

# 'Soffitto' (2008)

*Hans Roels*

for live performer (midi keyboard),  
computer and the music robots  
'Qt' (automatic organ) and 'Xy' (automatic xylophone)

## Necessary files, software and hardware

### Software:

**Pure Data (Pd):** live audio software, free open source program. The core of Pd is written and maintained by Miller Puckette and includes the work of many developers. Pd versions exist for Windows, IRIX, GNU/Linux, BSD and MacOS X. Pd can be downloaded on <http://puredata.info/> (chose Pd-vanilla, not the extended version). Pd version 0.40-2 was used for this composition.

**Python:** a free and open source multi-platform programming language. You can download it at [www.python.org](http://www.python.org)  
Python version 2.4.3 (march 2006) was used for this composition.

**Py/pyext : Python external** (made by Thomas Grill) that enables the use of Python within the Pure Data program. You can download this at <http://grrrr.org/ext/> (or <http://grrrr.org/ext/beta/pd/>)

### Files:

**soffitto-1.pd: the Pd-file for this composition**

**glisclus7.py: the Python-file for this composition.** Place this file together with the python-external in your extra-folder of Pd (depends on where you have installed Pd on your computer...).

There are two optional files ([sasantawavepoly.pd](#) and [sasantawave.pd](#)) that you can put in the same folder. These two files aren't necessary to play 'Soffitto' with Qt and Xy, these synthesizers (poorly!) imitate the music automats and were mainly used for debugging. But they might be useful to play a first, simple tryout of 'Soffitto'.

### Hardware:

You need the two music automats -built by Godfried-Willem Raes- for this composition! These automats are: **QT - a quarter tone organ** and **Xy - a quarter tone xylophone**. You can find more information about these robots and their builder at [www.logosfoundation.org](http://www.logosfoundation.org)

You also need **a midi keyboard** with 5 or 6 octaves, 8 controllers (8 buttons and 2 sliders) and a sustain pedal.

Some additional information about these two automats:

The range of the Qt-organ is from midi note 36 to midi note 108. The organ isn't sensitive to loudness or velocity but the wind pressure can be adjusted (lower pressure results in a softer and lower pitch (the timbre also changes).

The range of the Xy-xylophone is smaller, from midi note 65 to midi note 108. This instrument has velocity sensitivity.

## User Interface – how to play ‘soffitto’?

*(The \*numbers refer to the numbers in the screen-picture in ‘Panel of soffitto Pure Data file’ – see further)*

‘Soffitto’ is a algorithmic composition. When the performer plays on the midi keyboard, algorithms change or add material to this input and this changed material is sent to the two music automats Qt (organ) and Xy (xylophone). **The algorithms are grouped into 8 parts based on presets of these algorithms. Each part has a different character and the performer may use these parts in any sequence. Parts may be omitted or repeated ad libitum.** With these parts the performer can build an overall structure to the composition. A note that is played on the keyboard, is counted (\*9) and on the computer screen (\*6) one can see what is going to happen with the next 8 notes (this means: one can see which algorithm will be applied to the following notes). Only notes longer than one second are counted, so you can make fast repetitions of the same algorithm by playing fast notes.

**There are two main groups of algorithms** that change the performers input and one ‘normal’ mode:

**‘norm’ = normal**, what you play on the keyboard is passed on more or less unchanged to the Qt-organ. Exceptions: the pitch may be transposed in certain parts or adjusted to the right quarter-tone scale and the part/preset 5 also plays fast repetitions on the Xy(lophone) automat.

**‘clus’ = cluster** on Xy and QT based on the pitch of the midi keyboard, higher velocity on your keyboard results in a cluster with a wider range.

**‘glis’ = generates glissando-like motives** based on the input-pitch. A lot of variations of this algorithm are used in the different parts/presets. **A soft velocity on the midi keyboard always results in the QT-organ that plays the algorithmic motives, a high velocity enables the Xy-xylophone to play.**

One can also adjust **the wind pressure** of the Qt-organ (mostly applied in the ‘normal’ mode -no algorithm resulting in sustained tones on this organ- or with the algorithmically generated chords - see further). There are 2 ways to alter the wind pressure during the performance.

1. **By pushing the sustain pedal (controller number 64).** This starts or stops the reading of a table (\*7) with values for the wind pressure.
2. **By modulating a slider (controller number 29 in the Pd-file)** that adds or subtracts small values to the values from this table.

One can also switch on the generation of algorithmic **chords**. Which chord is chosen depends on the pitch that you play on the keyboard and on rules about the sequence of chords that are part of the algorithm and that can’t be changed. There are two ways to switch on these chords by means of sliders. These also control the range and the pitch limit of these chords.

1. **Controller 19 (values 0 to 127) switches on the chord algorithm** from the moment that the value is higher than zero. When the value is low, then the chord algorithm chooses one or a few notes from a chord in the lowest range of the chord range (that you see on the computer screen \*3). Higher values result in chords with more notes and with a wider range.

2. **Controller 18 (values 0 to 127) works in the opposite way of the previous controller and switches the chord algorithm on** from the moment that the value is lower than 127. With high values, a 'thin' chord in the highest register is created, lower values result in thicker chords with a wider range.

The parts or presets only change the harmonic rhythm or the speed (f.e. every 5 notes with a random deviation of 2 notes) at which a new chord is chosen. When you switch off the chord algorithm (by moving controller 19 to 0 or controller 18 to 127) the chord will stop after this number of notes has passed.

You can force the Qt organ to play a new chord without playing a note on the midi keyboard by moving **controller 16**. This creates a chord based on the previous pitch, this can be used if one wants to create a purely harmonic sequence (without other algorithms or motives).

The **pitch** that is played on the midi keyboard is adjusted in two ways:

1. it is adjusted to certain quarter tone scales (therefor the E and F result in the same pitch), in some parts this scale is transposed 3 or 6 semitones downwards. So take care that in these parts you are still within the right range for Qt and Xy (see 'Files, soft- and hardware') or you won't hear anything!

2. the wind pressure of Qt also adjusts the pitch. A lower pressure lowers the pitches that are sent to the Xylophone automat.

These are the scales that are used in 'Soffitto'. Part 1, 2, 6 and 8 use scale 1. Parts 3,4 and 5 use scale 2 and part 7 uses scale 3.

The image displays three musical scales, labeled 'scale 1', 'scale 2', and 'scale 3', each presented on two staves. The top staff of each pair is labeled 'sounding:' and the bottom staff is labeled 'midi keyboard:'. Scale 1 is a major scale (C-D-E-F-G-A-B). Scale 2 is a major scale with a lowered 3rd degree (C-D-Eb-F-G-A-B). Scale 3 is a major scale with a lowered 6th degree (C-D-E-F-G-Ab-B). The notes are written in a rhythmic pattern of quarter notes.

There is **one 'emergency' button (controller 82) that sends an 'all notes off' message** to the Qt organ.

**This is a short description of the 8 parts** that can be used:

Part 1 (controller 74). The 'normal' mode is used mainly in this part. After a while there are a few 'glissandi'-algorithms (fast random notes, range of 3 semitones above and under the input pitch, slow repetitions after the 'glissandi' motives if a note is sustain long). Chords change slowly (average harmonic speed of 7 notes) in the upper half of the range.

Part 2 (controller 2). Mainly 'normal' mode but also some 'glissandi' (more than in part 1). Characteristics of these glissandi: fast random notes, range of 4 semitones above and under input pitch, slow repetitions after the 'glissandi' motives if a note is sustained long. Chords change moderately fast (average harmonic speed of 5 notes) in the upper half of the range.

Part 3 (controller 71). 'Normal' mode and 'glissandi' and 'cluster' algorithms are used more or less equally. All incoming pitches are transposed 3 semitones downwards. Characteristics of the glissandi: fast notes partly random and partly based on the last five pitches that you played, range of 4 semitones above and under input pitch, moderate ritenuto repetitions after the 'glissandi' motives if a note is sustained long. Chords change fast (average harmonic speed of 3 notes).

Part 4 (controller 10). Mainly 'normal' mode and 'glissandi' algorithm. All incoming pitches are transposed 3 semitones downwards. Characteristics of the glissandi: very fast notes, very narrow range of 1 semitone above and under the input pitch, constant moderate repetitions after the 'glissandi' motives with sustained notes. Chords change slowly (average harmonic speed of 6 notes).

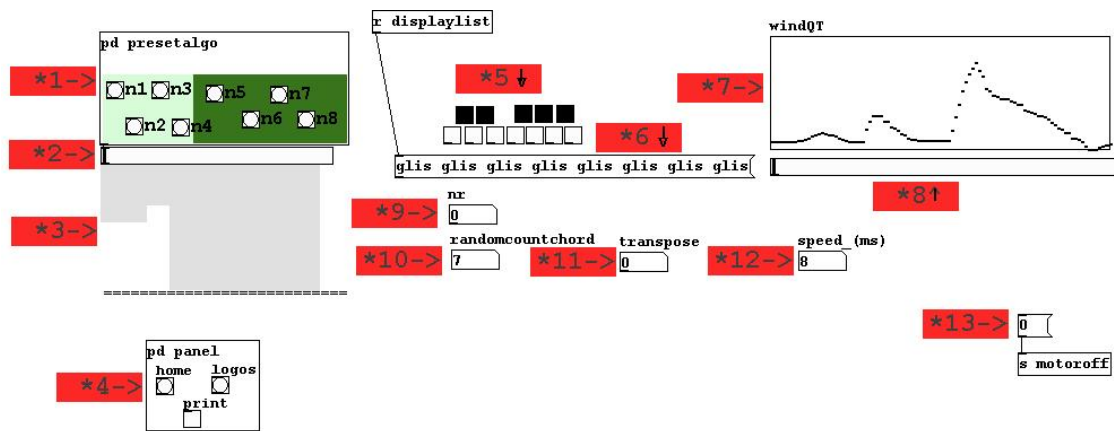
Part 5 (controller 81). Mainly 'normal' mode and some 'glissandi' algorithms. All incoming pitches are transposed 3 semitones downwards. In the 'normal' mode Xy also plays (very fast repetitions). Characteristics of the glissandi: fast motives based on the last five pitches that you played, the motives aren't just glissandi: other pitches are inserted, range of 3 semitones above and under the input pitch, fast constant repetitions after the 'glissandi' motives if a note is sustained long. Chords change fast (average harmonic speed of 3 notes).

Part 6 (controller 5). Almost only 'glissandi' algorithms. No transposition. Characteristics of the glissandi: fast motives based on the last five pitches and on pitches before that, the motives aren't just glissandi: other pitches are inserted, range of 3 semitones above and under input pitch, very fast constant repetitions after the 'glissandi' motives if a note is sustained long. Chords change very fast (average harmonic speed of 2 notes).

Part 7 (controller 91). Almost only 'glissandi' algorithms. All incoming pitches are transposed 6 semitones downwards. Characteristics of the glissandi: very long glissandi with a wide range based on the last five pitches, very fast constant repetitions after the 'glissandi' motives if a note is sustained long. Chords change moderately fast (average harmonic speed of 5 notes).

Part 8 (controller 21). Almost only 'clusters' and after a while a few 'glissandi' algorithms. No transposition. Characteristics of the glissandi: very long glissandi with a wide range based on pitches played more than five notes before, accelerando moderately fast repetitions with sustained notes. Chords change very fast (average harmonic speed of 2 notes).

## Panel of the 'Soffitto' Pure Data file



- \*1. If you use the controllers for the presets, this buttons turn black for a moment. The four presets in the light color, are the presets which are more or less 'relaxed', the ones in the darker green are more active. (see also 'User Interface')
- \*2. This fader shows which preset you are using at the moment.
- \*3. This grey canvas shows the range of the chords (see 'User Interface' - chords). The full range of the chords is from midi note 36 to midi note 108. Preset 3 f.e. has a small range in the high register.
- \*4. Click on 'logos' if you are playing with the Qt and Xy music automats, click on 'home' if you want to play with two software synthesizers in PD that (poorly) imitate these automats (see also 'Necessary files software and hardware')
- \*5. This simple piano keyboard shows the chord that the chord-algorithm has chosen. This is transposed in the same amount as your midi keyboard.
- \*6. This bar shows which algorithm will be applied to the next 8 notes that you will play.  
'norm' = normal (played on QT-organ automat)  
'glis' = glissando-like algorithm (soft velocity -> QT-organ, high velocity -> Xy-xylophone)  
'clus' = cluster on Xy and QT, higher velocity on your keyboard results in a cluster with a wider range
- \*7. This is the table with the values for the wind pressure of the QT-organ. (You can read the values in this table with the sustain pedal - see 'User Interface')
- \*8. This fader shows the exact place at which you are reading the table with wind pressure values.
- \*9. The number box 'nr' shows the number of the note you have played (counting the notes you have played per part/preset)
- \*10. The number box 'randomcountchord' shows the speed at which the chords change. F.e. '5' means that on average per 5 notes that you play on the keyboard a new chord is chosen.
- \*11. The number box 'transpose' shows the amount of transposition that is used in the present part/preset.
- \*12. The number box 'speed' shows the speed of the glissandi and repetition algorithm of the part/preset that you are in.
- \*13. Click on '0' to turn off the motor of the QT-automat (at the end of the piece if necessary - the organ is turned on automatically when you open the main file).