Case studies in live electronic music preservation: Recasting Jorge Peixinho's Harmónicos (1967-1986) and Sax-Blue (1984-1992)

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Abstract

We present two examples of technology transfer from analogical to digital systems, in two works of live electroacoustic music by the Portuguese composer Jorge Peixinho (1940-1995), *Harmónicos* (1967) and *Sax-Blue* (1982). These works require the use of analogue technology that has become obsolete or difficult to access by the average performer. We think that migration from electronics to software, also referred as recast represents a necessary step to preserve live electroacoustic music. However, this process can pose multiple questions as it also relies on aesthetic considerations. In this case, we put on a considerable effort into understanding both the composer's intentions and the equipment operating mode and we think the solutions proposed are adequate to perform both works. Finally, we discuss some of the questions, solutions and limitations that arose with these recasts and how they can contribute to the sustainability problem concerning these works.

01 | Introduction

The preservation of live electronic music is a problem that composers and performers have faced since its beginnings. Even more, paradoxically, the introduction of digital technologies have contributed to making works more perishable, as analogue devices have become more difficult to find and digital devices change everyday.

This problem has been dealt with in different ways, as we can see in articles like those by Sluchin [17] or Burns [1], or even in a whole journal dedicated to the problem, like the *JNMR* issue on Conservation, Restoration and Archiving of Electroacoustic Music [3] or *Organised Sound* vol.11, no.3 [9] to name just a few examples.

To deal with this situation, two possibilities arise: should we perform the work strictly according to the material conditions foreseen by the compos-er, or do we redesign the devices used to perform it? In the first case, we must also assume that once the original conditions are not fulfilled anymore, the work can no longer be performed.

In the second case, which is our position, we must be aware that the transfer to another technology must be carefully and clearly stated. In the case of live electronic music, Chadabe calls this kind of preservation "recasting" [5] but other names can be equally applied like, for example, "reforging".

As an example of recasting, we present two digital implementations of analogical configurations. These implementations, programmed in Max [10], were undertaken since 2001 [18] as a recasting of the electronic part in two works by Jorge Peixinho (1940-1995): Harmónicos (1967) [13] and Sax-Blue (1982) [14][1].

Peixinho is one of the most important Portuguese contemporary composers. Like most Portuguese composers of his generation, he was very interested in the possibilities of new devices. This interest can be noticed in two ways: Peixinho not only wrote electroacoustic music, with or without live electronics but he wrote about the needs for the practice of electronic music in Portugal [12].

Recasting his music is a way of contributing to keep it alive. This is the main purpose of this work. But other issues arise: for example, it contributes also to pose the problem of the transcription of gestures and command. In the case of *Harmónicos*, we designed a general tape delay device modelled on analogue tape delay characteristics. For *Sax-Blue*, we designed a patch simulating the *Korg Stage Echo SE 500* [8] behaviour along with a patch translating the gestures required originally into new gestures.

Our aim in recovering these works is to allow them

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1   The patches can be freely downloaded at http://www.sousadias.com in the download section.

to be performed, assuming a compromise: the solutions should respect the instructions in the score, and they should not add possibilities not supposed by its author; exceptions must be clearly stated and justified.

The current implementations are programmed in *Max* version 5. *Max* seems to ensure some stability regarding its development and sustainability and since version 5 there is a big change in the file format of the patches, which became much clearer for direct code reading. These recasts include some algorithms belonging to the *jimmies* library [16]. They were included as subpatchers and not as abstractions, in order to get the code assembled together, but explicit references to their original source are stated in the code.

02 | Harmónicos

2.1. | Brief description of work

Harmónicos is a work for piano and live electronics dating from 1967. It exists in several versions: the first, *Harmónicos*, dates from 1967, the second, *Harmónicos* I, from November 1967, and the third, *Harmónicos* I-2b, for four instruments, piano, harp, harpsichord and celesta, dates from 1986. According to Clotilde Rosa[2], one of the founders of *Grupo de Música Contemporânea de Lisboa,* Peixinho adapted this work to different instrumental contexts, sometimes even for group improvisation.

The scores for the different versions state a minimum of 15 minutes duration and consist of a series of performing instructions, suggesting how the performer will play a guided improvisation on a pitch set, build from notes that are tempered approximations of the harmonics of a virtual fundamental (for a translation of the programme notes see Section 7.1 below).

The performance is recorded and played back in real time with a delay of 6 to 8 seconds through a tape delay system. We think that Stockhausen's *Solo* (1965-1966) is probably an influential work as we find the use of an approximate performance vocabulary ("varied", "contrasted" materials, and so on) although the delay system used in *Harmónicos* is much simpler.

2.2. | The context for the recasting

In 2002, Francisco Monteiro contacted us in order to set up the electronic part for a performance of *Harmónicos* I in Lisbon. Due to the difficulty of setting up the analogue configuration imagined by the composer, we decided to program a patch in Max/MSP simulating this device as closely as possible. The aim was to enable the work to be performed anywhere. This version for piano and digital device (Macintosh iBook G3-Max/MSP 4.0.7) was performed at the National Conservatoire School of Music, Lisbon, on 18th May 2002, by Francisco Monteiro - Piano and António de Sousa Dias – Mac-Max/MSP.

A second performance with the same set-up took place later in July 2005 by Miguel Borges Coelho (piano) and Carlos Caires (digital device). Since then, the work has regularly been performed with José Luis Marques Ferreira (digital device) since the *Musica Viva* 06 Festival, in 2006.

2.3. | A note on the mechanical tape delay

The original device consisted of two tape recorders, a microphone and an amplifier (see Figure 2). During the performance, the piano is recorded on tape recorder A and the tape is read on tape recorder B. This introduces a delay due to the distance between the tape recorders (the composer indicates between 6 to 8 seconds), generating a canon in unison.
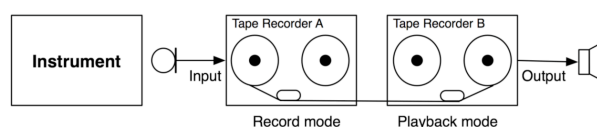
Since 1965, this configuration was a common way of obtaining long delay signals and we can trace different forms of its use in composers and works, with or without feedback. We can find some examples, ranging from contemporary music composers and works such as Pauline Oliveros *I of IV* (1966) or Stockhausen's *Solo*, to progressive rock such as Brian Eno and Robert Fripp in the early '70s, to name just a few.

This analogue set-up poses two problems: on the one hand, it is hard today to find two analogue tape recorders anywhere, and on the other hand, there is the possibility of instability of the device, with the

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2   Clotilde Rosa's personal communication with the author in 2002.

risk of resultant fluctuations. This is due to the distance between tape heads (to obtain a delay time ranging from 6 to 8 seconds at 38 cm/s the distance must range from 2.28 to 3.04 metres) and the fact that the tape reel, on each tape recorder, is fixed to only one capstan, and the tension is not respected. According to Keane:

"A second tape recorder makes possible longer delay times for echoes. When threading tape recorder one, instead of winding the tape on the take up reel, after it has passed the last guide, feed the tape through the transport and heads and on to the take-up reel of the second machine. Be sure that you thread both machines so that automatic shut-off sensors are not activated and proper tension is maintained across both sets of heads. […]" [7]

2.4. | The *Harmónicos* Max implementation In order to overcome these problems, we decided to recast this set of works as a Max program, *asd_JP_Harmonicos.maxpat*. The first version was programmed in Max/MSP 4.0.7 and the present *Max 5* version contains some improvements. Its structure is shown below (Figure 3).
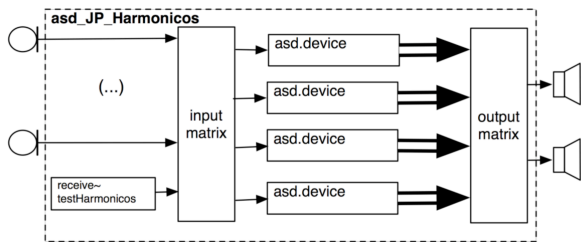
**3** | Simplified block diagram of asd_JP_Harmonicos patcher program.

asd_JP_Harmonicos.maxpat acts as a front end and its 16 inputs can be redirected to up to four devices (as required to perform *Harmónicos* I-2b). It also manages the different settings for each device and their position in a stereophonic field (see Figure 4).
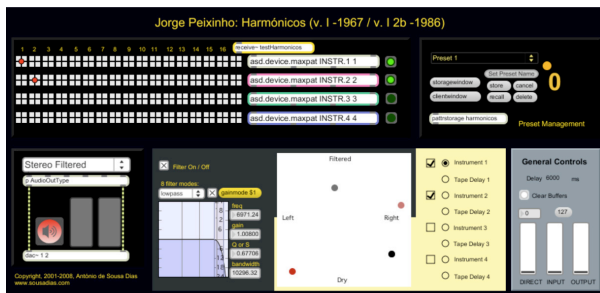
4 | The main patch window from asd_JP_Harmonicos.maxpat (adapted from Jorge Peixinho, Harmónicos, 1967-86).

There is an additional input, through the "receive~" object, as a way of providing an extra form of input. The "General Controls" section allows all devices to be controlled simultaneously . Finally, there is also a "Preset Management" section to store the information concerning the main patch and each device.
The Max abstraction *asd.device.maxpat* (see Figure 5) implements the tape delay system. For each set-up, the user can control the amount of dry signal (direct) and the amount of signal input in the tape delay, its output as well as the delay time and the filter parameters.
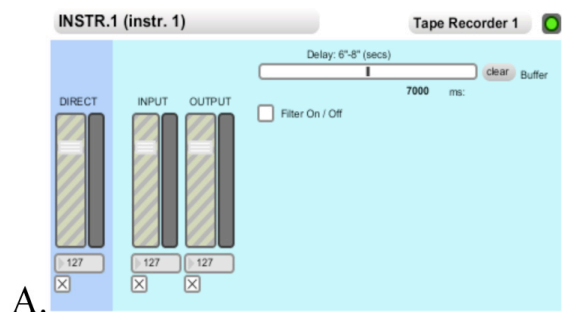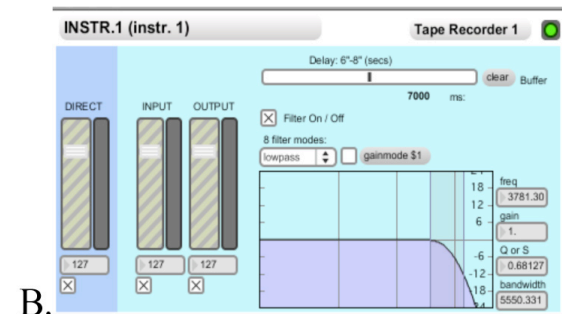
5 | Patch asd.device.maxpat (adapt. from Jorge Peixinho, Harmónicos, 1967-86): example of two set-ups (A.) without or (B.) with filtering.

The *asd.device.maxpat* abstraction includes the sub-patcher *tapeDelay* containing the core code for the tape delay set-up. In this patcher, its leftmost input accepts the audio signal, the middle one accepts the incoming messages to set the delay time and the rightmost input, the messages for filter activation and parameter settings (see Figure 6).

We introduced modifications to Peixinho's original idea, paradoxically with the aim of respecting it. These modifications include:
• an optional low-pass filter (to simulate a small loss of high frequencies due to recording: see, for example, *Revox A77 Service Manual*, p12.1.4: correction factor for frequency response [15]);
• a memory bank to store rehearsal and concert settings;

• the definition of the location of the input source (*dux*) and its delay image (*comes*) in the stereophonic field defined by the loudspeakers.
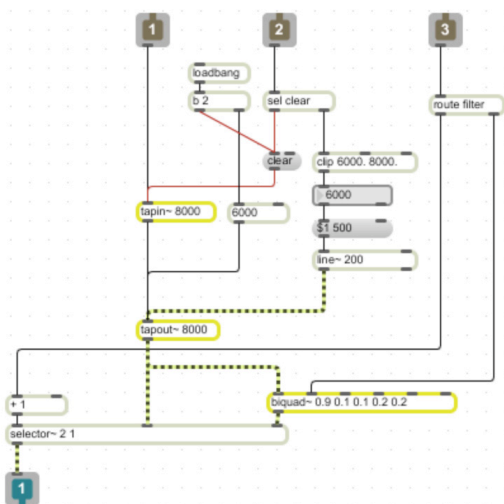
6 | The patcher object *tapeDelay* encapsulated in the patch abstraction *asd.device.maxpat*. This subpatcher contains the core code for the tape delay set-up.

The first modification confronted us with the problem of a too strict respect of the technical conditions of the time. The reason we did not try to impose differentiation from the input and delayed sounds is based on the assumption that, possibly, Peixinho would have preferred a texture where the two sources would blend smoothly together. In the score of *Harmónicos*, he states that the delayed sounds constitute an "alter ego" of the pianist and, in *Harmónicos* I, that "It is from the resulting "polyphony" of the piano–loudspeaker system that the work will be formally defined" [13].

The second modification seemed to us justified in order to guarantee a minimum ease of performance. The reasons stated for the first modification also apply to the third one, as it was implemented as a way of obtaining a balance between the instruments and the electronic part.

 Finally, there is one option that we did not yet implement : the possibility of an automatic stop after the 15 minutes minimum duration of the work simulating the ending of a tape reel. Peixinho did not explicitly foresee this option. Indeed, we are almost certain that Peixinho provides the minimum duration of 15 minutes to take into account the diameter of the tape reels: for example, in a reel of a diameter of approximately 18 cm (7 inches), there are 1200 feet (approximately 365 meters) of ribbon, which makes it possible to record approximately 16 minutes at a speed of 38 cm/s.

03 | *SAX-BLUE*

3.1. | Brief description of work
Sax-Blue, for sopranino and alto saxophones and live electronic system, dates from 1982 and is dedicated to Daniel Kientzy. The required electronic system is composed by a Korg Stage Echo 500 (SE500) tape delay and a Korg S-2 Dual Footswitch and the performer is supposed to manipulate the Korg SE 500 during performance, either directly or via the foot switch.

In the score, passages written in proportional notation alternate with passages written in traditional notation with and without bar lines or metre and provides performance notes on how to set up, and an explanation of the symbols. These performance notes make reference to *Variants-invariants* (1982) from Costin Miereanu[3] for a more complete description of the use of the Korg tape delay.

7 | *Sax-Blue* example of Korg SE 500 settings in the score (adapt. from Jorge Peixinho, *Sax-Blue*). In this example we can see the tape head selected (E II), feedback and speed values (F.b.5, Sp 4) and footswitch position (right footswitch triggered).

3.2. | The context for the recasting
Portuguese saxophone player and teacher José Massarrão has played many of the works of Peixinho. In 2001, he decided to perform *Sax-Blue* in a concert, in July, at *Escola Superior de Música de Lisboa*. Difficulties in accessing a *Korg SE 500* led Massarrão and us to try to implement a simulation with Max/MSP, as a compromise to allow the realization of *Sax-Blue* under any circumstances.

The owner's manual [8] and the performance notes, written by Peixinho, were not sufficient to understand the operating mode of the *SE 500*. Neither those included *Variants-Invariants*. It was the same for the recording of work; the precious indications of Kientzy himself (at the time of a concert in Lisbon where he played *Sax-Blue*, in June 2001), helped us very much, especially from the point of view of certain musical passages. Finally, Minemier's article [11] added valuable technical information.

Consequently, the presentation of this version of *Sax-Blue* was the result of the assembly of all of these clues.

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3   Miereanu, Costin. *Variants invariants*, saxophone or clarinet with echo effects. Ed. Salabert, 1982.

3.3. | Description of the system

As previously mentioned, the system set-up consists primarily in a *Korg Stage Echo SE 500* driven by a *Korg S-2 Dual Footswitch*.

The *SE 500* is a tape delay allowing for delays ranging from 70 ms up to 1500 ms.

These delays are obtained through a tape head mechanism comprising 7 heads - one recording head, one erasing head and five playback heads - assigned to switches labelled "1" (70 to 130 ms), "2" (200 to 370 ms), "3" (400 to 750 ms), "Long Delay" (800 to 1500 ms) and "Sound on Sound". The latter is a special feature that allows previously recorded sounds to be heard with a delay ranging from 20 to 30 seconds. The user can hear different delays simultaneously, through switch combination and there are two other important controls: the rotary knobs "Speed" and "Feedback". "Speed" allows the delay time to be changed in an approximate rate of 1:2 and "Feedback" controls the amount of the recorded sound that re-enters the sound system.

The *S-2 Dual Footswitch* has two switches each with its own jack , and was primarily intended for use with the Korg drum machines. Here it is coupled with the *SE 500* external controls: one switch drives the "Effect" control (to switch off the playback heads) and the other the "Feedback" (cancelling the feedback effect – a single repeat).

3.4. | The Sax-Blue/SE500 Max implementation

We decided to design a set-up integrating all elements needed for the live Performance, according to the simplified block diagram shown in Figure 8.

Consequently, the main patch (see Figure 9) integrates the *Korg* tape delay, a reverb unit not mentioned in the score but heard in the recording (build on the *rev1~* abstraction from the *jimmies* library [16]) and operates also as a mixing console. It also includes a storage mechanism and has built-in performance features to control the *Korg SE 500* either through a step sequencer or MIDI controllers. The step sequencer contains a "coll" object, holding the instructions to trigger the actions on the echo chamber, and the MIDI controllers are assigned through a matrix to the Korg parameters.
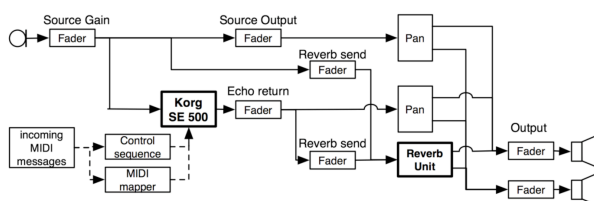
**8 |** Performing *Sax-Blue*: simplified block diagram of the set-up.
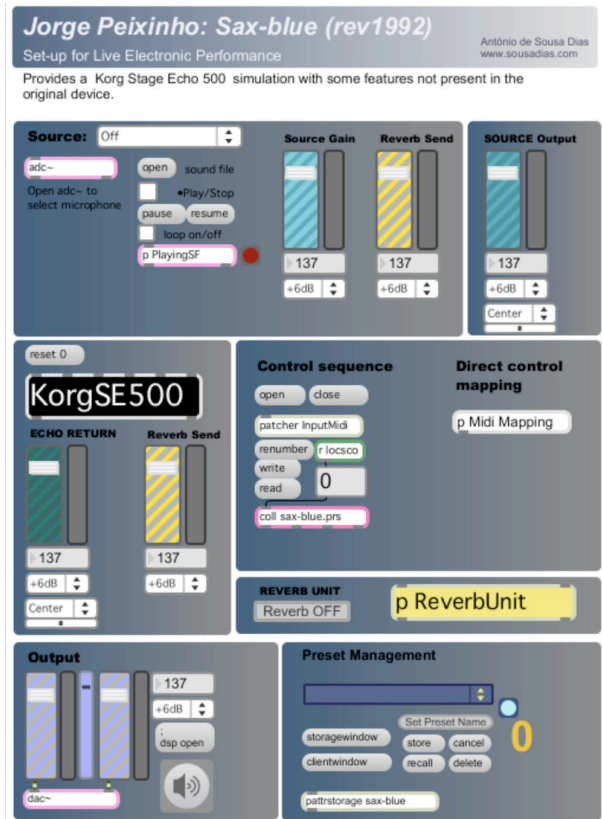
9 | The main window of the patcher *Sax-Blue-v5.maxpat* (according to Jorge Peixinho, *Sax-Blue*).

3.4.1. | The *SE500* patch

The *SE500.maxpat* patch simulates the behaviour of the *Korg SE 500* and can be used either as a Max/MSP abstraction or as a *bypatcher*. It looks like the front panel of the *SE 500* with some changes and adaptations.

This patch has 5 inlets corresponding to the 5 inputs of the *SE 500* (two audio signals and three command foot switches) and 2 outlets corresponding to the audio outputs. It contains one additional inlet for incoming external commands providing a mean of externally controlling the front panel.
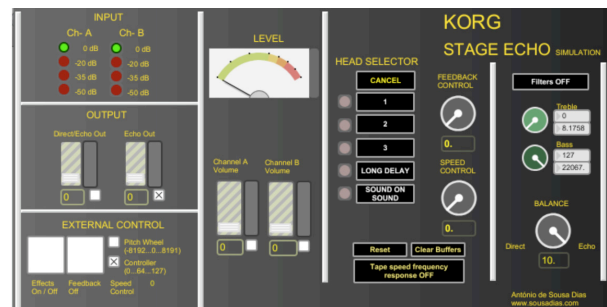
10 | The *KorgSE500.maxpat* patch main window (Max presentation mode).

Thus, all the parameters of the *SE 500* can be modified in real-time in two ways: direct patch manipulation (mouse or trackpad) or through remote command messages via the sixth input. In the case of *Sax-Blue*, these command messages are sent through the *Sax-Blue-v5.maxpat* patch where the *SE 500* patch is embedded.

The *EchoUnit* subpatcher contains the core code to the audio processing (Figure 11).

It is implemented as a delay line providing multiple access playback points. This is achieved through a combination of a "tapin~" object and five "tapout~" objects.

Despite the apparently straightforward appearance of the mechanism, we had to improve it with a tape compensation mechanism to avoid signal distortion and clipping. This mechanism takes into account the number of active heads and adjusts their gain accordingly. We also added a switch to bypass the filter, simulating the frequency response of 100-7500Hz at low speed and 100-14000Hz at full speed stated by Minemier [11] (we only consider the upper values).

3.4.2. | *The control features*

At the time we started this work, along with the design of the *SE 500* simulation, we faced an interface problem resulting from the modes of interaction between the performer and the footswitch and the head selector switches operation mode.

For a musician already performing an instrument on stage, it is not very comfortable to use a mouse, a trackpad or a keyboard to control a software device and at the time we had no MIDI controller available.

One possible solution was to implement a score-following system but we abandoned this idea in favour of the use of a footswitch. We think it establishes a minimal physical link between performer and computer, which can be considered roughly equivalent to the relationship between musicians when playing together.

To accomplish this we decided to implement a language conceived to describe the actions in the form of remote control messages. This language has a very simple syntax (for more information see Section 7.2 below) and it would allow all gestures made by
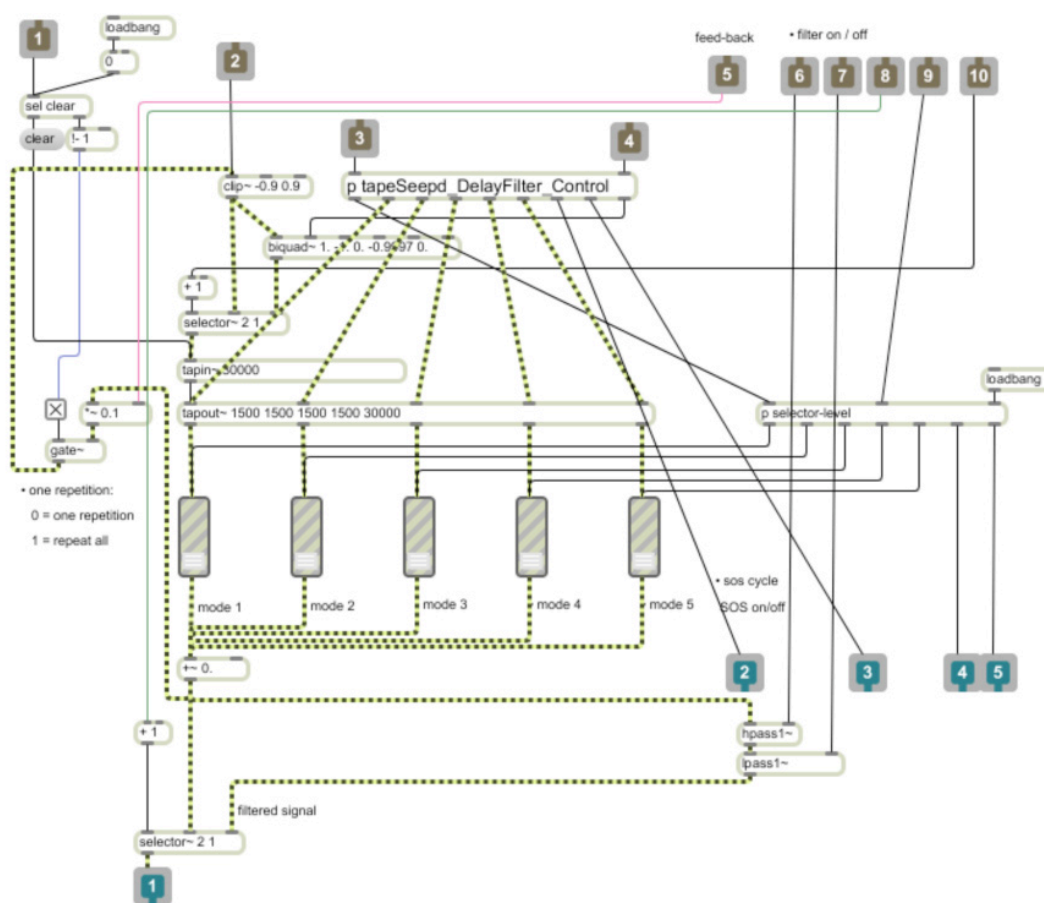
11 | Modelling of the *Korg SE 500* circuit (according to Jorge Peixinho, *Sax-Blue*): *EchoUnit* subpatcher - simulation of the tape playback heads.

the saxophone player to be translated into command line messages triggered by a MIDI foot switch. Next, we programmed a step sequencer to trigger one by one the command lines stored in a "coll" object labelled "sax-blue.prs". This step sequencer includes an algorithm reading several commands per line, to make it easier to control the device: the foot switch action triggers the reading of a line containing several actions.

Moreover, each action can be placed anywhere in this line: a gesture can be made up of multiple actions corresponding to a line containing multiple commands. That allows a better effectiveness concerning the creation, editing and debugging of the instructions

These instructions were triggered through the *InputMIDI* patch. This patch receives values sent through a sustain foot switch (assigned to controller 64). These values, 127 or 0, correspond to the modes ON or OFF. Value 127 (ON) triggers an accumulator that sends a command line number to perform the commands stored in that line and the value 0 (OFF) is not taken into account.

The decision to use only the value ON, was an ergonomic one: the foot switch easily available was a *Yamaha FC5 Sustain Footswitch* and the performer preferred to remain standing up. This is not a comfortable position in which to play such a small foot switch, not a very common device for musicians who do not play keyboard or guitar instruments.

Nowadays, we prefer a more suitable approach for a performer, using a MIDI controller like the *Evolution UC-33* because of its assignable buttons and rotary knobs along with footswitches. This is the reason that led us to implement a *Midi Mapping* subpatcher that allows an easy way of setting up the controls assignment.

3.4.3. | Remarks on the Korg simulation

This *Korg SE 500* simulation allowed an adequate performance in the strict framework of *Sax-Blue*. However, it presents certain limitations that prevent its generic use. In fact, further work needs to be done as, for example, the behaviour of the tape speed control mechanism is only approximate. The same applies to the feedback values and a more detailed study of the *SE 500* should be carried out in order to take into account its idiosyncrasies, since they can turn out to be relevant from a musical point of view. We have added some features and decided to make some changes. The possibility of bypassing the tape speed frequency response and the high and low pass filters can be an improvement but it raises some unanswered questions. We think that, in this case, rather than maintain a strict respect for the original machine behaviour it would be interesting to provide an optional way to get closer to the compositional idea of multiple delay line without "side effects". Other features added include a reset button and clear buffer button to clean the delay buffer.

One of the changes is significant as it introduces an important change in the score: the operating mode
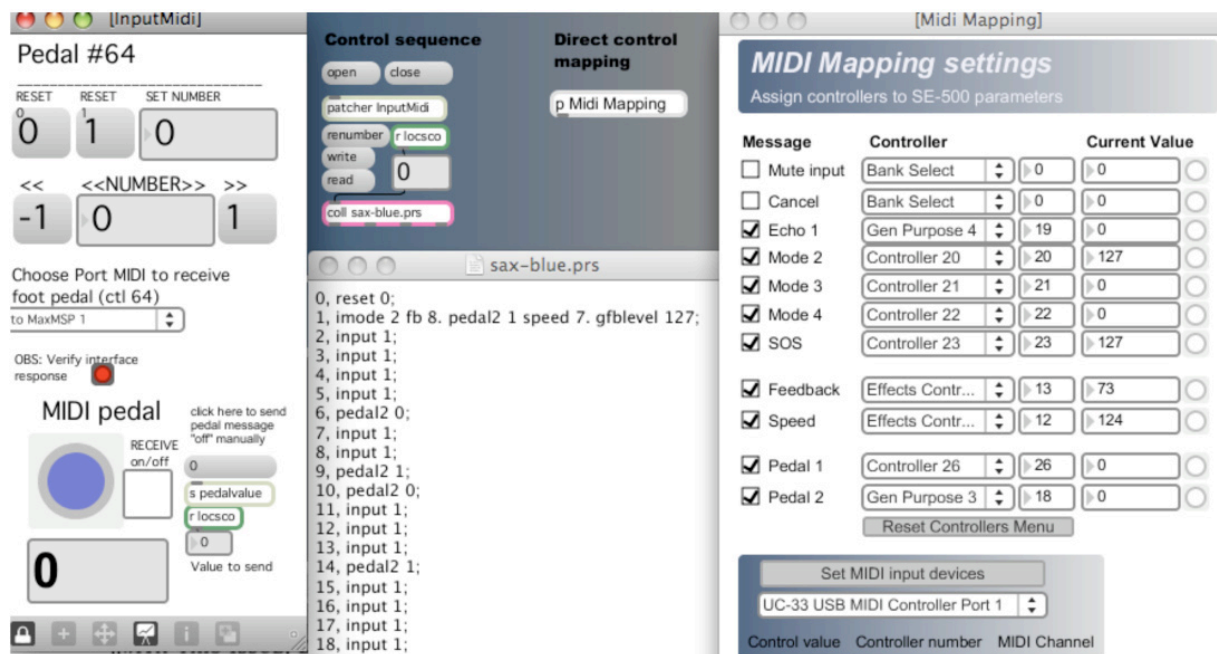
12 | Modelling gesture controls and the Korg SE 500 controls for Sax-Blue: (a) inputMidi patcher, (b) coll sax-blue.prs (example of a sequence emulating gesture control), (c) Midi Mapping patcher.

of the tape head switch selector. Normally, it behaves like this: selecting one head cancels all the others unless you press two or more of them at the same time. This behaviour was hard to simulate with only a foot pedal switch.

Accessing the computer through its usual interfaces (mouse, keyboard, and so on) did not help very much either. This is why we decided to program a totally independent behaviour for each head selection. However, the "Cancel" switch still operates as expected.

4 | CONCLUSION

We think the solutions presented here for the different versions of *Harmónicos* and *Sax-Blue* are suitable for performing these works and they provided a means of answering certain questions that arose concerning musical details. Further work needs to be done, as the documentation provided is very sparse and further system test and critical score edition waits to be carried out in order to fully met the requirements proposed by authors such as Bernardini and Vidolin [2].

These proposed solutions are not supposed to be used as general devices: they are just for the musical performance of the works in question. As an example of limitation, the tape delay system implementation for *Harmónicos* is designed to impose delay limits (6 to 8 seconds) as it contains a clipping setting that does not allow values outside these limits. The same applies for *Sax-Blue*: even if the *Korg SE 500* behaviour is simulated in general terms, it is tailored to *Sax-Blue* needs. We did not verify if it could be used to perform the work of Miereanu referred to above.

This contribution to preserve two works that used non-digital technologies has a very pragmatic sense: it aims to make the technological part of these works available to performers, thus allowing them to be performed in a wide range of circumstances. As Burns says, "Performance creates the opportunity to share the work with new audiences, and encourages close study of the music by performers" [1]. We believe that these works of Peixinho are interesting enough to deserve this opportunity.

5 | ACKNOWLEDGEMENTS

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7.1 | Harmónicos – Program notes by Jorge Peixinho

[s.d. – probably written after 1972 for a concert including Jorge Peixinho's *Estudo II* (*Sobre "As 4 Estações"*) (1970, rev. 1972) and Manuel Enriquez *Invenciones* (fl & vla, 1967)]

Concebida em 1967, esta obra utiliza como único material um reservatório de notas correspondentes aos nossos harmónicos de um som fundamental virtual (o Sol# ou Láb), adaptados por aproximação, é claro, ao sistema temperado. Cada instrumentista deve desenvolver da maneira mais imaginativa possível esse material, sem nunca sair do reservatório de base (ora formando estruturas "harmónicas" e "melódicas", ora agindo sobre o ritmo, a dinâmica, o tempo (andamento), o movimento direccional e até o timbre). Os instrumentistas devem ainda reagir ora reciprocamente, ora ao sistema gravação-reprodução que se sobrepõe ao jogo instrumental.

Conceived in 1967, this work uses as unique material a note reservoir corresponding to the harmonics of a virtual fundamental sound (G# or Ab), clearly adapted by approximation to equal temperament tuning. Each performer must develop this material in the most imaginative way possible, never getting out from the base reservoir (building "harmonic" and "melodic" structures, acting upon the rhythm, the dynamics, the time (pace), the directional movement and even timbre). The performers must also react either reciprocally, or to the recording-playback reproduction system that overlaps to the instrumental game. (our translation)

7.2 | Sax-Blue gesture transcription: Sequence control and command description
7.2.1 | The sequence control language

The syntax of the language designed to define the sequence to perform the gestures in Sax-Blue has the following structure:
<performance coll> ::= <line number> "," <instructions> ";" {<line number> "," < instructions > ";"}
<line number> ::= <integer value>
<instructions> ::= <statement> [<instructions>]
<statement> ::= <command> <value>
<command> ::= "fb" | "fbmove" | "gfblevel" | "input" | "imode" | "next" | "pedal1" | "pedal2" | "reset" | "sec" | "sos" | "speed"
<value> ::= <integer value> | <float value>

<integer value> ::= [+-]["0"-"9"]+
<float value> ::= ["+" | "-"]["0"-"9"]+ "."["0"-"9"]*

It models the required gestures indicated in the score to operate the *Korg SE 500* translating them in normalized text strings as shown in the following example:

[...]
53, speed 4. fbmove 9.;
54, input 1 fbmove 7000. sos 0 gfblevel 127;
[...]

7.2.2 | . Statement reference
1. fb
Controls the Feedback knob. Argument values range from 0. to 10.

Syntax
   fb value
Example
   fb 5
Score equivalent
   F.b.

2. fbmove
fbmove models a gesture of rotating the Feedback knob. An argument value greater than 10. sets the ramping time in ms and a value between 0. and 10. sets the feedback value. The behaviour is dependent of context. To successive values lesser than 10. cause a smooth movement between the two values according to last ramp time. A value of zero causes movement from the last feedback value to move down to zero and return to departure value in the ramp time value settled.

Syntax
   fbmove value
Example
   fbmove 5.
Score equivalent
   Picture showing movement of feedback knob. 15 /17

3. gfblevel
   gfblevel sets the default playback head level setting. An argument value of 127 sets all gain sliders to the 0 dB position.

Syntax
   gfblevel value
Example
   gfblevel 127

Score equivalent
> Not used

4. input
input mutes the input channels A and B. Muted "off" (0) or "on" (1).

Syntax
> **input** value

Example
> **input** 0

Score equivalent
> Not used.

5. imode
imode switches tape heads on / off. It takes two arguments: <head number> (1...5) and <status> (0-1)

Syntax
> **imode** head_number [status]

Example
> **imode** 1 0

Score equivalent
> E II, E 4 or E IV, SOS, STOP SOS, etc.

6. next
Causes an immediate jump to the sequence line number given as argument. Used for sequence performance only: it is ignored by the *SE 500*.

Syntax
> **next** line_number

Example
> **next** 0

Score equivalent
> Not used.

7. pedal1
Effect pedal control: pressed (1) or depressed (0). 16 /17
Syntax
> **pedal1** value

Example
> **pedal1** 0

Score equivalent
> Diagram showing pedal status (left rectangle).

8. pedal2
Feedback pedal control: pressed (1) or depressed (0).

Syntax
> **pedal2** value

Example
> **pedal2** 0

Score equivalent
> Diagram showing pedal status (right rectangle).

9. reset
Resets Korg SE 500 parameters and values according to mode provided as argument: 0 resets the whole patch whereas an input argument value 1 clears only the delay buffer.

Syntax
> **reset** value

Example
> **reset** 0

Score equivalent
> Not used.

10. sec
Section mark. Used as a comment for sequence performance only: it is ignored by the SE 500.

Syntax
> **sec** value

Example
> **sec** 2

Score equivalent
> Not used.

11. sos
Argument values 0 or 1 switch off or on the Sound on Sound feature. Equivalent to an "**imode 5**" statement.

Syntax
> **sos** value

Example
> **sos** 1

Score equivalent
> SOS, SOS STOP.

12. speed
Controls the Speed knob. Argument values range from 0. to 10.

Syntax
> **speed** value

Example
> **speed** 5

Score equivalent
> Sp