FMZ

USER MANUAL

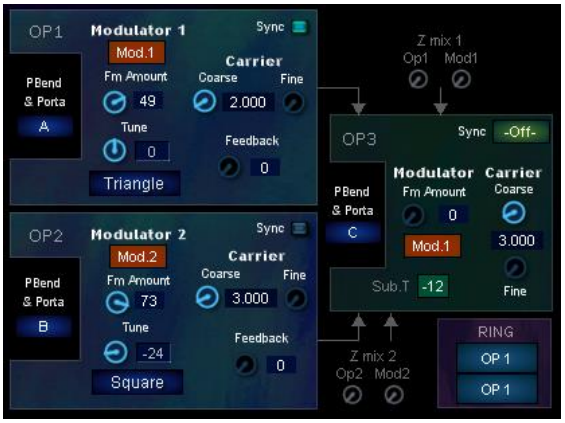
INTRODUCTION

One particularity of FMZ is that it is built like a Modular Rack, but without any modulator. All Modulators should come from KrOn or other equipment.

Another particularity is that it allows creating FM algorithms very similar to the ones found in the DX100 synths. Instead of selecting an algorithm, you do it by selecting modulator sources and which filters are actually heard in the output section. Ok! FMZ has only 3 operators, but it is generally enough for most FM sounds. FMZ is not a recreation of DX synths, and wasn't made to recreate famous electric pianos and bells. It is DSP FM, made in Scope, and it also offers access to VA and other sound colors.

The operators can be mixed in 3 "Amp Channels" with Modulated filters, modulated levels and an "ADR" EG that can be triggered by Notes-On or external modulators.

OSCILLATORS SECTION



An operator is made of a "Carrier" sine Wave modulated by a "Modulator".

Each operator has its own Modulator-Oscillator. But you can chose to use another modulator. For example, you can use modulator 2 on Carrier 1.

Operator 3 has more FM modulator options than Operator 1 & 2. However the Modulator included in Operator 3 – which is called "Sub T" - is limited to Triangle and can only be transposed -12 and -24. It is a sub-triangle wave, that forces you to use the Carrier tuning, or other modulators.

In FMZ, the Modulator is calibrated for Sine and Triangle waves, but the other shapes can work. Additionally, there is 2 "Z-Mix" and a Ring source.

OPERATORS 1 & 2

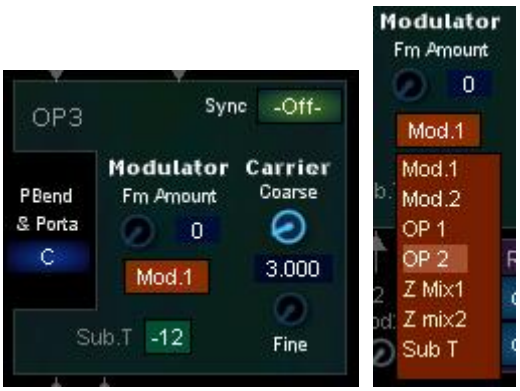
Operator 1 and 2 are the same.

Sync button: the Carrier can be synced to its modulator, or not. This has an influence when the Carrier Pitch is modulated. In other instance, the effect can be hard to notice.

The "FM amount" and "Feedback" are the most important parameters in FM Synthesis. That's how you get frequency changes.

It is normal that high amounts of feedback cause a "noise" like sound. It is used to create FM Snare drums. Through CV, you can control "FM Amount", "Modulator Pitch", and "Carrier Pitch".

OPERATOR 3



Operator 3 is a bit different than the others.

It is made to be modulated by other operators rather by its own modulator.

"Sub-T" was added at the very end of the design "just in case", but it limited to Triangle Shape, can only be transposed to octaves and does not have its own Pitch modulator. It is there as a bonus but there is a lot to do in the other areas. Sub-T helps making Operator 3 different Operators than the 2 others, which is good.

Operator 3 is made to be modulated by all other operators and modulators. The Carrier pitch of OP 3 can be modulated through CV.

Z MIX AND RING

"Z-Mix" is an optional mix of the Operator and its Modulator. So it is the modulator running parallel to the FM operator (which is modulated by the same modulator). Using the Z mix by itself can give very fat sounds.

Ring is a "Ring oscillator" of a sound source by another. The position of the input does not matter: for example if you have a ring of Op1+Op3, it is exactly the same as Op3+Op1.

"Z-Mix" is available as a modulator and as a sound source in the mix section. "Ring" is available as a sound source only.

Tip Ringing a source with itself gives a sound close to the source (a little bit different but useable as an oscillator). By ringing "Sub-T" to itself, you can use it as sound source for the filters.

AMP & FILTER SECTION

This section is simply 3 mixing channels with modulated filters, modulated levels, and VCA for each channel.

It is organized like this

- Pre-Filter mixer levels
- Filter selection and settings
- Gain Boost/distortion (-inf to +12dB)
- Level modulation
- Triggered ADR envelope (attack/decay/release)
- Mono Insert Fx
- Pan
- Stereo Insert FX

Then each channel goes to the final VCA and output level.

You can link some controls of AMP 1 & 2 by using the blue button in between AMP 1 and 2.

- Levels
- Filter Type
- Filter Frequency
- Post Filter Gain

OSCILLATOR LEVELS

Set the volume of the various oscillators here.

There is no rule and you could send the same oscilllators to 3 filters, or each oscillator to its own filter to layer sounds.

The OP1 and OP2 channels can be switched to VA and Zmix, for more sound options.
FM = Operator Output
VA = Modulator of the operator
Z 1 or Z 2= Operator and modulator in parallel.

FILTER AND GAIN

Old DX synths do not include filters.

FMZ offers 3 filters :
1 – Off (no filter)
2- Lowpass
3- Bandpass

After the filter, a +12dB Gain allows to boost signals or to distort them.

LEVEL MODULATION & TRIGGERED EG

The **level modulation** must be activated (button on/off). Then, you can access Offset and modulation Amount setting.

The Trig.EG is a “Triggered ADR Envelope”. Basically, it is a Attack/Decay envelope, with the possibility to add release.

The trig EG can be triggered by “Notes-on”, CV and trigger messages.

The Level modulation can be modulated by all CV inputs as well as the trigger inputs. It simply gives extra modulation inputs. If you use the free SpaceF Logiquencer, it is a good idea to plug it to the trigger inputs of FMZ, and to choose what works best between Level Mod and EG Triggers.

FX AND PAN

FX on synths is not something usual on SpaceF synths. On FMZ though, it can be useful or just fun to try. It also allows to use basic eqs just before recording the synth through the direct outputs.

IMPORTANT: the FX are after the final VCA of the synth. It is done like this to save Dsp.

OUTPUT VCA

The VCA is applied to all AMP channels.

When “Drone” is On, the VCA is bypassed.

In the internal circuit, the Output VCA is placed just before the Insert Effects.

OUTPUT VOLUME AND BOOST

This is where you set the general volume of the device.

The potentiometer is a level (max = + 0dB), while the menu allows to boost the gain by increments of +3 dB (+0,+3,+6,+9,+12).

CV SECTION

OP 1 & 2 CV

You can modulate the Pitch of the Modulator and the Carrier as well as the FM Amount.

When used with KrOn, you get exact notes when the pitch pots are at Max position.

On the picture at the left, check the position of Op1 Pitch of Mod 1 and Carrier:

- The Mod 1 is at half position and carrier is at max position. This is the kind of setup to use when the Carrier is not synched.

Tip: The Carrier Pitch modulates the Pitch Frequency in a continuous way. Another great way to modulate the carrier Pitch is with a Midi CC assigned to the Coarse parameter of the Carrier.

OP 3 CV

It is the same as op1&2 except that you cannot modulate the pitch of the Sub-T modulator.

Do not see it as a limitation but as a characteristic. In fact, FMZ was designed without the sub-T which was added at the very end of the design “just in case someone needs it”. Operator 3 compensate by offering much more modulator sources than Op1 & 2.

FILTER FREQUENCY CV

Modulate the frequency of each filters by selecting a source and a modulation llevell.

You can Invert the signal by pressing the blue button at the right of each Amount potentiometer.

INTERNAL VU METERS

Internal gain in FMZ is pretty high, and the Gain Boost of the Amp channels is an opportunity to saturate that channel.

If you do not want any saturation, you can verify the levels at various points of the mono-circuit. The menu allows choosing “post-filter / post-gain/pre-Fx1/post Fx1.

Some positions are before the VCA and EGs, and will show a continuous signal, while other positions are after EGs and will show signal only when the envelopes are triggered.

GLOBAL SECTION

Sets the master tuning for all oscillators at once.
Range : -36/+36

PITCH BEND AND PORTAMENTO

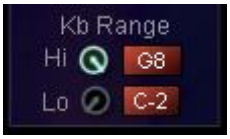
Like on the original DX 100, you can assign each operator to a different pitch bend.

The way to use it is to set 2 pitch bend at different values and to keep one at 0 (Off), which is the mode of the original DX 100.

You could also use 3 different pitch bend values.

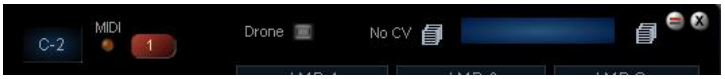
The portamento can also be different for each operator.

KEYBOARD RANGE



You can create layers of split keyboards with this function, without the need for any other module. You just need to add several SpaceF synths, set there keyboard range as you wish, and begin to play multi-synth setups.

MIDI, DRONE, PRESETS



The midi section includes the incoming midi note, the midi activity led, and the channel selector.

The “Drone” allows to bypass the final VCA.You still have access to Level modulation and triggered EG. The No CV preset list is the same as the main preset list, but includes no parameter of the CV section. Refer to KrOn’s Manual for further information.

Thanks for using FMZ!