**Quilcom MYSTERY**



**Design**

The Quilcom MYSTERY synthesiser is the result of an experiment I had in mind for some time. I wondered what it would sound like to have a 16 partial additive oscillator where each partial could be amplitude modulated by its own independent LFO. That’s the simple basis of the architecture which evolved by experimentation into a synth which lends itself well to creating ever-moving pad sounds which have variety and never repeat. The presets focus on the pad creation capabilities although it can also be used as a regular 2 generator additive synth.

Much use is made of random settings which can be done manually, or automated to happen at a rate that can be adjusted. The system includes true morphing from one set of settings to another with an adjustable (or random) slew time. This allows smooth transitions for the majority of tone generation values so there need not be sudden transitions.

Due to the many parameters which can be randomised, if you create a sequence of notes in a DAW, every time you play it you’ll get a different sequence of sounds (within the bounds of the instrument and settings). This means it may be a good idea to record the audio output if you want consistency in a composition. Also there’s a lot of processing going on, so the CPU can go quite high, so it would be better to create the audio and when you have something nice, just use the recorded pad sound. The on board audio recorder can record up to 1 minute and save it as a wav.

I should add that the MYSTERY is not intended to be a general purpose pad creator which many other synths are perfectly capable of. Rather it just explores one type of pad-making technique which may be more difficult to realise on other synths.

**Overview**



There are 2 identical MYSTERY generators at the top. If using both, they are panned left and right. If either is turned off the signal is then mono and automatically centred in the stereo field.

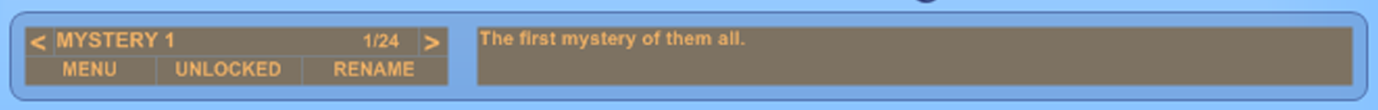
There are 3 effects available; PSYCHOPAN, DELAY and REVERB. The effects signal path is left to right.

Bottom left is the panel for setting pitch control. Next to the main VOLUME knob is the recorder mentioned above.

Finally, at the bottom is the preset manager.

What follows now is a detailed description of all the panel functions.

**Preset manager**



I’ve provided presets which demonstrate some of the sounds available, and several INIT slots where you can store your own. The presets are offered as starting points for you.

On the left side is the small section where you select the preset either by clicking on the preset name or paging though them using the arrows.

The **MENU** selector is where you operate on presets or 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 button **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 parameters. Of course the factory presets are baked into the code but to get one back you may otherwise have to reload it or use the DAW to return to factory defaults (which returns ALL of them in Reaper).

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 preset 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.

**MYSTERY generators**



There are 2 identical MYSTERY generators which create the sounds. As mentioned before, if you only want to use one, turn the other one off with the LED switch by the name MYSTERY 1 or 2. This automatically switches the signal routing so the one in use is centred in the stereo field (each generator is mono). If you have both turned on, they are panned hard left/right.

The two rows of small knobs are for LFO frequency at the top and partial level (**AMNT**) along the centre. From left to right they are for partial 1 to 16 (F1 to F16). On the right side is an optional **SUB** oscillator which creates a partial one octave down from the fundamental. The SUB can be turned on/off with the orange LED switch.

The **ALL** knobs on the right allow all the settings in their row to be adjusted to the value of the **ALL** knob.

If you click on **RAND FRQ** rectangular button, all the LFOs will get a new random frequency value. The **RAND PHS** turns on random LFO phase which means every time a new note is played the LFOs will start at a random position in their cycle. The small orange LED switch alongside the **RAND FRQ** button enables the **RAND ALL** or automatic **UPDATE** to trigger a new set of random values. If this is OFF the randomise function is manual only, achieved by clicking the button.

The central **AMNT** row of knobs set the level of each partial in the additive oscillator.

**RAND AMNT** works like **RAND FREQ** described above, but randomises the level of the partials. This can produce a wide range of unpredictable timbres.

The **EVEN** switch will enable all the even numbered partials and the **ODD** switch is for the odd numbered partials. You need at least one of these turned on to hear the full additive oscillator.

The **1/N** is a special trigger button that sets the classic reduction of harmonics where N is the partial number. A sawtooth wave will have all harmonics descending in level in this way, whereas a square wave will be the same but just have odd numbered harmonics. Note that the fundamental is always present in the calculation. If you have auto **UPDATE** set for this the **1/N** setting is overridden when the next trigger comes along.

If you click the trigger button **RAND ALL** then any parameters with the small LED switch lit will update to a new random value.

To automate the **UPDATE** triggering, the **UPDATE** knob can be used to set the time interval between new random update triggers. To enable this, the larger orange LED switch by the **UPDATE** knob needs to be lit.

The **SLEW** knob is global for the MYSTERY generator. Slew sets the time taken to morph between a new setting and the previous one. So when a trigger happens the new random values will be approached at the speed set on this knob. Note that if you want to make individual adjustments to knobs for a static setting, it’s best to turn **SLEW** to minimum, otherwise you’d have to wait the slew time to get the new adjustment. The **SLEW** knob can be selected for updating too by turning on its little LED switch. This can introduce a lot more variety into the soundscape.

The **MIX** knob is to introduce the LFO modulation of amplitude and is global for the generator. The **AMNT** knobs set the nominal audio level of each partial and the **MIX** knob introduces the LFO when turned up. So when the **MIX** is fully down you don’t hear any LFO amplitude modulation. This knob also can be set to be randomly updated.

The **N** knob sets the upper limit to the partial count and goes from 1 to 16. When set at 1, only the fundamental is heard, and at 16 all the partials will sound. This operates like a very accurate low pass filter and the knob value can be set to update randomly.

The **PITCH** knob shifts the MYSTERY generator’s base pitch and affects the whole additive oscillator and sub. This too can be set to update randomly and this can create Portamento glides between random pitch offsets, the glide time being set on the **SLEW** knob.

The AHDSR envelope generator is used only for amplitude, but having different settings on the 2 MYSTERY generators can create some interesting effects. The **VEL** knob sets the sensitivity to key velocity. When turned fully down the amplitude is always maximum, and turning it up will reduce the amplitude at lower velocities.

**Effects**

**PSYCHOPAN**



This panel actually has 3 functions

**DETUNE** sets the difference in tuning between MYSTERY generators 1 and 2. The mean tuning is maintained, so one goes higher and the other lower, in cents.

**WIDTH** is only useful when *both* MYSTERY generators are turned on and are thus creating a stereo signal source. When fully down the sound is mono, even with both generators running. The half-way default is regular stereo and beyond that the sound becomes wider.

**PSYCHOPAN** is either on or off and doesn’t affect the **DETUNE** and **WIDTH** knobs above. When **PSYCHOPAN** is turned on, the stereo channels are slowly swapped over, at a random rate set when a new note sounds. On headphones especially this is a fascinating sound with each sounding note panning around at its own speed.

**DELAY**



The DELAY has 3 local templates: **ECHO, CHORUS and FLANGE** which put all the relevant settings to a useful starting vale.

The delay line time is set with the **TIME** knob and this time can be modulated with the LFO which can have its **SPEED** and **AMOUNT** adjusted.

**FBK** sets the amount of feedback from output to input. Below the **FBK** knob is a routing switch which can be set to **L-L R-R** for no swap and **L-R R-L INV** which swaps the feedback channels and inverts one (for Ping-Pong and richer chorus for example).

The 2 **CUT** knobs set the frequency range of the feedback loop so you can have damping of higher frequencies or bass reduction per repeat.

The **LEVEL** knob sets the level for the delay line output mixed in with the dry signal.

**REVERB**



The engine for this reverb was created by Martin Vicanek and I think sounds really pleasant. The feature set for the reverb on this synth was tailored to pad production so, in addition to **TAIL** length and wet/dry **MIX**, I provided a Pitch shifter set to just over 1 octave up, for bringing in the so-called shimmer effect. The level is set with the **SHIM.** knob.



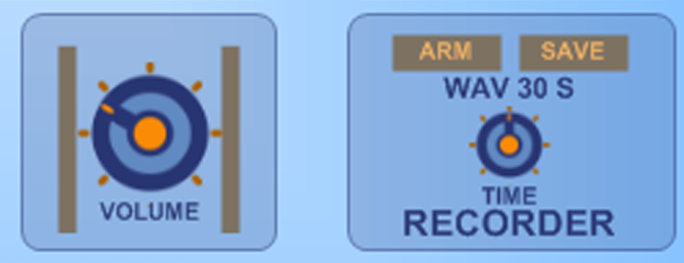
This panel has several functions relating to pitch. You can set the pitchbend up and down in semitones separately. The selector showing **ALL** has the option to bend **ALL** sounding notes, The **LAST** note played only or the **HIGH** (highest) note currently being played.

At the bottom are 3 knobs for tuning the whole instrument.

Top right are the controls for vibrato (slow pitch modulation). **RATE** sets the vibrato speed and **AMNT** sets the upper and lower pitch excursions in semitones. The **DELAY** knob sets the delay time before onset of the vibrato.

The ALL selector works like the pitch bend selector above, with **ALL**, **LAST** and **HIGH** options.

The selector showing **CC#** allows you to choose between the **CC#** number you enter into the text box below. The default is **CC#1** for modwheel, but any CC can be chosen. You can also select **A-TOUCH** for channel aftertouch or **KNOB**. The **KNOB** option means you just get the vibrato as set on the knobs, with or without any delay.



The **VOLUME** knob is for the whole instrument and features a left and right bar meter which indicates average peak values. The central ring turns red and holds for 1 second if even a very short clipping peak occurs on either channel.

I usually include a recorder set to a maximum of 10 seconds to record and save individual sounds or short clips but due to the pad orientation of this synth the recorder can go up to 60 seconds.

To operate it, set the expected **TIME** then click on **ARM**. The recording starts automatically when a midi note is played. A bar graph appears and shows the progress.

At the end, click on **SAVE** to open a standard Windows dialogue box to save the recording as a WAV. The wav will be stereo16 bit at 44.1 kHz. If you didn’t get what you want just start again, since the buffer is overwritten.