

TOCCATA
for found objects and computer
www.joowonpark.net/Toccata.pdf

performance guide by Joo Won Park

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I. Introduction

Thank you for considering to play Toccata. This document will serve as a technical and aesthetic guideline to perform the piece.

Toccata is a solo live electroacoustic piece featuring found objects on a contact microphone. As a solo performer, you will make sounds by touching non-musical objects in different ways (scratching, tapping, plucking, rubbing, etc). The sound of those objects are picked up by a contact microphone, and are digitally processed with different combination of effects I made with SuperCollider (a free text-based audio synthesis program).

I wrote this piece to explore combinations of acoustic sounds and their electronically processed counterparts in a live situation. It is best to demonstrate the piece by watching video recordings.

<https://vimeo.com/13886896>
<http://youtu.be/IzdOdHHesVA>

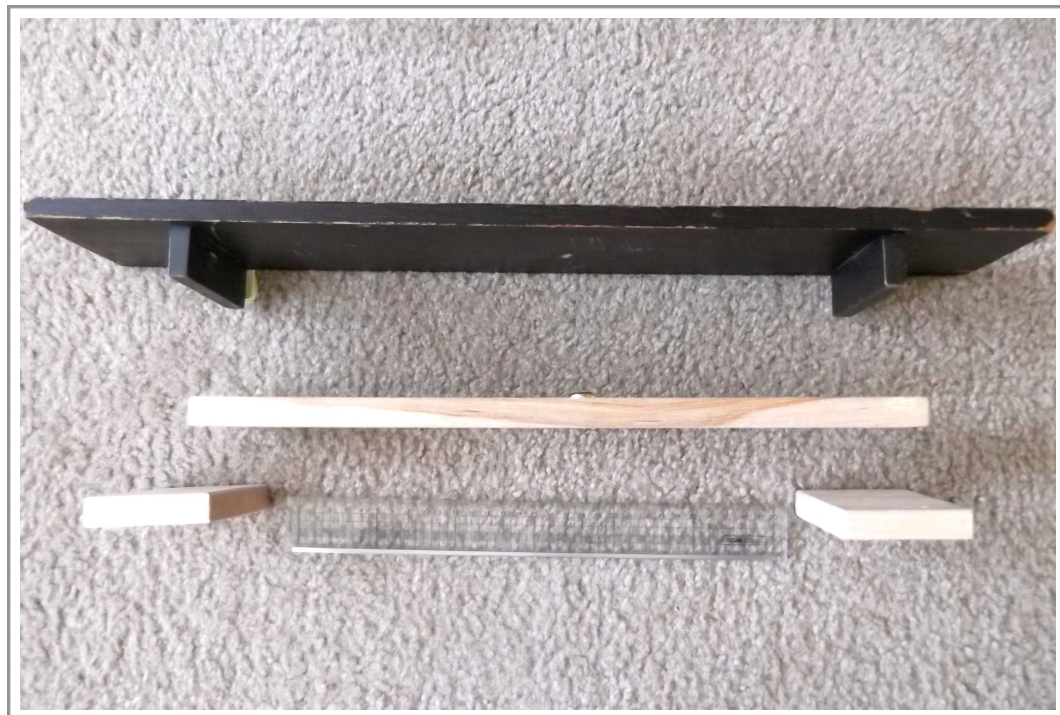
II. Preparation

You do not need an extensive technical background to perform Toccata. Any musicians with open ears and a small set of digital audio gear will be able to play the piece.

As for the **hardware**, you will need the following.

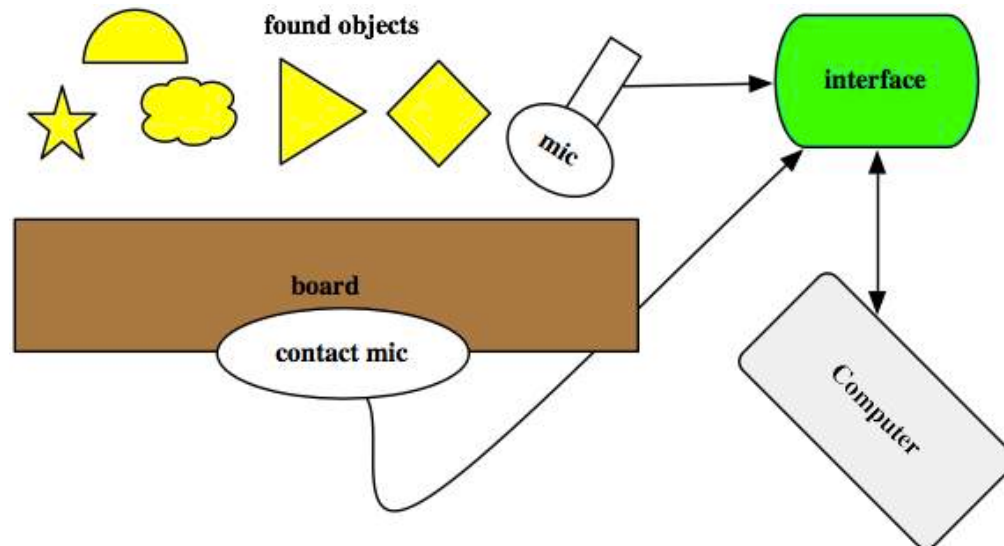
1. Macintosh computer: Any computers purchased in the last 2 years should work.
2. Audio interface: The interface should be able to receive two audio inputs and send stereo outputs. An interface with a good preamp is preferred.
3. Contact microphone: Contact mic converts vibration of a solid object into sound. Korg CM-100 is a sturdy and affordable model if you do not know how to make your own. CM-100 also has a clip so you can mount it easily (<http://bit.ly/OjyGGc>). You can also make your own contact microphone if you are into DIY (<http://bit.ly/KMY1o3>).
4. Dynamic or condenser microphone: any kind of dynamic or condenser microphone will do the work. This equipment is optional. As you have seen in the first video demo, Toccata can be played with a contact microphone only.
5. Wood board: A thin board with a short leg is ideal. The board is the main sound generator of the piece. Get a board that sounds loud and resonant when tapped with fingernails. The pictures on the next page are the two boards I use currently. I put a 12" (30cm) ruler as a reference. I found the dark one in a garage. My guess is that it is a part of a bookshelf. The light one is a part of a shelf I bought at IKEA for less than \$10 (<http://bit.ly/LLkJAj>). The board with thickness of 1/4"-1/2" works well.
6. Found objects: Gather about 10+ objects that make interesting sounds when hit or touched. Remember that contact microphones receive and amplify vibration of a solid object. Try to choose ones that will make contrasting sounds when they are in contact with the wood board. Examples of good sound sources for a contact mic are plastic ruler, slinky, credit card, coin,

rock, wind-up toys, rubber band, nail, bicycle chain, etc. Examples of good sources for a regular microphone are violin, trumpet, voice, harmonica, etc.



As for the **software**, download and install SuperCollider from www.audiosynth.com. Then download *Toccata.scd* patch from www.joowonpark.net/Toccata.scd. Both the program and the patch are free. SuperCollider can run on any platform and OS, but the patch is designed for Mac. As of December 2012, I am running version 3.6.

Below is a diagram of a possible **stage setup**. Place the board and found objects on a table. Put the computer on the side of the table so that the visual focus of the audience is on the found objects instead of the computer. Both found objects and the computer should be easily reachable during the performance.



To **run the patch** for Toccata, follow these steps:

1. Connect computer, interface, and microphones. Firmly attach the contact microphone to the board.
2. Launch *Toccata.scd* using SuperCollider. The best way to do this is to drag *Toccata.scd* to SuperCollider application icon. If you double click the file, you may open other text editing program.
3. Select all text in *Toccata.scd* and hit *enter*, not *return*. For laptops, you can hit *shift+enter* or *fn+enter*. A GUI window will open at the right-top corner when this step is done properly
4. On the GUI window, click *StartSuperCollider*. Wait for few seconds or until your localhost window on the bottom-left corner has *running* sign.
5. Click *LaunchToccata*. A control panel window should popup in the center of the screen.
6. Click *StartToccata*. You should hear a sound when you tap the microphone. If the sound is too weak or inaudible, increase the gain. Contact microphone usually needs a high gain.
7. To stop the patch, hit *command+period*. Repeat steps 4 though 6 to restart the patch.

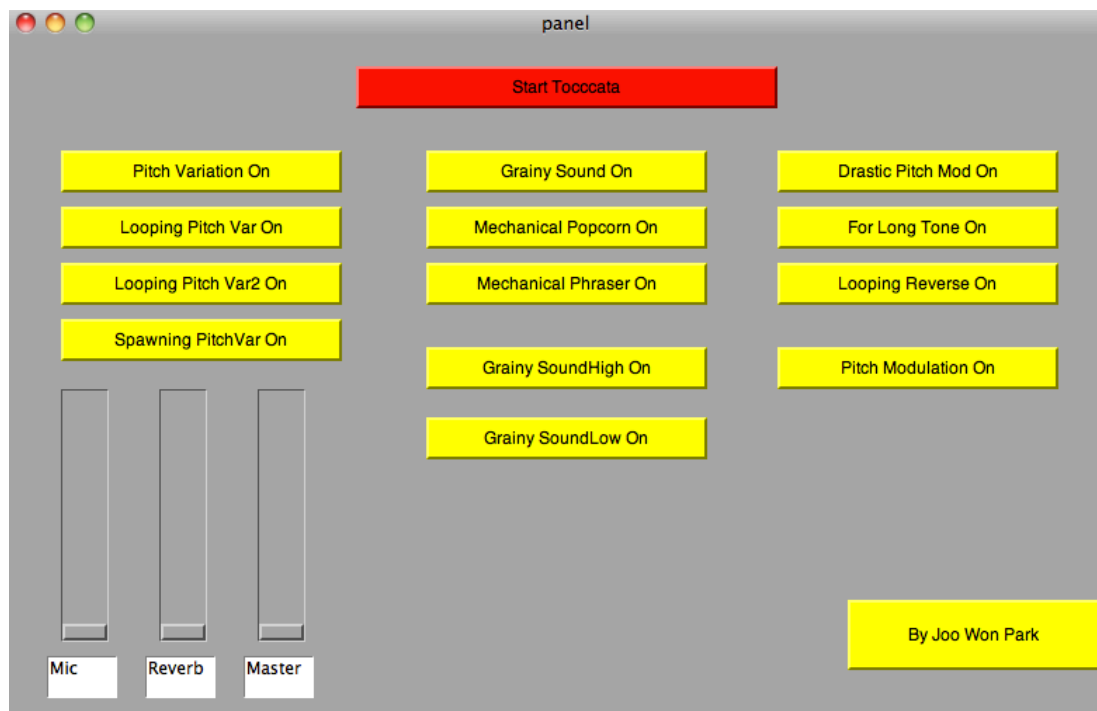
If you are having trouble getting the sound, here are some **trouble shooting tips**:

1. Make sure to connect all the hardware before launching the software. For example, connect the audio interface before launching SuperCollider.
2. Putting the computer to sleep will often disrupt the connection between the audio interface and SuperCollider.

- If you get the following error message when booting the patch, change your audio interface's sampling rate to match that of SuperCollider (default is 44100)
input and output sample rates do not match. 44100 != 48000
- Do NOT boot SuperCollider by clicking the *Boot* button on the localhost server. You will run out of memory. Booting with *Toccata.scd* will customize the memory allocation.
- If you get a parse error, you probably have incorrectly modified *Toccata.scd*. If this is the case, revert to the original file or download the file again from the web.

III. Performance

For a start, I suggest to just play around with the patch. Click any buttons on Toccata control panel and hear how it changes sound received by the microphones. Once the feeling of novelty is gone, it is time to go beyond “making cool sounds” and make a musical composition. This section will help you to achieve that goal.



The following list explains **function of effect buttons and faders**. All buttons have multiple states that change the parameter of each effect processor. Most of the effects also have short volume fadein and fadeout.

- *Mic* slider: controls the level of the unprocessed original signal
- *Reverb* slider: controls the balance between reverb and dry signal. 0% is dry signal only. 100% is reverb only.
- *Master* slider: controls the master volume.
- *Pitch Variation*: randomly varies pitch of the input. It has on, off, and reset states.
- *Looping Pitch Var*: random pitch variation with loop function. It has on, start looping, off, and reset states.

- *Looping Pitch Var2*: random pitch variation with loop function. It has on, start looping, off, and reset states.
- *Spawning Pitch Var*: random pitch variation with loop and iteration. It has on, start looping, start spawning, off, and reset states. When *Spawning PitchVar Spawn* button is clicked, the looped segment will be randomly pitch shifted 10 more times. This effect is useful in making a thick texture from one sound source. This process is also memory intensive, and should be used only a few times (3 or less) per performance to avoid a possible crash.
- *Grainy Sound*: pseudo-granular synthesis texture. It has on, off, and reset states.
- *Mechanical Popcorn*: series of random pitch shifts with comb delays and noise generator. Delay time of the comb delays gradually decreases over 10 seconds with pops and clicks, creating a pitched percussive artifacts. It has on, start looping, off, and reset states. The off button triggers a long fadeout.
- *Mechanical Phraser*: series of pitch shift with comb delays. Delay time of the comb delays are modulated with low frequency oscillators. It has on, start looping, off, and reset states. The off button triggers a long fadeout.
- *Grainy SoundHigh*: pseudo-granular synthesis texture with pitch shift to a higher register. It has on, off, and reset states.
- *Grainy SoundLow*: pseudo-granular synthesis texture with pitch shift to a lower frequency. It has on, off, and reset states.
- *Drastic Pitch Mod*: intense pitch modulation with low frequency oscillator. It has on, off, and reset states.
- *For Long Tone*: the source is split into two different pitches and are automatically changing stereo positions. It has on, off, and reset states.
- *Looping Reverse*: reversed random pitch variation with loop function. It has on, start looping, off, and reset states.
- *Pitch Modulation*: subtle pitch modulation with low frequency oscillator. It has on, off, and reset states.

The following **aesthetic directions** will help you shape the performance of the piece:

1. The piece is improvisational, but you should practice the different combination of found objects and effect processors beforehand. The goal of the practice is to learn and internalize the sonic possibilities of your tools. Get thoroughly acquainted with the different effects triggered by each button so that you don't have to read the text on the computer screen. Trying to figure out the function of the buttons during the performance is not recommended.
2. Try various ways of touching found objects. Contact microphones pickup small sounds with less chance of feedback than other microphone. It will pickup and distinguish sounds of rubbing, scratching, pressing, etc of objects made with different materials. Metal objects produce high-frequency hits and scratches. For example, plastic cards make screeching noises when scratched quickly on the wood board. Writing with a chalk produces a resonant hit.
3. Combination of different sounds are crucial elements of the piece. Aim to have at least two effects running at the same time. It is common to have 5-6 effects running simultaneously. Try to play more than one found objects. Try to produce different tones from a single object while running multiple effects.
4. Try using looping function of some effects to make layers of different timbres.
5. The overall sound should be intimate and aggressive. Do not use too much reverb. Stay dry for the most of the performance for better presence of the sound.

6. Try to be in hectic and nervous mood. The performer should avoid making drones, repetitive rhythms, or meditative moments. Fast, loud, and violent gesture is preferred over slow, soft and gentle one. Do not play one found object for a long time. Change the sound sources quickly.
7. The duration of the piece becomes longer as you have more found objects. I have had a performances that lasted 5 minutes to 30 minutes depending on the number of found objects. The picture below is a setup for 20 minute Toccata set. The audio file link is an example of a long version with slower development than the video recordings in the previous section.



<http://soundcloud.com/joowon/live-at-ccptv>

IV. Contact

For any questions or comments, contact me, Joo Won Park. If you are using this piece for a class project or a concert, please give me a proper credit as a composer of the piece. I believe that instrument/software design is a part of a compositional process in electronic music composition. Please give me proper credits if you are modifying the *Toccata.scd* patch for other uses.

Thank you,

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