx05_Harmons.aif
soundfiles • preload 7 023-metalx06_Whispers.aif
soundfiles • preload 8 047-metalx07_ScaleDown.aif
soundfiles • preload 9 054-metalx08_Monster.aif
soundfiles • preload 10 075-metalx09_WhisperChord1.aif
soundfiles • preload 11 089-metalx10_Glisses.aif
soundfiles • preload 12 105-metalx11_Rips.aif
soundfiles • preload 13 112-Metalx12_DevWithAcresc.aif
soundfiles • preload 14 115-metalx13_WhAdd1.aif
soundfiles • preload 15 119-metalx14_WhAdd2.aif
soundfiles • preload 16 126-metalx15_Mobemol.aif
soundfiles • preload 17 130-metalx16_HeavyWa1.aif
soundfiles • preload 18 132-metalx17_HeavyWa2.aif
soundfiles • preload 19 139-metalx18_EndSequence.aif
soundfiles • preload 20 noclick12-Metalx12-a_DevWithAcresc.aif
soundfiles • preload 21 noclick13-Metalx12-b_DevWithAcresc.aif
soundfiles • preload 22 noclick132-Metalx17-a_HeavyWa2.aif
soundfiles • preload 23 noclick135-Metalx17-b_HeavyWa2.aif
soundfiles • preload 24 noclick139-Metalx18-a_EndSequence.aif
soundfiles • preload 25 noclick154-Metalx18-b_EndSequence.aif
soundfiles • preload 26 noclick157-Metalx18-c_EndSequence.aif
soundfiles • preload 27 noclick172-Metalx18-d_EndSequence.aif
soundfiles • preload 28 noclick183-Metalx18-e_EndSequence.aif

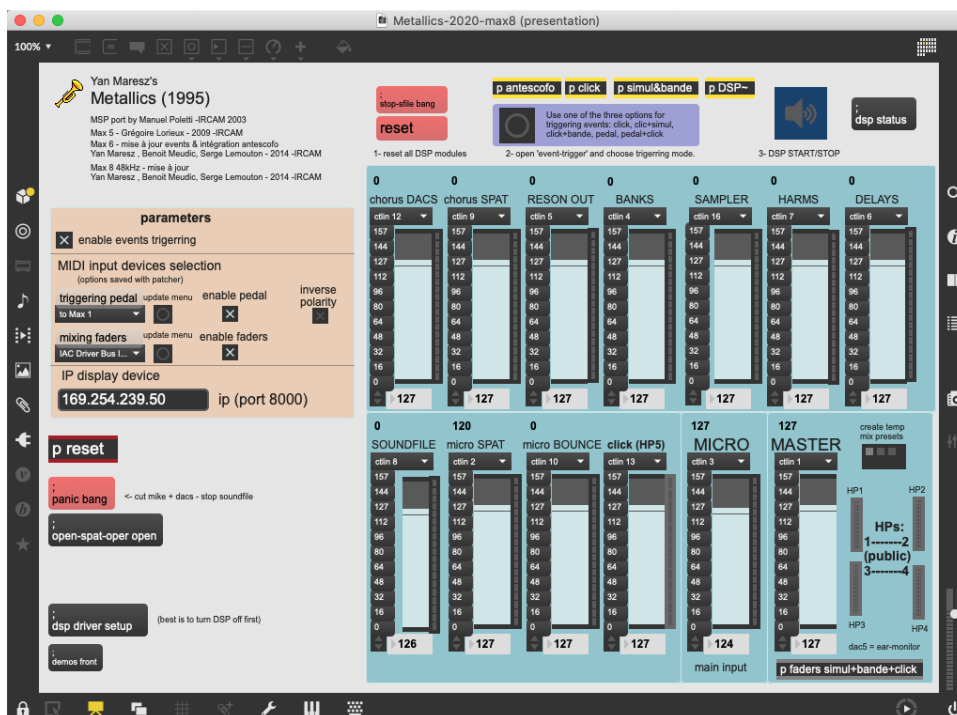
```

```

soundfiles • preload 29 075-metalx09_WhisperChord2(si 1 trop filtré).aif
pedal-enable • 1
rev4-to-reson • 0 10
antescofo- • Suivi OFF.
score • MTX14-score-150512.asco
antescofo- • setScore is called: old state chain size=0, new one size = 1515, new score size=1515
antescofo- • Score loaded succesfully with 1175 events and 2146 actions.
antescofo- •
/Volumes/System/Users/meudic/Documents/Ircam/compositeurs/Maresz/Metallics2020/data/MTX14-
score-150512.asco.txt
mode • 4
antescofo- • Turning remote forwarding ON.
OPEN-INIT • bang

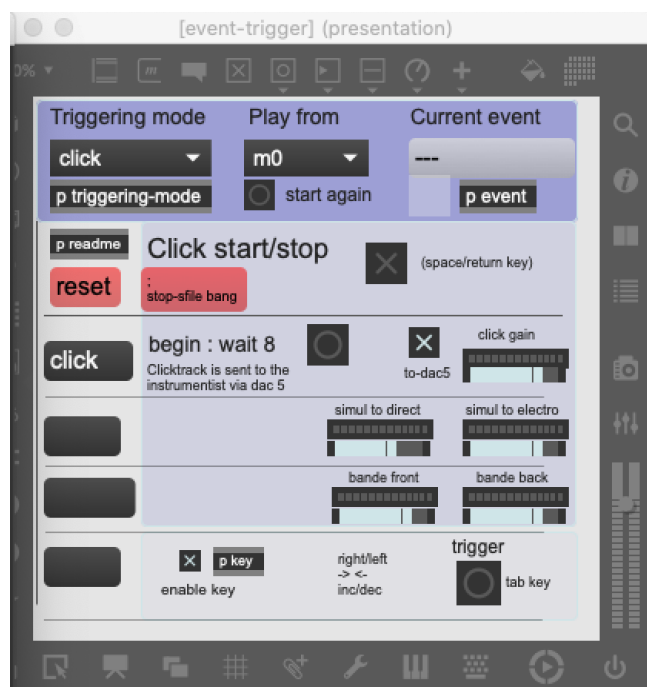
```

- Two windows open : the main patch 'MetalX-2020-Max8' and the patch 'event-trigger':



In the Main interface, you can tune general parameters (middle left part - see below the picture "parameters"), adjust the level controls of the electronics (right part) and open important sub-patchers (top right part): 'p events' which contains events, 'p DSP' which contains the signal objects, 'p simul&bande&click' which contains the simulation, the tape and the antescofo click-track sequencer, and 'p event-trigger' which contains controls for event triggering.

Adjust the input level of the trumpet into the patch towards the treatments here :



In the 'event-trigger' window, you can start/stop click-track, choose the triggering mode, choose where to start in the score, control the levels of click/simul/bande, and in case of pedal triggering, select next event.

• Where I am supposed to click ? What I am supposed to do ?

1. In the patch : click on «reset» then on «reset yan-bang» each time you stop the rehearsal or you begin.
2. Choose with the trumpapist the best way to play the piece (See below section 'Triggering modes' for details):

- \* click (recommended),
- \* 'click+simul' (for rehearsals without trumpapist),
- \* 'click+bande' (for concerts without live electronics),
- \* pedal (if the instrumentist triggers events with a pedal)
- \* pedal+click (instrumentist triggers events with a pedal except in five parts in which click-track i

\* pedal-dp

3. Start DSP

4. Then you can select where you want to start from (menu 'Play from' of the patch 'p event-trigger'), and click the toggle 'Click start/stop' for starting/stopping the click.

## Triggering modes:

With live electronics, two technical possibilities are proposed to find a good balance between a better "accuracy", for more live feeling, and a better "efficiency", for more precision, according to the trumpet player.

1) first possibility:

Events are triggered by a sequencer (antescofo) wich is automatically loaded with the Max patch. While the events are automated inside the patch, the midifile sends a continuous clicktrack to the player via headphones.

This way, nor the player nor the musical assistant have to care about the regularity of triggers, or of events mismatches.

That's a better way to keep the maximum of efficiency. This possibility is recommended by the composer.

2) second possibility:

Events are triggered by the trumpet player him(her)self, using a midi sustain foot pedal. Events are notified inside the musical score, so

(s)he can synchronize them to his/her playing. The midi pedal device should be selected in the menu "trigerring pedal" on the left of the main screen (see picture "parameters").

The musical assistant should follow the score and check that the player doesn't miss any event. He has the possibility to correct the errors, using the Mac keyboard, or by clicking with the mouse into the Max patch.

In mode 'pedal+click', as some parts of the piece need that the events are triggered synchronously with some soundfiles, for those parts, a clicktrack is sent to the player via headphones.

In this mode, click-track will start:

from event m89 to m101: click-track (12 bars + 2 beats)

from event m114 to end of bar 116 : click-track (3 bars)

from event m119 to m126 : click-track (6 bars + 1 beat)

from event m130-2 to m138 : click-track (7 bars + 1 beat)

from event m139 to m190 (1rst beat of bar 190) : click-track (52 bars)

In order for the instrumentalist to know which is the current mode, an arrow is added to the messages on the left of the patch 'event-trigger':



Above, the trigerring mode is 'pedal+click', and the current mode is pedal (instrumentist has to press the pedal for the next trigerring)



Above, the triggering mode is 'pedal+click', and the current mode is click (the computer musician has to start the click-track in order to start from event 91).

Least, another mode (pedal-dp) can be used for trigerring events from a simulation session in digital performer. In this case, any midi output note from digital performer is taken as an event trigerring. The dp midi device should be selected in the menu "trigerring pedal" (see picture "parameters").

**parameters**

☐ enable events triggering

**MIDI input devices selection**  
(options saved with patcher)

trigging pedal ☐ update menu enable pedal ☐ inverse polarity ☐

to Max 1

mixing faders ☐ update menu enable faders ☐

IAC Driver Bus I...

**IP display device**

169.254.239.50  ip (port 8000)

Note: Clicking on the grey messages of each menu ("triggering pedal" or "mixing faders") you will have access to the corresponding max patchers.

## TAPE VERSION

If for some reasons the piece can not be played with live electronics, it is possible to use the tape (triggering mode 'click+bande'):

For this option, you just have to select the triggering mode 'click+bande' and then start click-track (you can choose also where to start from with the menu 'Start from').

You should also send the "real" trumpet to the reverb and follow it during the concert, depending on the musical context.

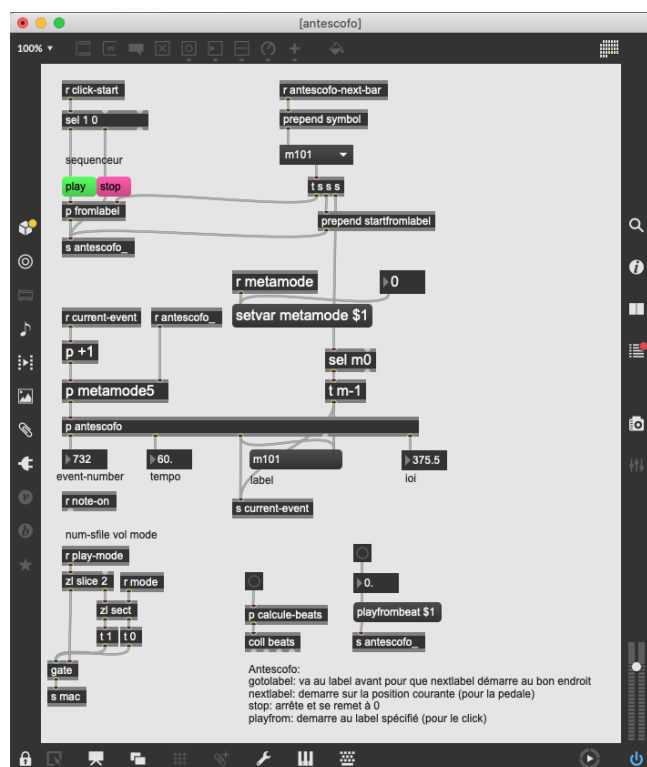
During the rehearsals, you can also use the triggering mode 'click+simul' in order to simulate the trumpet.

Note: an mp3 version of the tape+click-track is also available for rehearsal in "media/ **Metallics-2014-Practice-Tape.mp3**"

Two trumpet recordings are also available for tests and set-up: "media/TrumpetPart-cure.aiff" and "media/TrumpetPart-gaudon.wav".

## ABOUT THE CLICK-TRACK

The click-track is sequenced by antescofo ('p antescofo') with the score 'MTX14-midisimul-click.asco'.



The pitches are sent to 'sfplay~' with 'clave1.wav' and 'clave2.wav' sfiles.

The events are named according to the bar at which they are positioned. (ex m52 stands for an event at bar 52).

In the simulation mode it is possible to start from any bar (label).

In the click mode a selection of starting points is proposed in the menu 'Start from' of the patch 'p event-trigger'.

## ABOUT SOUND DIFFUSION

The trumpet signal is sent to the four loudspeakers through the max patch after spat/reverb treatment. Each of the four sound outputs of the Mac is sent separately to one of the four speakers (out1 to ls1, out2 to ls2, out3 to ls3, out4 to ls4).

1---2

3---4

One should find a good balance between the trumpet and the electronics signals, keeping in mind that electronics are a constant and essential part of the piece, and that one should hear the different signals (live & electronics) like sounding all "together".

The four loudspeakers must be turned in order to form the most regular squared quadraphony possible around the audience. The sound result must be a constant and omnipresent energy. In very "dry" rooms, the sound engineer should inject both the trumpet and the electronics signals into a slight reverb effect, whose output should be diffused into each of the loudspeakers, in order to compensate eventual sound "holes". The reverb parameters should be set in accordance to the size of the room, in order to keep a realistic effect.

The only source that is really directional is the real acoustic sound from the trumpet.

Some electronic effects can variate their behavior, according to the trumpet player, the microphone and the P.A. that are used, or the room where the piece is performed. For those reasons, the musical assistant has the possibility to re-mix every sound effect that comes from the Mac separately, either by using an external midi mixing console, either directly inside the patch by using the mouse. Generally, (s)he won't have to do much mixing during the piece, only some global and slight corrections.

## MIXING LEVELS

The mix can be controlled with a midi mixer (for instance a berhinger bcf2000). You can select the midi mixing device in the menu "mixing fader" (see picture "parameters").

The controller numbers are mapped to faders that control independantly levels of effects, input or output. You can change this mapping by changing each corresponding menu in the main patch.

The default mapping is the following:

- controller number - effect :
- 12 - chorus,
- 9 - chorus to spat,
- 5 - reson,
- 4 - banks,
- 16 - sampler,
- 7 - harms,
- 6 - delays,
- 8 - soundfile,
- 2 - micro spat (micro to spat),
- 10 - micro bounce (micro to reverb),
- 13 - click,
- 3 - trumpet,
- 1 - main output master

## First versions


Realised at IRCAM (Cursus) - Musical assistant : Xavier Chabot

First unfinished version - Premiere : 14 Janvier 1995 at IRCAM (Concert Atelier) - Trumpet : Laurent Bômout

Definitive version - Premiere : 8 et 9 avril 1995 à IRCAM (journées portes ouvertes) - Trumpet : Laurent Bômout

Tape version - Premiere : 13 Mai 1995 in New-York - Trumpet : Waine Du Maine

Version MSP Version - musical assistant : Manuel Poletti - Premiere : 2 Mai 2001 à Paris - Trumpet : Laurent Bômout

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## Program note

### Note pour la version ADAT ou Protocols

Ecrite à l'Ircam durant le cursus de composition et d'informatique musicale de 1994, la pièce a été créée dans sa version complète par Laurent Bômout lors des Journées Portes Ouvertes en 1995. La version originale fait appel au programme Max sur la station Next de l'Ircam qui sert de base pour la gestion de tous les événements électroniques en temps réel : synthèse par filtres, traitements, *sampling*, spatialisation et déclenchement de sons *direct-to-disk*. Pour cette pièce, l'Ircam a mis au point deux outils permettant une plus grande interactivité entre l'instrument et l'ordinateur ; un micro-capteur situé dans l'embouchure de l'instrument, et qui, par une analyse très précise du signal d'entrée, permet de faire un suivi de hauteurs et d'amplitude, ainsi qu'un petit déclencheur situé sur l'instrument et qui est actionné par le pouce de l'interprète.

J'ai toujours été fasciné par les changements de caractères qu'offre l'utilisation des sourdines sur les instruments de cuivre, démultipliant ainsi leur possibilités expressives. Après avoir porté mon choix sur la trompette, nous avons entrepris une étude des propriétés acoustiques des principales sourdines utilisées par l'instrument : bol, sèche, *harmon*, wa-wa et *whisper*. Après analyse des caractéristiques propres à chaque sourdine, j'ai tenté de recréer la transformation qu'elles opèrent sur la trompette en lui appliquant en temps réel les enveloppes spectrales de chaque sourdine (par filtrage formantique). La trompette est particulièrement bien adaptée à ce type de transformations, de par son utilisation même de sourdines qui font exactement cela d'un point de vue acoustique. J'ai donc pu simuler ces différentes sourdines sur l'instrument qui, par ailleurs, les utilise aussi dans la pièce, créant ainsi un jeu entre image sonore réelle et ombre synthétique.

Les résultats d'analyses des sourdines m'ont aussi offert une base formelle, car il s'est avéré quelles se classaient naturellement dans une échelle d'harmonicité/inharmonicité en comparant la déviation de leurs informations spectrales par rapport à celles de la trompette ordinaire. J'en ai donc suivi le modèle, dans un parcours musical segmenté en mouvements distincts, présentant à partir de la trompette ordinaire, les sourdines de la moins bruitée vers la plus bruitée avec, entre chacune d'entre elles, des parenthèses de trompette ordinaire (évoluant aussi vers des modes de jeux de plus en plus bruités) durant lesquelles s'opère le filtrage formantique. Le caractère musical de chacun des mouvements est lui, dû à l'acceptation et à l'incorporation des archétypes sonores et des références musicales inévitables propres à la trompette et à ces différentes sourdines.

De plus, les informations spectrales, régissent aussi en grande partie divers paramètres comme les notes pivots, les cellules mélodiques ainsi que l'harmonie. D'autres types de sons présents dans la pièce et déclenchés en *direct-to-disk* proviennent d'échantillons de trompette, de cuivres divers et de quelques percussions métalliques.

Dans la version avec bande, la plus grande partie des sons électroniques provenant du traitement en temps réel a été récupérée, mais, les traitements spécifiquement interactifs comme la spatialisation de la trompette ainsi que tous les procédés de filtrage sur l'instrument décrits précédemment sont absents. Toutefois, une simulation des réponses de ces différentes sourdines a été effectuée à l'aide d'échantillons de trompette.

### Note pour la version temps réel Macintosh-Max/MSP

Ecrite à l'Ircam durant le cursus de composition et d'informatique musicale de 1994, la pièce a été créée dans sa version complète par Laurent Bômout lors des Journées Portes Ouvertes en 1995. La version originale fait appel au programme Max sur la station Next de l'Ircam qui sert de base pour la gestion de tous les événements électroniques en temps réel : synthèse par filtres, filtrage, traitements divers, *sampling*, spatialisation et déclenchement de sons *direct-to-disk*. La pièce existe désormais dans une version temps réel Macintosh/MSP.

J'ai toujours été fasciné par les changements de caractères qu'offre l'utilisation des sourdines sur les instruments de cuivre, démultipliant ainsi leur possibilités expressives. Après avoir porté mon choix sur la trompette, nous avons entrepris une étude des propriétés acoustiques des principales sourdines utilisées par l'instrument : bol, sèche, *harmon*, wa-wa et *whisper*. Après analyse des caractéristiques propres à chaque sourdine, j'ai tenté de recréer la transformation qu'elles opèrent sur la trompette en lui appliquant en temps réel les enveloppes spectrales de chaque sourdine (par filtrage formantique). La trompette est particulièrement bien adaptée à ce type de transformations, de par son utilisation même de sourdines qui font exactement cela d'un point de vue acoustique. J'ai donc pu simuler ces différentes sourdines sur l'instrument qui, par ailleurs, les utilise aussi dans la pièce, créant ainsi un jeu entre image sonore réelle et ombre synthétique.

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Yan Maresz.



Version documentation creation date: Sept. 11, 2020, 6:55 p.m., update date: May 20, 2021, 3:53 p.m.