**AMAZONA.de - Workshop:**

# Doepfer Dark Energy & Mini Case

## Part 1

**by ''der Jim'' on 05/03/2011 translated by:** ricardodilago@gmail.com **07/05/2012, with kind permission from** http://www.amazona.de

The Dark Energy by Doepfer is probably the most successful and widely used analog synthesizers of the current generation of compact synthesizers. With this workshop we want to appeal especially to newcomers, for which the Dark Energy is the first hardware device with modular capabilities. The Dark Energy is very popular among musicians who have been working with software. This handy little box can make a great addition to the laptop via USB port, and it's great fun to experiment with the existing physical controls. However, the Dark Energy due to its compact dimensions and the technical construction has certain limits. Probably the most obvious limitation is that there is only one oscillator, which eliminates all kinds of (musical) sound scapes from his repertoire. In this workshop we want to demonstrate a few ways in which the sonic potential of the Dark Energy can be expanded.


*Dark Energy and mini-case - a modular system in a small space*

As a modular unit of the Dark Energy is of course the A-100 Doepfer system fully compatible. But such a system requires quit a bit of experience with modular systems and sound synthesis, which may discourages inexperienced because of it’s possibilities and not to forget it’s size! Which can fill-up a room.

Doepfer offeres for this user group smaller cases for every budget. The Doepfer A-100 miniature case is a handy mini-case, in which you can use a small selection of modules. The scope of the possibilities here is pretty clear, and you can create a patch very quickly and later reconstructed it once again.

**More Power**

For our first configuration of the mini cases we've got two oscillators to strengthen and make the Dark Energy to a 3 VCO synthesizer. It is not a Minimoog, but the increase in sound possibilities is already enormous. As space is limited in the mini-case, the choice falls on the module A-110. This oscillator provides the four basic waveforms square (with pulse width modulation), sawtooth, triangle and sine, plus there is also a hard sync input and a logarithmic FM input. In addition, the A-110 with only 10 subunits (TE) is relatively narrow, the VCO from other manufacturers are almost always wider and in this configuration would not fit into the mini-case.

**More Features**

Use two additional oscillators along with the Dark Energy and it will need two additional modules. First you need a so-called Multiples. This module distributes a control or audio signal to multiple outputs. To play the two VCOs in the mini-case tonally via keyboard or sequencer, we need to distribute the control voltage for the pitch with the multiples. The Dark Energy is receiving notes at the MIDI input and outputs CV on its top cover. These key-CV (pitch control voltage) must now be directed to the two VCOs in the mini-case.

**Basic patch**

The basic wiring is carried out as follows:

1) A cable goes from the CV Out of the Dark Energy to the Multiples input 1.
2) From there you connect two short patch cables to the CV1 inputs of the two A-110 VCO's. It is worth noting whether the Multiples is a 1x8 or a 2x4 distributor. Module A-180 can be configured namely by separating a solder bridge on the pcb. The 2x4 CV cable to the VCO must of course be put in the same half as the incoming key CV from the Dark Energy.

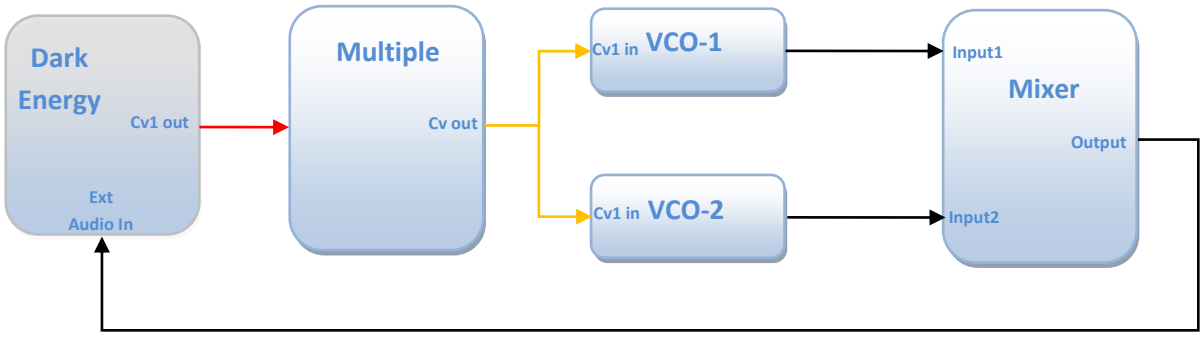



Figure 1 Block diagram of the setup (added by ricardodilago@gmail.com)

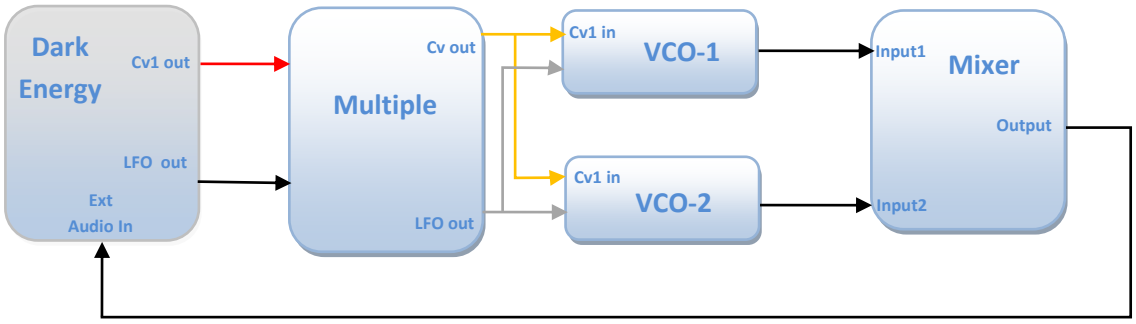
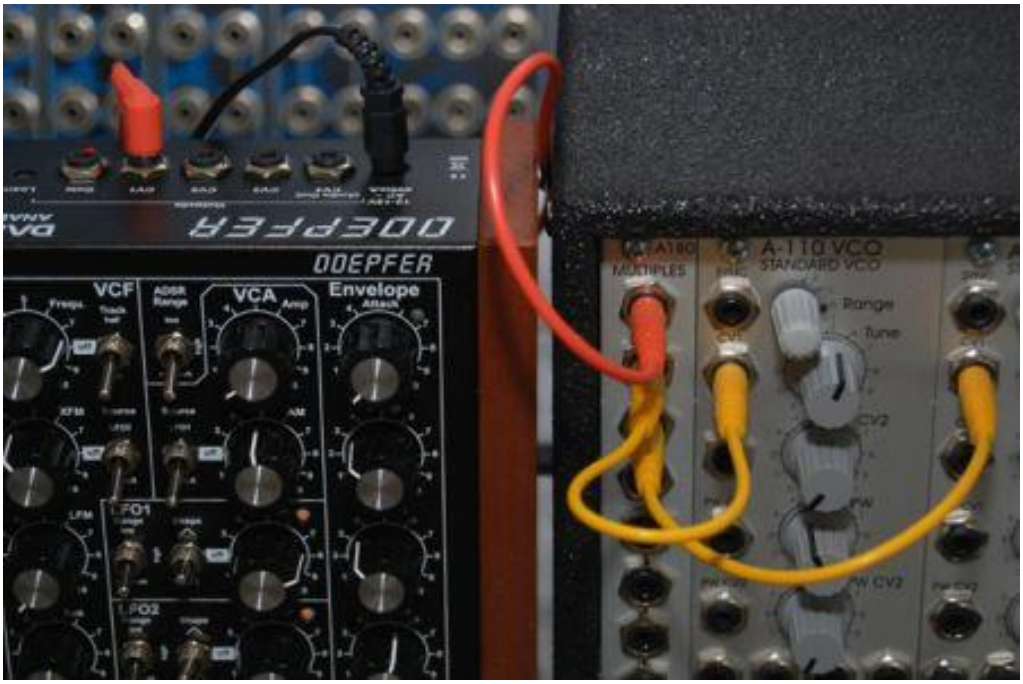



Figure 2 Block diagram of the setup using also LFO (added by ricardodilago@gmail.com)

**Tip**: If the multiple divided into 2x4, it can be the lower half of the LFO as it spread from one joint Dark Energy for vibrato or pulse width modulation on the two A-110 VCO's. This is shown in Figure 2. Multiple setups possible, you can modulate VCO-1's CV2 and VCO-2's PW1 for instance.

The basic wiring is expanded with:

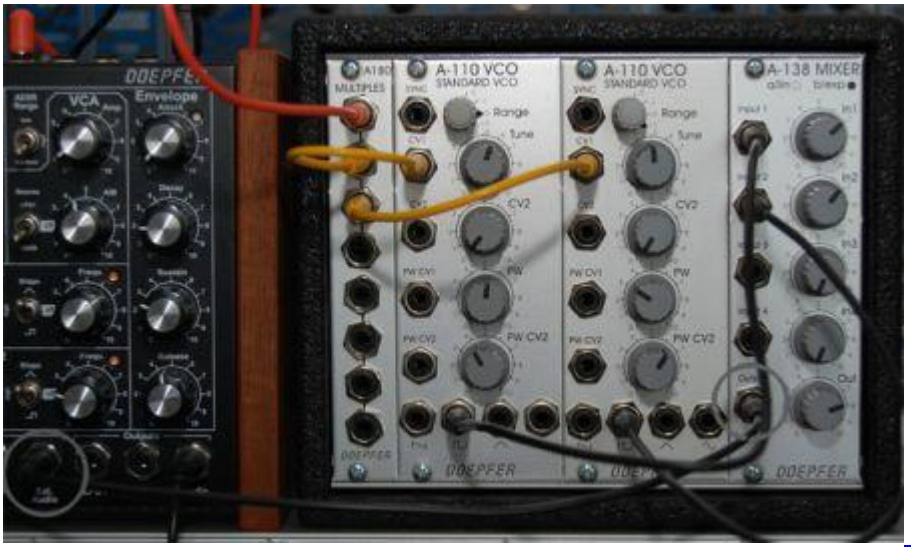
3) A cable goes from the LFO Out of the Dark Energy to the Multiples input 2.
4) Connect Multiples output 2-1 and 2-2 to VCO-1 and VCO-2




*The Dark Energy delivers the pitch over the Multiples to the two A-110 VCO's.*

After the CV connection is established, we move on to the audio path. As the Dark Energy has only one audio input, but we want to feed two oscillators, a mixer is needed. In our configuration the module A-138b is selected in exponential version which is suitable for audio signals.

This 4-in-1 mixer allows not only our two VCO's to mix together, but can be used with its adjustable attenuator output to feed the audio input of the Dark Energy. Another advantage of the four mixer inputs is that you create two (or three and one) waveforms of the VCO in here, as sawtooth and square. Thus it eliminates re-patching, you simply turn on the channel with the desired waveform and may have even two or three waveforms of a VCO mixed with each other.




*The two A-110 VCO's are combined in the A-138b Mixer and fed back to the Ext. Audio input of the Dark Energy.*

Then it goes from the mixer output as I said back to the Dark Energy in its audio input. Some caution should be exercised with the levels. If the inputs and the output of the A-138b mixer is turned up, it overloades the audio input of the Dark Energy. This may well be the intention and brings some saturation in the sound, but changed a bit by the filter behavior.

**In the application**

What we do now with three VCO's? A common problem is that a single VCO sounds a bit bland. Two VCO's fill our ears with slight resentment against each other and sounds much more alive. However, this causes resentment and a recurrent phase cancellation in sound, at least in some areas. Especially when the bass is undesirable, since the sound is pretty much ran out of steam. With a third VCO, this behavior can be compensated. The sound pulses still, but definitely alive. This 3-VCO-mix can be used as a basis for bass and as lead sounds equally good. When the VCO strongly detuned (detune), results in a typical alarm-lead sound, as this is popularly used in Trance, but also Crunk and Dubstep.

Lead Sound, with only 1, then 2 and 3 VCOs that are increasingly out of tune and filtered again for comparison at the end of a VCO (go to amazona.de for sound examples).

As a modification of three congenial VCO's we use the Dark Energy oscillator just an octave lower. That seems to be once banal, but the "force" of the sound increases hugely. This is especially noticeable in bass and reminds a bit of the Minimoog. No comparison with the 1-VCO-bass of the Dark Energy. In principle, this is like a sub oscillator, but with the difference that the waveforms are not phase-locked and the upper layer is formed by two VCOs, which sounds more alive. To obtain this, the sound should be not too strongly filtertered.

simple but effective: by changing the octaves of sound grows in strength
(go to amazona.de for sound examples).

Bass with 1, then 2 and 3 VCOs (octave down) in addition to the LFO modulates the filter and the power of 1 octave VCO
(go to amazona.de for sound examples).

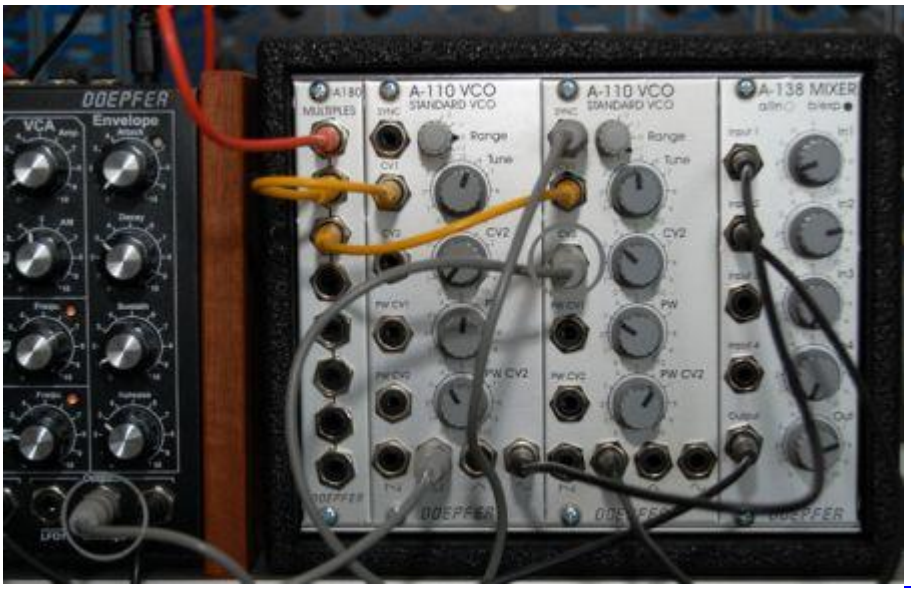
With two oscillators set at musical intervals of thirds, fifths, sevenths, it is a popular application. But we come into our system on a hurdle. The A-110 oscillators can be tuned only in a small area because of the Tune control is designed for fine tuning. Starting from the middle position, it extends only about two semitones up or down. With about five semitones of the Dark Energy. So we take an A-110 for the basic pitch and tune the VCO of the Dark Energy on F and get a stylish fourth. For the fifth (CG), we simply trick down a bit and set up the Dark Energy VCO tune it an octave and five semitones. And then we can still get the second A-110 into the game and set an octave above the first A-110. Not a very imaginative chord, but we still reach a wide sound that is well suited for percussive sequences and minimal chords with lots of reverb and delay.

with the 3 VCOs a simple chord is formed which is then shaped with a filter and envelope minimum typical (go to amazona.de for sound examples).

**Hardsync**

Oscillator synchronization is a technical process in which an oscillator (master) "imposes " it's pitch to another (slave) oscillator. Let us now stop here with theoretical treatise, it is enough to know that with hard sync you can achieve very harmonically rich and particularly aggressive sounds that can not be achieved with a VCO synthesizer.

Thanks to the two A-110 VCO's in our mini-case, sync sounds are also possible with the Dark Energy. The synchronization is done, however, between the two external oscillators, as the Dark Energy has no sync input but has a separate audio output, so it can not act as master or slave.




*The impenetrable cable-jumble is tight: for hard-sync VCO 1 is the master and slave VCO 2 (Sync input), the envelope of the Dark Energy controls the pitch of the slave oscillator.*

**Sync patch**

The basic patch with his CV and audio connections is preserved. Next, we establish the synchronization connection, as we use from the first A-110, the rectangular waveform and sync input of the second A-110. Thus the second VCO is the main sound generator in this patch. So we leave it in the blender first just turned up, while the other A-110 and the Dark Energy VCO will be hidden. In the latter, one must select for the rectangular waveform, and pulse width completely to the left or right.

The essence of a typical sync sounds is produced by modulating the pitch of the slave oscillator, preferably by an envelope, a LFO goes well. Since the pitch of the VCO is determined by the slave master, this modulation produces no change in the actual pitch, but the timbre.

So we connect the output of the envelope from the front of the Dark Energy CV2 to the input of the slave VCO. Because this input has an attenuator, the sound effect can be dosed at will. From around the knob position 3, it creates the typical sound. Turning to more, sometimes a point is reached where the sync-sound effect transitions into a sound that is no longer usable tonally. Very important here is the position of the envelope parameters. Since the ADSR envelope also controls the VCA of the Dark Energy (and possibly the filter), you need to find the right balance between the tasks. Attack should be set to zero and sustain relatively set low, such as between control positions 2 and 4. The critical value for the sync-sound is provided by the Decay. Too short or too long, and the desired effect does not apply. Depending on the length of the sync-sound rating between 2 and 5 positions of the control works best.

Now we still have the other two oscillators. Sync sounds are indeed aggressive, but naturally also slightly thinner than a normal waveform. In order to give more substance to the sound, you can mix in the Master VCO. If you change the pitch of the master, the slave will change accordingly and thus the sync sound. With Envelope modulation the master and slave are equal octave or differ no more than one octave. For static Sounds this can be further spread.

Hardsync between the two external VCO, the correct modulation depth is searched, then the Dark Energy-VCO is switched (go to amazona.de for sound examples).

Remains the Dark Energy oscillator which played no role here yet. Let us blend him in then. In the basic position he now plays together with the Syncmaster, but is still independent. One can therefore detune lightly or create an interval. It can become interesting, when the VCO is tuned one octave above the master VCO and thus the already fairly bright sync sound is given a little more color. In our example, the sound reminds us of a 808 cowbell.


*The lower part of 2x4 multiples may, for example for the distribution of LFO1 for controlling the pulse widths of both A-110's.*

**Today is not like every day ...**

I hope that the first part of the workshop has not only made fun for Dark Energy users and that i could give a few suggestions on which you can further experiment. Once this is done with two or even three VCO's, you will hardly want to work even with the single oscillator of the Dark Energy alone. But here the end of the story is far from being reached. Since the mini-case design provides freedom, we will further deal with other parts of extension configurations.
As keywords: Noise, Sample & Hold, Second envelope and Sequenzer connection.

Until then - Happy knob turning!

***Price***

Dark Energy: 398, - €
Mini Case: 90, - € (black) / 75, - € (untreated / raw)
VCO A-110: 140, - €
Mixer A-138b (log): 45, - €
Multiple A-180: 30, - €

AMAZONA.de - Workshop:

# Doepfer Dark Energy & Mini Case

## Part 2

**By "der Jim" on 12/06/2011 translated by:** ricardodilago@gmail.com **08/05/2012, with kind permission from** http://www.amazona.de

Welcom to the second round of our small workshops from Doepfer Dark Energy. Here we want to show newcomers and interested musicians how to expand the compact synthesizer with the help of mini cases and a few useful modules, so you have a lot more analog fun. In the first episode we extended the Dark Energy by two oscillators, a mixer and a Multiples, a pretty straightforward setup. This time we want to bring in more color to the sound in another way.


**Placement**

Imagine a new configuration of modules that you want in the mini-case. Clearly, this also includes an oscillator this time. As became clear in the first part of the workshop, the sound growth with a second oscillator is enormous. But instead of yet another VCO, a Noise Generator now comes into the case. In order to feed the two sources together in the Dark Energy, again, a mixer is required.Alternatively, one could also take an A-131 VCA, it also allows two sources to mix and to control these. However, there is a lack of suitable modulators in the setup, for you to fully use the VCA, the normal A-138b Mixer is sufficient.

In the remaining six sub-units of the Mini Cases is the A-148 dual sample and hold module slot. This allows special control signals to be generated. The Dark Energy, with this mini-case assembly is not only sonicly upgraded but also in modulation capabilities. The remaining 2 modules that are left over because of the noise generator is narrower than a VCO, it can be filled with a blanking plate.


*A very practical configuration, with VCO noise and sample & hold option extends the Dark Energy in both the aural and modulative opportunities*.

**My synthesizer roars**

In fact, noise is the enemy of sound, but for the sound synthesis is an important component. When they first started in the '60s, to build synthesizers in a commercial context, efforts were made to make the basic functions and concepts understandable. For example, the harmonic content of waveforms for certain woodwinds were used as comparison. And the existence of noise generators was legitimized through the simulation of airflow. In these ways, of course, no one thinks today, but the noise generator was an integral part in many synthesizers.

Module A-118 may require more than just simple noise. As a there is the classic White Noise, which extends over the entire frequency spectrum. And where other synthesizers have filtered Pink Noise, the A-118 offers "Colored" noise. Here you can individually shape noise. With the Red and Blue slider the low-and high-frequency components can be mixes as desired. There is also the random output of which values can be adjusted with the rate and level and can be used as a control voltage output.


with the use of noise, it depends on the right mix, because otherwise the tonal content of a sequence quickly goes down.

But back to the noise, so how to use it? First, there is a wide-band audio component, the tonality is missing. When noise is mixed together with a VCO, the sound will be warm, but not at too high a level musically.Rule 1 is: note the correct mixing ratio. Used well, a bass or a short Sequenzersound can be upgraded. Since noise is broadband, it responds well to the use of a filter. It is useful here to play with the filters with key tracking, which means that the cutoff frequency as a function of the pitch changes the music. In response, the audible noise obtained in this way is an apparent tonality and is better in balance with the VCO waveform.

Another application is noise noise imitations. In the 60s and 70s synthesizers were not just used for music, but to a large extent also used for the dubbing of films and radio plays. With noise you can imitate winds. This application has now indeed become less important, but I think we should deal with it anyway. One needs to have worked with it. First, one learns to know his synthesizer really know through those finger exercises. Not only the general features, but also the "sweet spots", which function in which setting sounds best. Second, self-made sounds can be dramatic to the point. The intensity of wind samples from a library usually has just not the right timing. Third, it's damn fun!

As a suggestion for further experiments, we create a "storm". The patch itself is very simple, the challenge is the right set of controls. The two VCO’s are not needed here, so they are disabled. In this Dark Energy, the waveform switch to the central position and the pulse width can be rotated to 0. Now we send the noise of Colored output of the mixer to External audio input of the Dark Energy. Since the wind is blowing constantly, the VCA control will be opened. With Cutoff and Resonance the sound is really formed. Is Cutoff too deep than it only “growls”, if it is opened too wide, it will sound unnatural. Now slowly increase the Resonance, and at a certain point, the wind association is just there. Do so, move the Cutoff slightly and irregularly. Preferably by hand, pinch LFO support could not do wrong either.


Wind noise requires a sensitive dose, especially with the resonance.

The cutoff is modulated most intuitively by hand.

To revive the wind correctly, you have to make it wide. A wide hall, stereo delay and / or chorus needs to be added as part of this emulation. Well, got the taste? Then try some other noise sounds, such as ocean waves or a helicopter. Such sounds are not just "for fun", they can be used well in an intro or interlude, especially since you can increase it to a specific point. A good example of the atmospheric and rhythmic use of noise-based sounds is the classic Human League "Being Boiled".

**Take samples and hold**

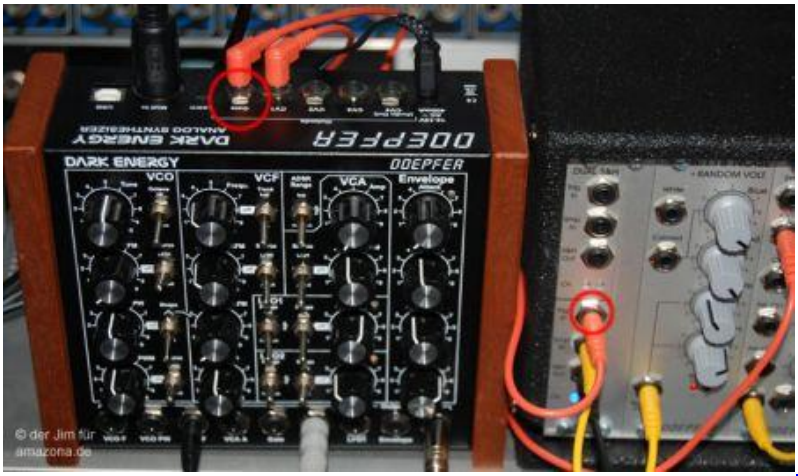
Sample & Hold, simply put: a co-ordinated chain of events ruled by chance. A S & H module only provides the link between the two sources, which must be supplied externally. In general, noise and a square wave LFO. Whenever the square wave emits a pulse, the sound of the currently applied value is taken (sample) and kept until the next pulse (Hold). Since the noise contains all frequencies at indefinite periods, the size of the actual value is truly random. At the output of the S & H module a control voltage is then provided at the current value until the next pulse.


Sample & Hold is fed by the output of the random noise and the square wave of the LFO.

That is the theory, but what you do with it? Another question, what do you control with a LFO? The same modulation targets are also of interest for S & H, that is primarily pitch and filter cutoff.

The A-148, receives the sample signal from the output of the random noise generator. With the controls: rate and intensity the level of randomness is determined. With Rate left from center, the jumps in the amplitude is very large.The LFO 1 square wave from the Dark Energy is patched to Trigger Input of the A-148. Real sci-fi effects can be achieved when the pitch of the VCO is controlled with this. The LFO 1 may be used with the triangle waveshape and add to the sound lots of reverb and delay – and already the spacecraft's receives radio signals.

Let's see, how the sample and hold can be used in our configuration in an other way. Musically, it is more useful to control the filter. For this the S & H output it is best not to directly patch to filter control input of the Dark Energy, but to the mixer, so the signal can be adjusted in intensity. Then a sequence can be played, while S & H modulates the cutoff. That sounds better with held notes than with fast sequences. Because the trigger signal from LFO 1 can not be synchronized, the effect is a bit chaotic here. So we take instead of the LFO output, the Gate output of the Dark Energy as a trigger signal for the S & H. Now, with every note is sent a pulse, which retrieves the next sample value and holds up to the next note. Thus runs the S & H pattern exactly in the rhythm.




*Triggered S & H, instead of the square LFO, the gate signal is used*.

**Dark Drums**

In two VCO's, noise and a self-oscillating filter provides enough potential for analog drum sounds. As our small system can only produce one sound at a time, it is useful to sampling the drums. Whether you make only a small drum kit or a very complex set of sounds for multiple velocity levels, depends on the needs. The effort is worth it anyway, because it creates its own individual drum kit.

Bass Drum - As basis for the bass drum, we take the self-oscillating filter. The resonance is turned up, the cutoff so far down, to the typical kick-frequency range. The sound is produced now by the modulation of the cutoff with the envelope. The setting of the decay and of the modulation depth must be done sensitively. When the right sound is found, one can modulate the filter cutoff with an attenuated noise to produce a sound similar to the Simmons-kick. With variations in depth and pitch modulation (cutoff) also similar drums and toms can be generated with this patch.


*A good bass drum depends on the correct tuning of the modulation depth and decay. With noise (weakened through the mixer), the kick can be modulated.*

Snare - The two components Body and Attack of and analog snare are caused by a short tone and noise. Unfortunately, our setup has no way to produce two sounds of different lengths, so our snare stays short. For the Attack take a triangle twice from the VCO, which are slightly out of tune at a medium pitch against each other. Then comes the noise. Here we use the possibility of Colored noise and reduce the low-frequency component. So, the snare fits better in the overall sound. The noise should be much louder than the attack.


*For a snare, the two VCOs (triangle) build the attack- and the noise builds the body.*

Hihat - The easiest way is to take a short noise. But it sounds boring. For a metallic sound we choose the triangle wave of the Dark Energy VCO's or the sine of the A-110 at a very high octave. Then, the VCO is modulated with LFO1, which is switched into the high regiion. The result is a metallic FM sound that dependent on the Tune relationship sounds harmonious -or disharmonious . You can also use the noise to modulate or combine both options.


For a metallic Hihat the VCO (triangle) is modulated with LFO1 in the high range and / or noise (attenuated through the mixer).

Cowbell – For the cowbell we focus a little on the TR808. This sound is made simply of two square waves. Only the ratio of the two VCO's Tune determine that sound. While you can research the original 808-frequencies, but I highly recommend to work by ear. Since in the TR-Cowbell uses a band-pass filter, which we do not have here, it will be no 1:1 copy anyway. One can, however, give the sound slightly increased contour with a fairly wide-open filter resonance. When properly adjusted Tune ratio, the cowbell sounds good on several pitches.


*A cowbell is highly dependent on the proper tune-ratio of the two VCO's.*

***Conclusion***

The Dark Energy / mini-case combination is not only a classic synthesizer, but can also be great for generating effect sounds and used for samples. The options outlined in this section should really be just a few examples and suggestions which can develop from one's own experiments on. The fun is at least as high as the utility value. Until the next time when we will have a look at soundshaping.

**AMAZONA.de - Workshop:**

# Doepfer Dark Energy & Mini Case

## Part 3

**by ''der Jim''. on 02/05/2012 translated by: Ricardodilago@gmail.com, with kind permission from http://www.amazona.de**

Winter time, cold time. Without a guilty conscience one can remain at home sitting in front of his beloved synthesizers. Therefore, here is another part of our workshops on Dark Energy with mini-case extension. This time the subject is: Practical Meets Soundshaping.


*The Dark Energy is supported by a 2nd time VCO, a second envelope and 2 Soundshapers*

**Placement**

In this part there is a variable configuration for the mini-case. Of course, again, an A-110 oscillator is used. As we noted in Part 1 and Part 2 of the workshop, the sound capabilities of the Dark Energy gains enormously by a second oscillator. Another sound source remains on the sidelines this time. Rather, we want to eliminate another weakness of the Dark Energy, namely the lack of second envelope. So far, we could not accommodate the mini-case with an envelope unit, since two VCO's respectivly a VCO and a noise generator and the mixers were needed, there simply was not enough space available. But because this time we use one VCO, we can put in an envelope. We have chosen the standard ADSR A-140. The envelope can generate extremely fast or extremely slow curves due to range switching, and has two normal and an inverted output. Of course you can use an other envelope module if it is no wider than 8 or 10 HP (units). The CV-controllable decay module A-142 would be a viable alternative.

Otherwise, we fill the mini-cases with soundshapers. Alternatively, we have chosen three different modules for this workshop, but of course you can also opt for a different module. With this 8 HP spaces are filled up. In the remaining 6 spaces, we use the dual ring modulator A-114. And the remaining 2 spaces can be concluded with a blanking plate. If you want to use even this last bit of space even more useful, for instance 2 TE modules by Intellijel design a multiple inverter can be installed.

**Double-wrapped**

With a second envelope, the potential rises almost like a synthesizer with a second oscillator – lucky us for having both. With the second envelope different curves for filters and volume are possible, of course, alternatively, a different sound parameters can be controlled with the envelope. An essential application is different decay times for volume and filter cutoff. While the volume slowly fades away or is kept high with full sustain, you can modulate the filter with a much shorter and percussive decay. This is handy not only for deep filtered bass, but also usefull for traditional lead and quickly triggered Sequencersounds. Similarly, for fake chord sounds like they are used in Minimal genres. More on this in the section of the A-115.


*CV and Gate of the Dark Energy control VCO and envelope*

The drive of the second envelope is very simple. The gate output of the Dark Energy is patched to the gate input of the A-140. In parallel, the CV output of the Dark Energy controls the oscillator in the mini-case on the CV1 input. The output of the envelope can now optionally be connected to the sockets VCF F or VCA A on the Dark Energy, to control either filter or VCA. That would be the default application. Of course, pulse width and pitch (VCO PW / F) or a parameter of the Soundshaper, which is located in the mini-case, are meaningful modulation targets.

You now have the choice of whether to control the internal envelope of the Dark Energy filter or VCA, while the A-140 module takes the other parameters. Since the control inputs of the Dark Energy have no attenuator, the decision is fairly straightforward. Because the filter needs an attenuator constantly while the VCA can be controlled over the full range. So on the Dark Energy we turn VCA switch “AM-source” to the middle position and connect the output of the A-140 controls to the input of VCA A. Now, the second envelope controls the volume. As now the full range is covered, the AM control is ineffective and can be turned to zero.

The internal envelope is now only responsible for the filter (XFM-source switch to ADSR) and can be adjusted according to taste in modulation depth and values. If another parameter is to be controlled instead of the filter, you can
a) patch the internal envelope to the the input you want or
b) the internal envelope switch to the VCA and take the second envelope for this parameter.

With the 2nd Envelope the VCA and Filter can be controlled separately, which is especially benefits basses
(go to amazona.de for soundsample).

**Tip**: If you can do without the ring modulator you could install the dual attenuators A-183-1 instead. So one would have the possibility to adjust both envelopes and modulation depths to all destinations, and also the audio input of the Dark Energy can be dosed.

**Triple bend**

Although we have made of the Dark Energy with our mini-case extension a complete synthesizer, the system has a weak point. Because the internal VCO can not be picked up separately, it can only be connected to the internal filter, but not be edited with a module in the mini-case. Using another filter in this system is thus of little sense, since you can only process the external VCO with that, while the Dark Energy up till the VCA would be virtually unemployed.

Nevertheless, we will use this sound-shaping modules again. The idea is this: The module can indeed only process the second VCO but we make its waveform flexible and merge it with the Dark Energy VCO. So we get a vivid and aggressive signal that we can shape with the filter of the Dark Energy.


*The Bit Crusher is fed by the VCO and modulated by DE-LFO*

**A-189-1 VC bit Modifier**

The bit modifier, also known as Crusher, is a digital effect that can manipulate a signal sample rate and bit resolution. So here we get a completely new tone in our analog system. The module provides 16 different modes, which break down the signal. With the two parameters BC (Bit Crushing) and SR (sample rate), the sound is set. The lower the parameter, the more broken the sound. Here one must make the balance in the two values. If you set SR to maximum, BC has little effect. Only with reduced SR you get the typical lo-fi sound. Drastically change the sound when you send sine or triangle in the module. At extreme settings, the signal may even lose its tonality. Therefore, it is good if the Dark Energy VCO is used here as a "support". The module has also delay modes for short delays, which can produce sounds very wiry.The parameters BC and SR are CV-controllable, but their own CV4 primarily slow modulations of the LFO or Pitch Wheel> for it.

The Bitcrusher produces digital sounds that can be tamed with the DE filter (go to amazona.de for example)

The sometimes very aggressive sound that comes from the A-189-1 should be tamed with the Dark Energy Filter. If the filter is controlled with a short decay and low sustain, assertive, percussive sounds can be created for which we do not even need the Resonance. Via the controllable input of the A-189-1, the levels at the DE-audio input can be adjusted.

**A-115 Audio Divider**

The A-115 is a combination of synthesizer and mixer and is thus ideally suited for our cramped mini system. An audio divider divides an incoming signal down by octaves. A typical application of this technique is the classical sub-oscillator. The signal generated by the divider is always a square wave, no matter what you put into it. The module generates four octave divisions, which would be enough for normal use within the Subaudiorange. But one has only to think "the other way round". We  set the second VCO at a very high octave. It makes sense that the sound that the average control F / 4 outputs, equals the pitch of the Dark Energy VCO . Then you have the other four controllers for two octaves below and above the signal. So you can mimic a classic sub-oscillator to mix or a higher-tuned signal. If you mix three or four layers with each other, it can lead to strange effects, so that the signal is changing in tone and strength. You have to try for something that you really need for your sound and what regulators can be left alone.


*The divider is used as a sub-oscillator generator and for simple chords*

Here we can rely on a trick from our first workshop part. With the divider, we produce a mixture of 2 octaves, possibly three layers thick. The Dark Energy-VCO (rectangle), however, comes at an appropriate interval as fifth or seventh. Through this interval, the seamly phase-locked signal and a relaxed, though very simple, chord is obtained. Again, we bring back the filter into the game to bring the raw sound in the shape we like.

With the divider and the DE-VCO can be generated simple Chordsounds (go to amazona.de for example)

**A-136 Distortion waveshaper**

The term distortion (distortion) is for the A-136 indeed true, but somewhat misleading. The object is not a heavy metal sound, but an incoming distorted waveform. Waveshaper's are more like what one imagines it to be. It is best to use a triangle or sine, with sawtooth and square the results are less severe. Internally, the signal is divided into three parts and five controls can bend both positive and negative portions separately.Thanks to two CV inputs, the process can be modulated, and similar to the Bitcrusher also slower movements are suitable here.


*The wave shaper processes the sine of the second VCO and together with the DE-VCO sent through the DE-filter*

As with the regular (analog) pulse-width modulation waveform can drive up to the audible range. Therefore it is recommended that the Dark Energy VCO always herzunehmen for duplication. It modulates the pulse width and parallel to the parameters of the A-136, produces a very lively and full sound. An alternative application would be to patch the second VCO to the Dark Energy filter both VCO's and send the Dark Energy Output to the waveshaper. Especially at high resonance this affects the distortion audibly, but signal noise breaks may remain, since the wave shaper is sitting after the VCA.

Sine of the second VCO processed using the wave shaper (go to amazona.de for example)

**A-114 Dual Ring Modulator**

Unless a A-183-1 is installed in our system the dual ring modulator is an option to complement our system, we use only one of the two sections. A ring modulator is always fed by two signals and outputs the sum and difference. Depending on the ratio of the two signal sources the result can be metallic sounds to the insane. But we run again into the vulnerability of the system, the Dark Energy VCO can not be tapped. That is why we take the second VCO and LFO 2 of Dark Energy, which has an output on the front panel. The LFO you can drive up to audio range, but not play chromatically. The results are therefore mostly oblique.


*The ring modulator is fed by the DE. 2nd VCO and LFO*

If operated with the LFO rectangle in Subaudiorange, it creates a nice rhythmic effect. In audio, you should rather use the triangle and try to set a speed in which at least some of the notes of the

melody is played in harmony. Delving around with frequency of the LFO, one comes to settings that are reminiscent of Sample & Hold or create a new series of notes apparently. If, for VCO and LFO square, matching ratio is obtained with a digital sound that is reminiscent of the SID sound.

Second VCO and LFO DE-ring-modulated, with only Subaudiobereich rectangle, then the triangle at high frequencies (go to amazona.de for example)

***Conclusion***

There is much more possible with our small combination of basically very simple Dark Energy and the mini-case. Whether classic 3-VCO synth (Part 1), noise generator (part 2) or, as here as an analogue / digital combo - with extended sound spectrum of the Dark Energy makes more than twice as much fun. The entry into the modular world with such a manageable system is much easier than with a full-size frame. And makes over time, perhaps even an appetite for a few more modules - and a few - and a few ...

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