**Quilcom SIM-MIJWIZ**



**Design**

The SIM-MIJWIZ is a plugin using only synthesiser techniques designed to simulate the sound of this ancient Egyptian wind instrument. No samples are used.

A Mijwiz consists of 2 ideally identical beating reed flutes played in unison by using fingers to close 2 parallel holes per finger at the same time. Both reed mouthpieces are placed fully inside the mouth and are not manipulated by the tongue or embouchure. Due to the manual and “organic” nature of the manufacture of the pipes and reeds, beating is often heard on some or all notes. Partially uncovering one of the holes can allow a skilled player to add beating for expression, but mostly expression is from the music played in terms of rhythm, repetition and speed of phrases.

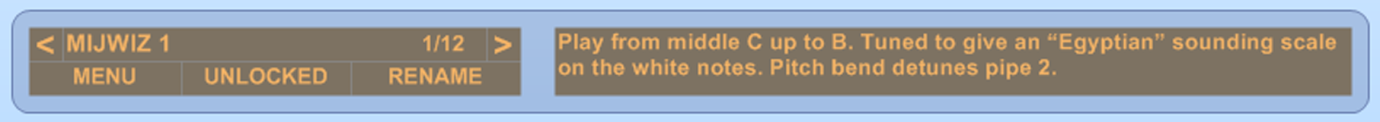
The synth can be switched from **MIJWIZ** to **ARGHUL** since the two instruments work in a similar fashion. An Arghul also has 2 tubes but one is used as a fixed pitched drone against which the melody is played. The drone pitch is determined by the length of the drone tube and often has interchangeable extension tubes so the drone’s pitch can be set to the desired note.

The Arghul is an ancestor to the bagpipes but there is no bag, which means for traditional continuous music the player must use circular breathing, as is the case for a Didgeridoo for example. Since the reed is enclosed in the mouth, and there is normally no flared horn, the sound differs somewhat from a typical bagpipe’s chanter.

These instruments come in all sorts of lengths and bores and I tried to find some data on tuning, but it seems there is huge variation between instruments and cultural traditions. The span is normally just under one octave and over-blowing to go up an octave doesn’t work since the reed would stop vibrating. Another point is that the tone holes seem to be equally spaced and sized and their position on the tubes seems to be arbitrary. This gives rise to what I would call bizarre scales (to my western ears). Add to this the fact that the number of holes is also a variable, and I’ve seen 4, 5 and 6 hole variants, all being equally spaced on the tubes. For this reason I’ve provided the means for you to set the pitch for each hole individually.

The Background info folder contains PDFs and links if you’d like more details.

Following on are the details about all the controls…



The included presets are offered as starting points and to demonstrate some possibilities to encourage exploration and experimentation.

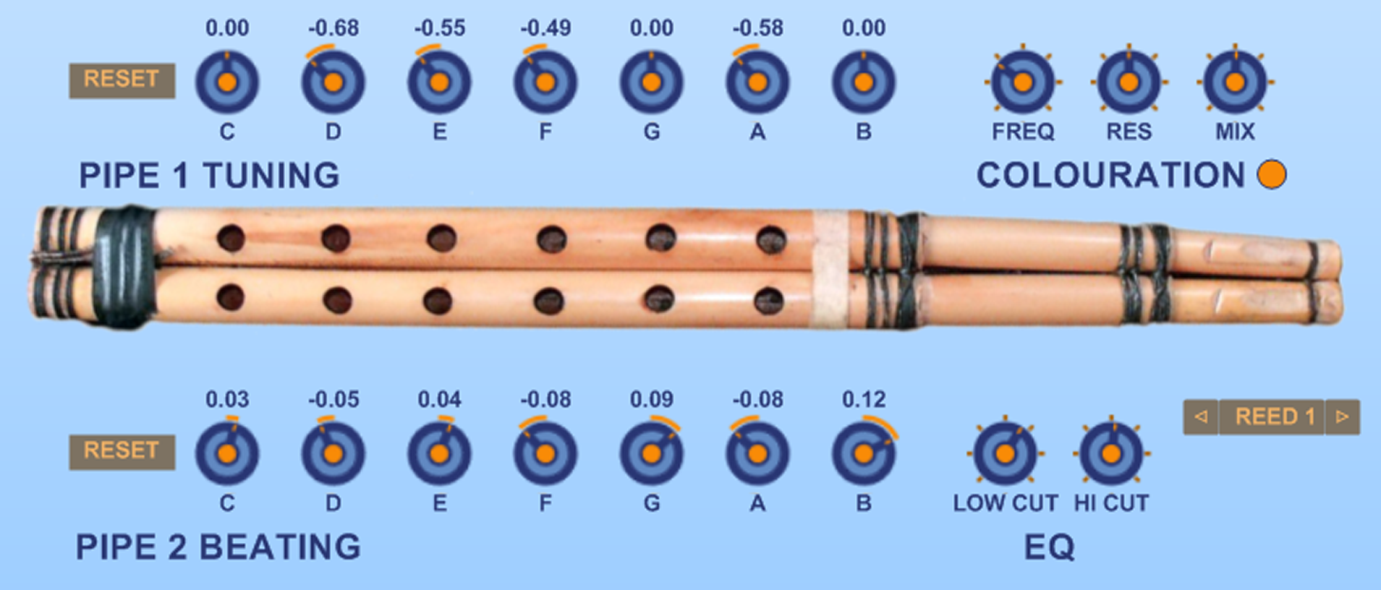
On the left side of the preset manager is the small section where you select the preset by clicking on the preset name or paging though them using the arrow buttons.

The **MENU** selector is where you operate on presets and banks. You can save, load, copy or paste presets, or save and load a bank from this menu.

All changes made to any settings will be stored with the DAW song file unless the switch **UNLOCKED** is changed to **LOCKED**. This locking feature is to avoid losing settings if you just want to mess with editing but want to keep the original default parameters.

The **RENAME** button allows you to name or rename a preset providing the preset manager is **UNLOCKED**. Otherwise the **RENAME** button is dimmed.

On the right side is a free text area for adding comments to the preset. These comments are saved with the song, and the preset if saved, providing the preset manager is **UNLOCKED**. Please be aware that you shouldn’t use a carriage return (Enter) in this text because the system won’t store any text after that. Also please be aware that when you **RENAME** a preset this text will clear, so if you want to keep it and just rename the preset, highlight the text, copy it then paste back in after you’ve renamed.



The instrument area shown above is what you see when the **MIJWIZ** is chosen.

**PIPE 1 TUNING** uses a set of knobs to tune each of the tone holes. The instrument plays from middle C (60) up to B (71). Each white note on the MIDI keyboard is tuned with the corresponding knob **C** to **B** and for maximum flexibility has a range of +/- 2 semitones. If you play a black note it will be 1 semitone above the white note below it. This possibility allows for weird accidentals and more micro-tuning craziness!

If you click the **RESET** button the tuning reverts to equal temperament and you can play in a conventional manner.

As I mentioned before, real Mijwiz instruments often beat on some or all notes due to imperfect manufacture and/or incomplete hole covering. Pipe 2 is the same pitch as tuned on Pipe 1, but the row of knobs for **PIPE 2 BEATING** allows the beating rate to be adjusted for each note **C** to **B**. The **RESET** button sets the knobs to no beating (all zero).

The knob readouts are for the amount of semitones, so a setting of 0.50 will be half a semitone.

The *actual* pitches played will be based on what is set on the **PITCH** panel (see later).



The timbre of individual real instruments seems to vary widely and the timbre can vary somewhat between holes on the same instrument. Some of that may be down to recording equipment and methods and some down to the construction of the reeds and step sizes in the tube. This variation can be simulated with the **COLOURATION** section which is based on comb filtering to give a wide range of sounds. The **FREQ** sets the base frequency above which the notches and peaks come into play. **RES** sets the resonance which affects the *height* of the peaks and notches. **MIX** adjusts the balance between filtered and unfiltered signals. When fully down no colouration is added, in which case you can turn off the filter with the orange LED-switch to save a bit of CPU. It’s also useful to turn the filter on and off to compare with and without filtering.



In addition to **COLOURATION** you have the 2 **EQ** knobs. **LOW CUT** reduces the low frequency content as the knob is turned up and **HI CUT** reduces the higher frequencies as you turn it up.



Reeds are cut into a bamboo tube such that the reed is part of the tube. It’s a very delicate process and being manually cut, shaved and opened, the reed sound can vary widely. I’ve provided a selection of 9 reed waveforms which I made in my Quilcom Wavemaker 4 to sound suitably “reedy” and give a good variety to choose from. This means that along with the **COLOURATION** and **EQ** you can adjust a huge range of timbres. The reed selection is for both pipes.



This is the instrument area you see when **ARGHUL** is selected.

**PIPE 1 TUNING, COLOURATION, EQ** and **REED** selection are the same as for the **MIJWIZ**.

As I mentioned before, an Arghul has one tube which plays as a drone whose pitch can only be changed by adding extra lengths of tube to the drone pipe. This is simulated by adjusting the **DRONE OFFSET** knobs. This offset is relative to the main instrument tuning as set on the **PITCH** panel (see later). So when all the knobs are set to zero the drone sounds the same note as that played on **C**.

I never saw an Arghul with a drone pipe *shorter* than the melody pipe, but you could set up such a thing with the **DRONE** **OFFSET** tuning. Apparently the traditional tonic note is the “2nd position”, which is played on **D**. In the picture this is adjusted so the pitch is down 1 octave and raised 2 semitones. The **FINE** tuning readout can be set to match the tuning of the chosen tonic note so when that note is played the beating *with the tonic* can be adjusted. In the picture **FINE** is adjusted to beat very slowly (-69 cents against -0.68 semitones).

Traditionally music is played without a break by using circular breathing; that is to use the cheeks as an air store while breathing in through the nose. Tricky! For the synth this is simulated by sounding the drone whenever any note is pressed, because on a real instrument it’s not possible to sound just the melody pipe or drone on their own.

On all the videos I watched I noticed that the drone pipe speaks at a lower volume than the melody pipe. I never saw one where it was louder. I guess if a microphone was placed close to the end of the drone pipe it *could* be louder, but that’s not a realistic situation. So the **LEVEL** knob allows you to set a *reduced* volume for the drone sound. The **LEVEL** knob is linear, so at half way the level is reduced by about -6dB which seems to be a good starting point.

**Tip**: If you want to hear pipe 1 on its own then you should select **ARGHUL** and turn the drone pipe **LEVEL** to zero. One example of a *single* reed pipe version of the Mijwiz is the Sipsi.



The **PITCH** panel controls pitch-related settings for the whole instrument. Since the playing range on your MIDI keyboard is from middle C (60) up to B (71) you may need to set the base pitch on this panel. The readout is the pitch played on middle C and you also get the frequency in Hertz which is affected by the **FINE** tuner. This adjustment might be useful to match other instruments or to set a frequency from a real instrument (good luck finding that!). If you click on the octave name (**E 4** in the picture) you can set your preferred octave numbering system.

The **RANGE** knob sets a compression or expansion of the range of notes *above* middle C. This provides a fast way of changing the pitch behaviour in addition to, or instead of, using the individual notes on the instrument area’s **PIPE 1 TUNING** knobs. When **RANGE** is set to 1.00 (default) the tuning supplied to the pipe synth is normal equal temperament.

The bend system is a little unusual. Pipe 1 always responds to the pitch bend wheel and when **BEND P2** is set to maximum (x1.00) pipe 2 bends the same as Pipe 1. However, if you reduce this setting Pipe 2 will bend by a lower amount and will introduce more beating with more bending. This is to simulate what I heard on just one video where a very skilled player slowly lifted a finger partially off the Pipe 2 hole to deliberately cause this effect as a form of expression.

**Tip**: For the **ARGHUL** it makes sense to set the **BEND P2** setting to zero, since the drone pipe cannot be made to bend its pitch and only pipe 1, the melody pipe, can respond to partial holing for bending.



The only included effect is a reverb designed by the remarkable Martin Vicanek and I think it has a lovely sweet sound. But if you want to use your own favourite reverb you can turn it off with the orange LED-switch to save a bit of CPU.

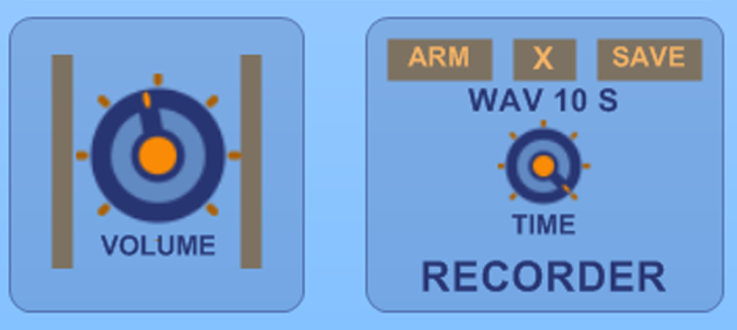
**PRE-DLY** is pre-delay time to give the impression of a larger space.

**TAIL** sets the reverb tail length and the readout is a guide only, since the decay is exponential.

**DAMP** introduces a more rapid fade out of higher frequencies to simulate a softer more absorbent space.

**WIDTH** sets the stereo width of the reverb tail (the instrument itself is natively monophonic).

**DRY-WET** sets the volume balance between the direct sound and the reverb tail.



The master **VOLUME** control features a system to indicate even brief peak clipping by turning the inner blue ring red for 1 second. The bar graphs for left and right are an indication of the average peak level.

The **RECORDER** enables you to record and save wav files from what you play on the synth. The **TIME** can be set up to 10 seconds. Click on **ARM** and the recording will start when you play a note. The progress is indicated on a horizontal red bar. Once the time has completed, click on **SAVE** to store the wav file (44100 Hz 16 bit).

If you wish to cancel the recording click on the **X** button and the recording will be reset and cleared.

After saving a wav file please wait for several seconds before opening it because the creation and writing of the file isn’t instant.