SANJO GAYAGEUM

Operation Manual Version 1.0
Icebreaker Audio 2014

1 CONTENTS

2 WELCOME TO SANJO GAYAGEUM

Thank you for purchasing **SANJO GAYAGEUM** from **ICEBREAKER AUDIO**. This guide will show you how to use the included instruments, give you an overview of the controls and offer some useful hints and tips along the way.

I personally hope you enjoy this release and find it to be an inspirational addition to your musical toolkit.

2.1 SYSTEM REQUIREMENTS

- PC/Mac running Native Instruments **Kontakt 5.3.0** or higher.
  SANJO GAYAGEUM does not run in **Kontakt Player**, only the full version of **Kontakt**.
- 1.2GB Free Hard Drive Space
- 300MB Available RAM

More information on Kontakt can be found on the Native Instruments website:
http://www.native-instruments.com/en/products/komplete/synths-samplers/kontakt-5/

3 ABOUT THE LIBRARY

SANJO GAYAGEUM is a multi-sampled instrument designed to re-create the sound of the traditional Korean stringed instrument of the same name.

3.1 WHAT IS THE GAYAGEUM?

The Gayageum (가야금 – also Romanised to *Kayageum* or *Kayagŭm*) is a traditional stringed instrument from Korea. It is a close relative to the Japanese Koto and the Chinese Guzheng. Like these instruments, it is a zither with movable bridges and is played by plucking the strings with the right hand and bending them with the left hand.

1 A WOMAN PLAYING THE GAYAGEUM.
IMAGE COURTASY OF THE ENCYCLOPÆDIA BRITANNICA.

There are three main kinds of Gayageum:

- The *Court Gayageum* is the oldest variant, it has 12 strings.
- The *Sanjo Gayageum* also has 12 strings, but they are spaced closer together to allow for faster playing styles. The Sanjo Gayageum design evolved in the 19th century with the emergence of Sanjo music. This is the Gayageum on which this library is based.
- The *Modern Gayageum* can have anywhere between 13 and 25 strings. They are usually made much larger in order to accommodate the extra strings.

3.2 SANJO MUSIC AND PLAYING STYLE

Sanjo (산조 – literal translation: *Scattered Melodies*) is a folk music of Korea that developed in the late 19th Century. Sanjo takes the form of an instrumental style in which a solo instrument is accompanied by an hourglass shaped drum called a *Janggu*. It is semi-improvised – players take set melodies and adapt them to their own style.

A Sanjo often starts slow and contemplative, and then gradually picks up speed before ending in a virtuosic flourish. During the music, the drummer, and sometimes even the audience, might make exclamations, called *chuimsae*, to let the musician know they're doing a good job.

2 A GAYAGEUM PERFORMANCE
PHOTO BY FLICKR USER DALCROSE

The Sanjo Gayageum is generally played with the thumb and the first two fingers of the right hand. The player can pluck or flick the strings and, during faster passages, can make use of a double-flick technique. The pluck + double-flick technique often leads to a 3/4 or 6/8 feel, though sanjo tends to have no strict meter.

The left hand is used to bend the notes or to create vibrato. The vibrato of the Korean Sanjo tends to be very intense and pitch rarely stays static for long.

Compared to other oriental traditional music styles, Sanjo is very percussive and almost aggressive at times. The strings can be plucked and flicked hard enough to slap or buzz and the almost constant vibrato gives an unsettled feel to the music.

3.2.1 TUNING

The Sanjo Gayageum is tuned in a pentatonic scale. The western equivalents of the notes are (from low to high):

G – C – D – G – A – C – D – E – G – A – C – D

The Court Gayageum is tuned to the same scale tuned 3 semi-tones lower (starting on an E).

Both the Sanjo and Court tunings were sampled for this virtual instrument.

3.3 LIBRARY FEATURES

3.3.1 SAMPLE INFORMATION:

- Over 1500 samples.
- All samples were recorded at 24bit/48kHz quality.
- 2.84GB uncompressed audio files.
- 1.15GB compressed sample size (using lossless .ncw compression)
- All 12 strings of the Sanjo Gayageum were sampled with two different tunings and using the two main playing styles (pluck and flick).
- Each sampled articulation features a minimum of 3 round robins and between 6 and 14 velocity layers.

3.3.2 INSTRUMENT FEATURES:

- Advanced pitch-bend control
- Tuning control for each string
- Ability to mix between two microphone positions
- Repeat Mode and Auto-Repeat functions
- Mixer effects including EQ, Transient Master, and Tape Simulator
- Delay and Convolution Reverb effects
- 12 Custom Impulse Responses

4 USING THE INSTRUMENTS

The library contains two main instruments:

- **Sanjo Gaygeum (traditional)**
- **Sanjo Gaygeum (chromatic)**

The chromatic instrument plays like a standard MIDI instrument, with each key matching the note played.

The traditional instrument is designed to be played more like a real gayageum.

Only the features of the traditional instrument will be covered in this manual, as the chromatic version has many of the same features only with a more familiar key mapping.

4.1 KEY MAPPING

3 THE KEY MAPPING FOR THE TRADITIONAL INSTRUMENT

The 12 white keys from **C1** to **G1** trigger the 12 strings. C1 corresponding to the lowest string, and G1 to the highest.

G0 and **A0** are key-switches that can be used to control the playing technique in real-time:

- **G0** – Plucked Mode
- **A0** – Flicked Mode

By holding one of the above keys, you will override the setting of the **Repeat Mode** menu. Releasing the key will return the playing mode to the **Repeat Mode** setting.

4.2 THE INSTRUMENT INTERFACE

When you first load the instrument into the Kontakt rack, you will see the main interface.

4 THE SANJO GAYAGEUM INTERFACE

Most of the controls are hidden and can be accessed by using the buttons along the left of the instrument.

Presets are readily available from the main interface. There are 3 preset menus:

- **Mixer Presets** – located below the **Mixer** button. These change the sonic character of the instrument.
- **Scale Presets** – these presets change the main tuning of the strings. In other words, which note is assigned to each string.
- **Tuning Presets** – these select a fine-tuning method for the strings.

Note that the Chromatic version of the instrument does not offer the tuning controls or preset menus.

4.2.1 SCALES & TUNING

The interface allows you to tune each string individually in different ways:

- You can click and drag on the virtual *Anjok* (movable bridges) under the strings.
- Below the strings are controls for setting the note and tuning amount for each string.
- To the left of these controls are menus for selecting Scale and Tuning presets.

Holding the [Alt] key while using the Note controls or Anjok will change the tuning of all of the strings by the same amount.

More information on the available scale and tuning presets is available in the appendices at the end of this manual.

NOTES ON SCALES AND TUNINGS:

The included Korean scales will load absolute notes, but the additional scales will load relative to the tuning of the first (lowest) string.

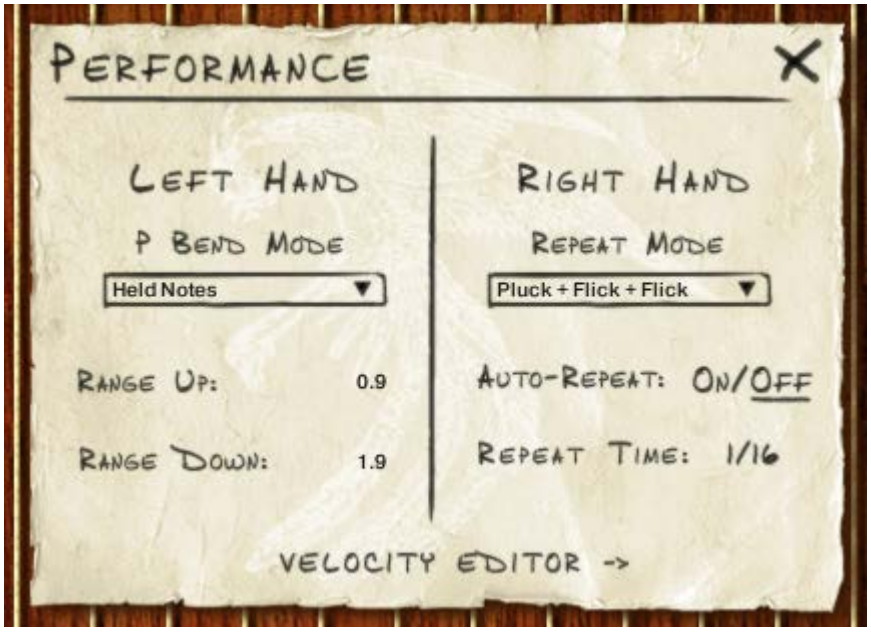
Therefore, loading the *Sanjo* scale will always tune the strings to G, C, D, G, etc…, but loading the *Minor* scale will tune the strings at intervals relative to the first string.

When loading a fine-tuning preset, the tuning of the strings is relative to the first string (assuming that it is set to the tonic note of the scale) and is based on the current note settings.

So, selecting a just tuning, then changing the notes later, could cause the just intonation to break. Generally it is advised to select and adjust the scale first, and then select a tuning at the end.

4.2.2 THE PERFORMANCE PAGE

Clicking on the **Performance** button on the left of the instrument will open the Performance Page.



5 THE PERFORMANCE PAGE

The Performance Page is split into two sections:

- **Left Hand** – where you find the controls for the pitch-bend options.
- **Right Hand** – for the articulation options.

LEFT HAND CONTROLS

On the Gayageum, the left hand is used to alter the pitch of the strings; as such this section contains 3 controls all relating to how the pitch bend control interacts with the instrument:

- **P Bend Mode** – defines how the pitch bend control functions:
  - *All Voices* – the general standard of most keyboard controlled instruments. All active notes have their pitched changed by the same amount.
  - *Held Notes* – the pitch bend will only affect a note if you are holding down the respective MIDI key.
  - *Last Voice* – the pitch bend will only affect the last note played.
- **Range Up** – sets the range of the pitch bend control when it moves upwards.
- **Range Down** – sets the range of the pitch bend control when it moves downwards (note: it is not possible to bend the pitch of a string downwards)

RIGHT HAND CONTROLS

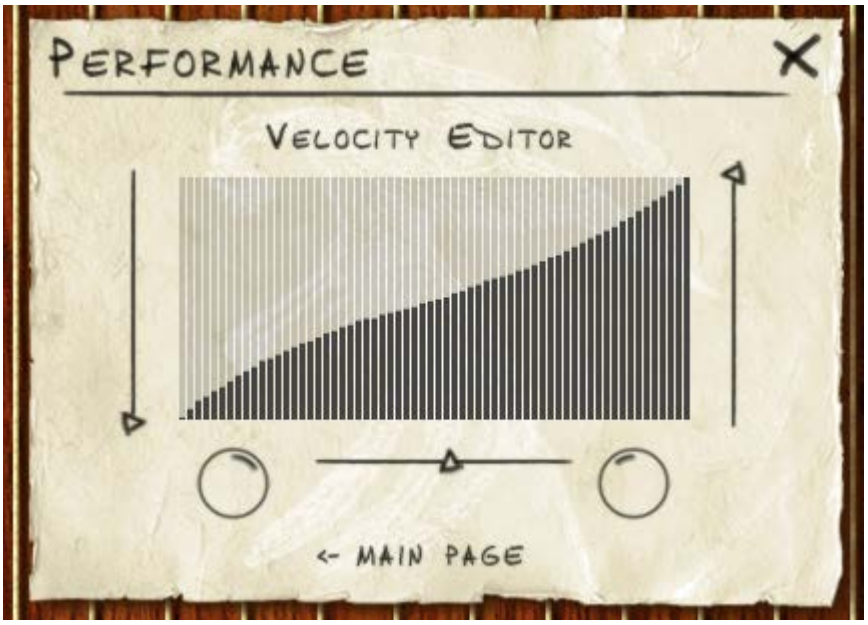
The right hand is used to pluck or flick the strings. This area offers performance options relating to the triggering of notes:

- **Repeat Mode** – selects how the instrument should react to repeated notes on the same string:
  - *Pluck Only* – all played notes are plucked.
  - *Flick Only* – all played notes are flicked.
  - *Pluck + Flick* – the first note played on a string will be a pluck, the next a flick, and then this pattern repeats until you play the next string.
  - *Pluck + Flick + Flick* – like the above, but with a second flick added to the pattern.

- **Auto-Repeat** – toggles on or off an auto-repeat function. When this is active, a note will repeat at a given interval for as long as the key is held.
- **Repeat Time** – designates the rate of the auto-repeat function.

VELOCITY EDITOR

At the bottom of the Performance Page is a button that takes you to the Velocity Editor.



6 THE VELOCITY EDITOR

In the Velocity Editor you can define a velocity curve that changes how the instrument reacts to the velocity messages from your keyboard by remapping them.

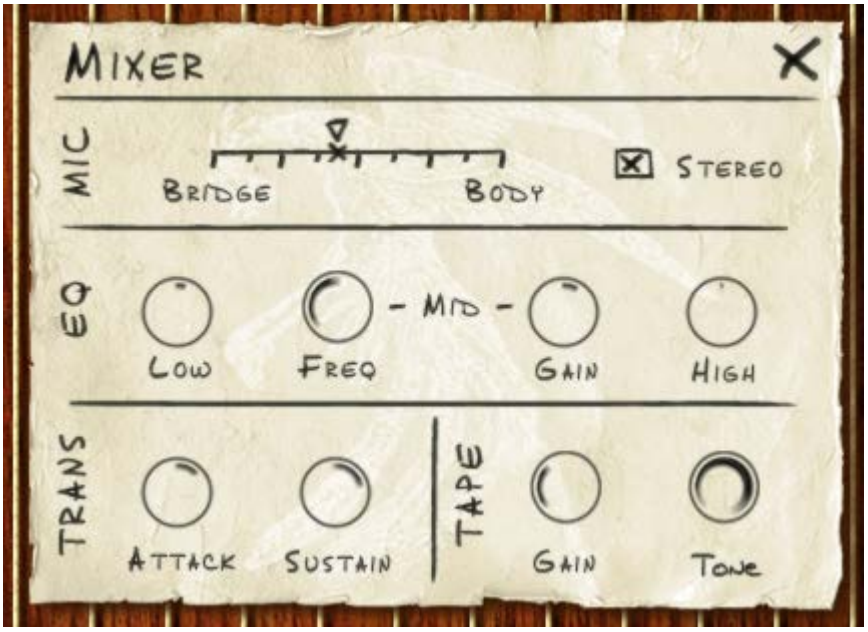
In the centre is the velocity table that displays the settings of the curve.

To the left and right of this table are sliders that set the Maximum and Minimum velocities. Note that these can be set to any value, so it is possible to invert the velocity curve.

Below the table is a slider that sets the centre point of the curve. To the left and right of this slider are knobs that define the curve before and after the mid-point.

4.2.3 THE MIXER PAGE

Clicking on the **Mixer** button on the left of the instrument will open the Mixer Page.



7 THE MIXER PAGE

The Mixer Page is where you can alter the sound of the instrument by blending microphone sources and applying effects.

The Mixer Page is split into 4 areas…

MIC

The **SANJO GAYAGEUM** Samples were processed in such a way that two microphone sources were able to be combined in a single sample. This allows you to have access to a two channel mixer without increasing the voice count, giving you more options at a lower cost to your system.

In the Mic area you have a slider that allows you to blend between these two microphone sources:

- **Bridge** – this microphone was positioned closer to the playing hand, and picks up more of the attack of the sound.
- **Body** – this microphone was positioned facing the centre of the instrument and picks up more sound from the resonating body.

Blending between these sources can change the character of the instrument quite a lot.

The **Stereo** button to the right of the slider applies a small stereo spread to the two microphone sources, creating a wider sound. Note that the stereo spread is scaled by the setting of the mix slider; if you use a single microphone source, then the sound will be mono.

EQ

SANJO GAYAGEUM offers a 3 band EQ with a sweepable Mid band that allows you to further alter the timbre of the instrument. The controls for the EQ are as follows:

- **Low** – controls the gain level of the lower frequencies (everything below 155Hz). This can be used to control the bass of the instrument.
- **Mid Freq** – controls the central frequency of the middle frequency band (range: 200Hz to 2.5kHz).
- **Mid Gain** – controls the gain level of the middle frequency band.
- **High** – controls the gain level of the high frequencies (everything above 6kHz)

TRANS

Below the EQ and to the left are the controls of the Transient Master effect, which controls the shape of the instrument's volume envelope. It has two controls:

- **Attack** – controls the scaling of the initial transient. In other words, it controls how percussive the instrument will sound.
- **Sustain** – controls the scaling of the sustaining portion of the sound. This can be used to increase or decrease the body/weight of the sound.

TAPE

To the right of the Trans effect is the Tape Simulator. This effect emulates the saturation and dynamic effects of recording to tape. The effect has two controls:

- **Gain** – controls the level of the signal entering the simulation. Higher levels will cause more distortion and compression.
- **Tone** – controls the high frequency rolloff (or brightness) of the tape.

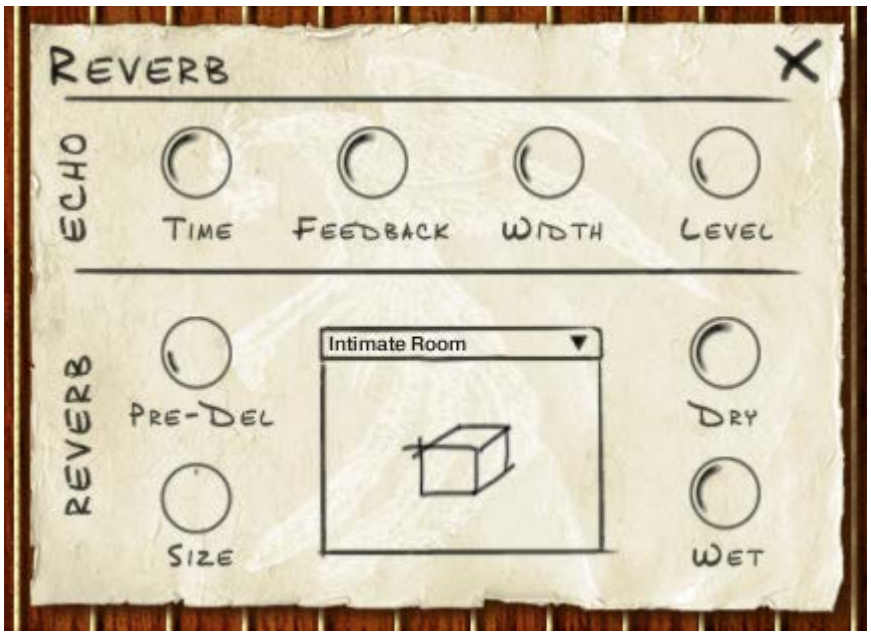
PRESETS

Below the **Mixer** button you will find a dropdown menu labelled **Presets**. This menu contains a handful of useful starting points for getting the exact sound you are after:

- *Clean* – a good neutral and accurate sound. Only subtle effect settings are used to create a well-rounded Gayageum sound.
- *Vintage* – heavy use of the tape saturator, coupled with a single microphone source, leads to a lo-fi/vintage recording sound.
- *Percussive* – the bridge microphone position and extreme settings on the Transient Master give a sharp, percussive sound.
- *Round* – Similar to the *Clean* setting, but with more sustain and body.

4.2.4 THE REVERB PAGE

Clicking on the **Reverb** button on the left of the instrument will open the Reverb Page.



8 THE REVERB PAGE

The Reverb Page gives you control over the virtual space for the instrument. Since the raw samples were recorded dry, this page can allow you to give the impression that the instrument was performed in any size of room or hall.

The Reverb Page is split into 2 areas…

ECHO

The echo effect uses a delayed signal to give the impression of repeating echoes. The **SANJO GAYAGEUM** Echo is tempo synced to your host, so you can also use this as a rhythmic effect.

The controls are as follows:

- **Time** – sets the delay time of the effect (the time between the input signal and the delayed signal).
- **Feedback** – controls how much of the effect output is fed back into the effect input. In other words, this controls the number of repeating echoes.
- **Width** – controls the stereo width of the echoes.
- **Level** – controls the output level of the effect.

REVERB

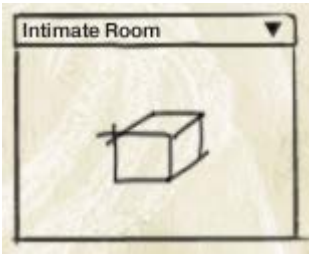
The reverb effect uses convolution to reproduce the sound of acoustic spaces.

The main dropdown menu in the middle of this area selects the impulse response for the effect. It selects the character of the virtual space.

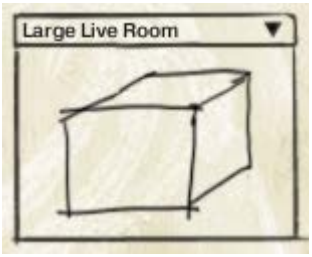
There are 12 custom impulse responses to choose from, ranging from small spaces, to large halls, and even spring reverbs.

There are four main categories for the impulse responses, illustrated by the image below the selection menu:

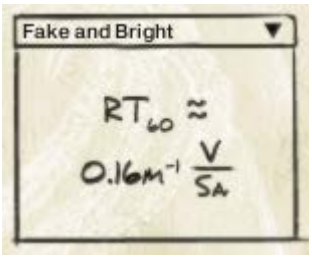
Small Spaces:



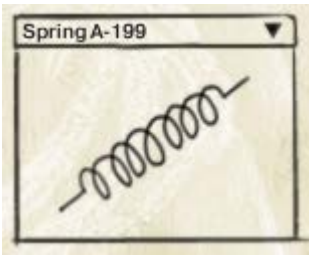
Large Spaces:



Artificial Spaces:



Springs:



The other controls for the Reverb are as follows:

- **Pre-Del** – controls the delay time between the input signal and the convolution signal.
- **Size** – changes the length of the impulse response sample, which can make the room sound smaller or bigger.
- **Dry** – controls the level of the unaffected input signal.
- **Wet** – controls the level of the convolution signal.

5 CREDITS

Instrument Design, **Kontakt Scripting**, and **Performance**: Adam Hanley

Recorded at: Flesh & Bone Studios, London

Recording Engineer: Shaun Savage

Sample Editing: Paul Maurer and Adam Hanley

Special Thanks: Ji Eun Jung and the KCCUK

6 Appendix 1: Included Scales

This appendix includes a list of the available scale presets.

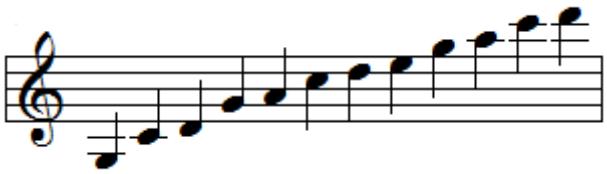
The strings of the Gayageum are tuned from lowest to highest, with the lowest string being the furthest from the player.

The provided tunings that are not part of the Korean Gayageum tradition have been adjusted to fit the Gayageum. However, the scales and tunings provided are mostly taken from close relatives to the Gayageum, and so do not deviate much from their originals.

6.1 Korean

Sanjo

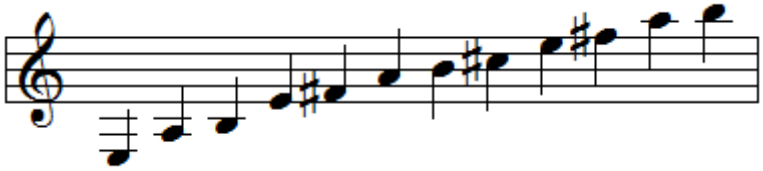
The standard scale for tuning the Sanjo Gayageum.



G – C – D – G – A – C – D – E – G – A – C – D

Chongak

The standard tuning of the Court Gayageum. This scale is similar to the Sanjo scale, but it starts on an E (a minor third below the Sanjo scale).



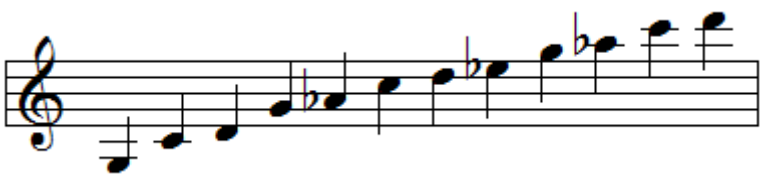
E – A – B – E – F# – A – B – C# – E – F# – A – B

6.2 Japanese

The following scales are found in traditional Japanese music. The tunings are based on those used by the Koto, but adjusted to fit the Gayageum.

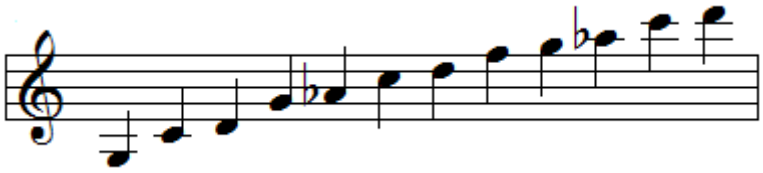
For the purposes of illustration, these scales will be shown with G as the root note.

Hira Joshi



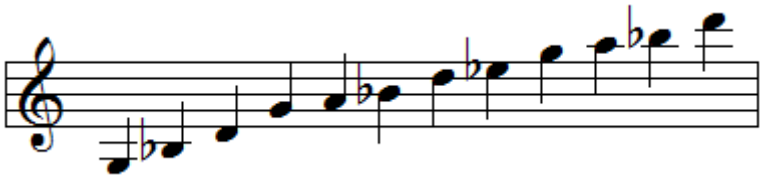
G – C – D – G – Ab – C – D – Eb – G – Ab – C – D

KOKIN JOSHI



G – C – D – G – Ab – C – D – F – G – Ab – C – D

KUMOI JOSHI



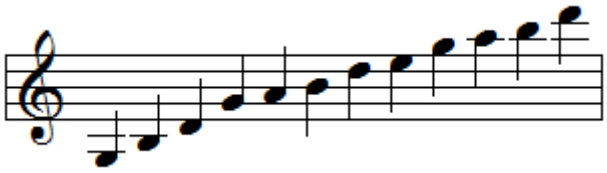
G – Bb – D – G – A – Bb – D – Eb – G – A – Bb – D

6.3 CHINESE

GUZHENG (MAJOR)

The GuZheng is a close relative to the Gayageum. It can have any number of strings, but is usually tuned to the following scale.

For the purposes of illustration, this scale is shown with G as the root note.

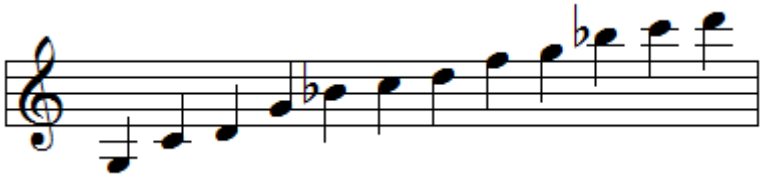


G – B – D – G – A – B – D – E – G – A – B – D

6.4 OTHER

MINOR

This scale is a pentatonic variation of the western minor scale.



G – C – D – G – Bb – C – D – F – G – Bb – C – D

7 APPENDIX 2: INCLUDED TUNINGS

All tunings in the following tables are based on their deviation in cents from the standard equal temperament in which all 12 tones of the western chromatic scale are 100 cents apart.

EQUAL

Standard western equal temperament, found on most modern keyboard instruments.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	0	0	0	0	0	0	0	0	0	0	0

JUST

A basic just temperament.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	+11.7	+3.9	+15.6	-13.7	-2	-17.5	+2	+13.7	-15.7	+17.6	-11.8

LU

A Chinese tuning from the Han Dynasty.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	-1	+3.9	+15.6	-5.7	-2	+8.4	+1.9	+0.9	+5.9	+17.6	+6.4

SUPER JUST

The Super Just temperament developed by Wendy Carlos.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	+5	+3.9	+15.6	-13.7	-2	-48.7	+2	+40.5	-13.6	-31.2	-11.7

MEANTONE

A popular European tuning used before equal temperament.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	-24	-6.8	+10.3	-13.7	+3.4	-20.5	-3.2	-27.4	-20.3	+6.8	-17.1

WERKMEISTER III

A well temperament from 1691, developed by Andreas Werkmeister.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	-9.8	-7.8	-5.9	-9.8	-2	-1.7	-7.8	-11.7	-3.9	-7.8	0

YOUNG

Another well temperament.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	-6.1	-4.2	-2.2	-8.3	-0.1	-8.1	-2.1	-4.2	-6.2	-0.2	-8.2

VALLOTTI & YOUNG

A well temperament from the work of Thomas Young.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	-5.9	-3.9	-2	-7.8	+2	-7.8	-2	-3.9	-5.8	0	-9.8

JOHNSTON

A just tuning based on the work of Ben Johnston.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	+5	+3.9	-2.5	-13.7	-29.2	-48.7	+2	+40.5	+5.9	-31.2	-12.7

PYTHAGOREAN

The classic Pythagorean tuning based on simple fractions.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	+13.7	+3.9	-5.9	+7.8	-2	+11.7	+2	-7.8	+5.9	-3.9	+9.8

CARLOS HARMONIC

A scale based on the harmonic series, developed by Wendy Carlos.

Interval	0	1	2	3	4	5	6	7	8	9	10	11
Tuning	0	+5	+3.9	-2.5	-13.7	-29.2	-48.7	+2	+40.5	+5.9	-31.2	-11.7