

SYNTRX

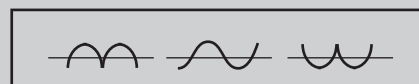
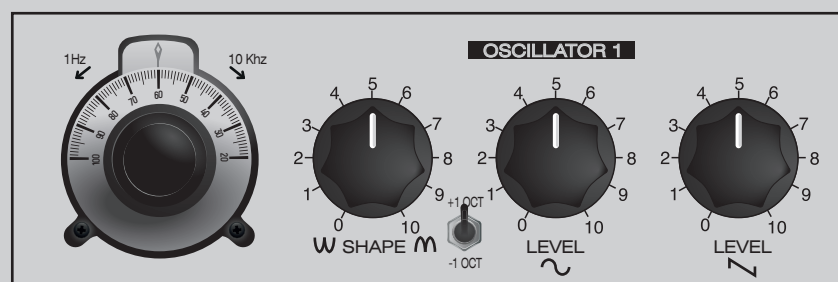
THE “MODULES”

The SYNTRX is somewhat similar to the modular synthesizer – here you can modulate any available “module” with another, and possible connections are almost limitless. The mixer/splitter matrix allows the mixing of up to 16 signals to one output and likewise – because all inputs and outputs are buffered – split one signal to up to 16 destinations. Let’s take a closer look at individual “modules” in order to fully understand all the functionality of the synthesizer.

OSCILLATOR 1

OSCILLATOR 1 is primarily an audio rate oscillator and without an external CV applied, it generates sine and sawtooth waves at frequencies from 1Hz to 10kHz and has a +-1 oct switch. Both waves are mixed before being routed to the patch matrix with an adjustable level for each wave. Furthermore, the sinewave has a manually adjustable waveshape. If an external CV is used, Oscillator 1 is controlled via CV1 input.

Set the master frequency of Oscillator 1
Flip a switch to change the pitch of Oscillator 1 for +-1 one octave instantly
Set the sinewave signal level
Set the sawtooth wave signal level

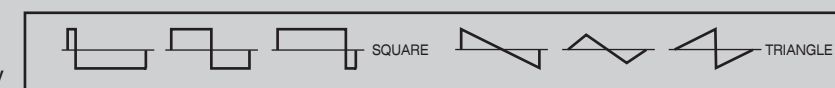
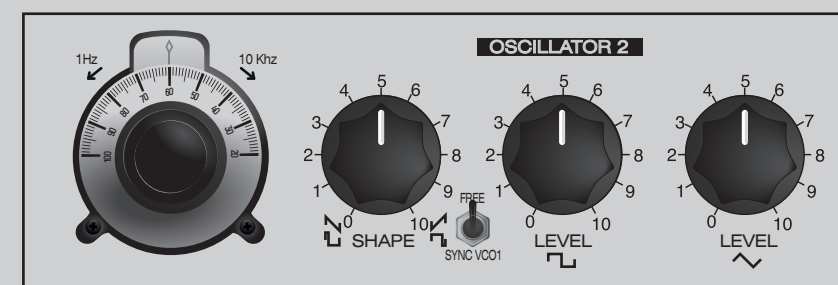


OSCILLATOR 2

OSCILLATOR 2 is primarily an audio rate oscillator and without an external CV applied, it generates pulse and triangle waves at frequencies from 1Hz to 10kHz. Both waves are mixed before being routed to the patch matrix with an adjustable level for each wave. Both waves have a manually adjustable waveshape.

Oscillator 2 can be free running or synchronized to Oscillator 1. If the external CV is used only on CV1 input, Oscillator 2 is controlled via CV1 input, but if CV2 is used, it takes over control of Oscillator 2.

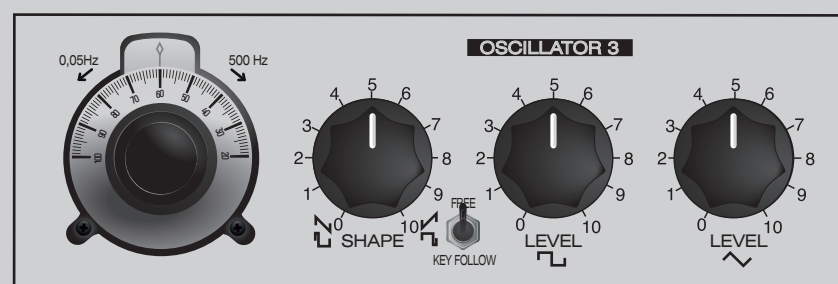
Set the master frequency of Oscillator 2
Adjust the waveshape manually; it simultaneously affects both waveshapes
Use the switch to synchronize Oscillator 2 to Oscillator 1
Set the pulsewave signal level
Set the triangle wave signal level



OSCILLATOR 3

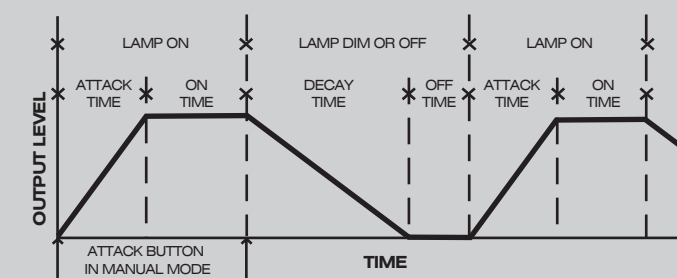
OSCILLATOR 3 is functionally similar to Oscillator 2, but it's primarily a low frequency oscillator that goes into audio range, and without an external CV applied, it generates pulse and triangle waves at frequencies from 0.05 Hz to 500 Hz. Both waves are independently available on a patch matrix with an adjustable level for each wave and both waves have a manually adjustable waveshape. Oscillator 3 can be free running or controlled via an external CV (key follow).

On the patch matrix, the triangle output shares the input with the Sample&Hold output. Use the switch on the Sample&Hold module to select the output, which is routed to the matrix! Set the master frequency for Oscillator 3
Adjust the waveshape for both waves simultaneously
Use the switch to choose between a free running or CV controlled mode
Set the pulsewave signal level
Set the triangle wave signal level



TRAPEZOID

SYNTRX has a distinct looping envelope generator, functionally similar to the one found on the EMS Synthi, and called a TRAPEZOID, because the envelope shape reminds one of a trapeze. The Trapezoid generates control voltages to control events on the SYNTRX – the amplitude of the signal, the pitch of the oscillators, the cutoff frequency of the filter, the reverberation mix, etc. By default it's a looping envelope generator with 4 stages – attack, on, release (decay), and off.



All stages are manually adjustable and the decay stage is also voltage controlled, so the decay time of the envelope can be varied automatically. If the OFF control is set to more than 9, looping is terminated, and a new envelope circle can be initiated by pressing the ATTACK button next to the joystick controller. If SYNTRX is used with an external CV/Gate signals (connected to the CV and Gate inputs correspondingly) or a MIDI keyboard or sequencer, in most cases looping must be switched off (OFF control all the way clockwise), otherwise, when the gate is off, the envelope will start looping. Also, with the external gate signal applied, the ON knob will have no effect – the ON time is defined by the gate length. The AD/ASR switch allows one to select between the full attack-on-release-off envelope (ASR) and the attack-decay envelope, where ON and OFF controls have no effect, but a decay stage begins as soon as the attack voltage reaches the maximum level. This is particularly handy to produce sharp, punchy sounds, and also - when in manual attack mode (pressing the ATTACK button) – to cancel the effect of holding the button for a longer time. The output level of the envelope generator is adjusted by the TRAPEZOID knob. In other words, it's a modulation depth for other “modules” on the SYNTRX.

Besides the envelope generator, the trapezoid unit has a built-in voltage-controlled amplifier (VCA); its control voltage input is linked to the output of the envelope generator. The audio signal input for the VCA is the ENVELOPE input on the patch matrix, and the SIGNAL control in the trapezoid unit sets the audio signal level after the VCA output.

Set the ATTACK time for the envelope generator (6ms – 850ms)

Set the ON time for the envelope generator (0-1.5s)

Set the RELEASE/DECAY time for the envelope generator (16ms – 2s)

Set the OFF time for the envelope generator (14ms – 1.3s) and turn the looping off, when the control is set full clockwise

Select between the ASR and AD envelope modes

Set the envelope generator (TRAPEZOID) output level

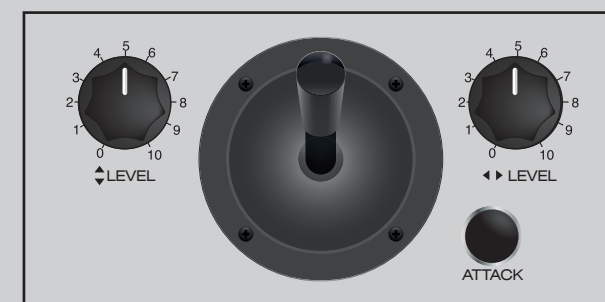
Set the VCA signal output level

The LED gives visual feedback on the envelope generator status

JOYSTICK

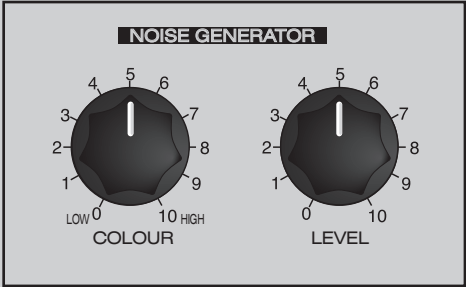
The JOYSTICK enables one to alter two bipolar control voltages simultaneously. These control voltages can be applied to control parameters on other “modules” e.g. the Oscillator pitch, the Filter cut-off frequency, the VCA gain and others. The X and Y level controls define the range of control voltages, where the maximum range is -5V to +5V. The joystick is connected to pins 15 and 16 on the patch matrix, and there's a hidden feature – the control voltage from user defined MIDI CC messages is added to the one from the joystick, so you can have more versatility in controlling the SYNTRX.

The Joystick module also features a manual ATTACK button that controls the envelope generator described above.



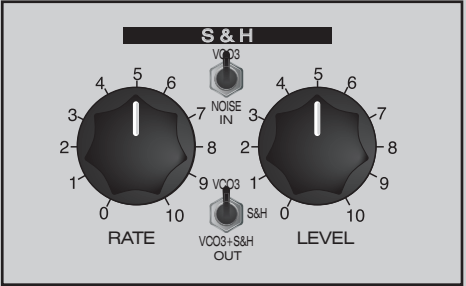
NOISE GENERATOR

SYNTRX has a Zener diode based NOISE GENERATOR that provides full spectrum white noise. The Noise Generator is not voltage controlled, but the COLOUR knob allows the emphasizing of the low (LOW setting) or high (HIGH setting) frequencies of the noise spectrum. Adjust the COLOUR – frequency spectrum of the noise - manually Set the noise signal level



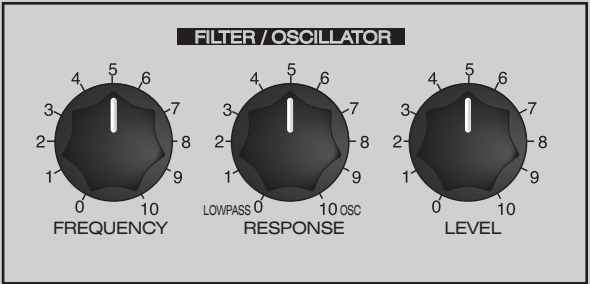
SAMPLE&HOLD

SAMPLE&HOLD generates stepped control voltages for voltage control of other modules. It has independent sample RATE control as well as LEVEL control, and two switches – one selects the input signal, the other – the type of signal that is sent to the patch matrix. The matrix has only 16 inputs, therefore, the Sample&Hold shares the matrix input with the Oscillator 3 triangle output. Adjust the sample rate manually – from one sample in a few seconds to a low audio rate. Adjust the output signal level – the control voltage span. Max span is -5V - +5V Select the input signal for the S&H circuit. The available options are a triangle-sawtooth wave from Oscillator 3 and Noise. The triangle-sawtooth wave (depending on the waveform knob setting) will generate staircase-like control voltages on the output. Noise will generate random voltage steps. Select which signal is routed to the patch matrix! The three position switch selects between a triangle-sawtooth wave from Oscillator 3 (unaffected by the S&H circuit), S&H output and a mix of Oscillator 3 and S&H outputs for super random modulations.



FILTER/OSCILLATOR

The FILTER/OSCILLATOR is a resonant lowpass filter of unique design. It can be modulated at audio rate and when the resonance is set to 10, it becomes an oscillator that produces a pure sinewave. The frequency of the oscillator will depend on the Frequency knob setting, as well as on the CV applied to the Filter Frequency input on the patch matrix. The Filter/Oscillator will not track 1V/oct. Set the cut-off frequency for the lowpass filter. The Filter Frequency control voltage is added (or subtracted, if it's negative) to the knob setting Set the desired resonance level. In settings above 9, the filter will start to self-oscillate Set the filter signal level



RING MODULATOR

The RING MODULATOR, also known as a Four-Quadrant Multiplier, is a special case of amplitude modulation - one signal changes the level of (or “multiplies”) the level of the second signal. Two signals (A and B on the patch matrix) are required in order for the ring modulator to operate (if you multiply by zero, you get zero). For example, two oscillators running at audio rates or an oscillator and microphone patched into one of the Inputs on SYNTRX. Depending on the input signal frequency relationship, the output is a complex set of component tones, being typically metallic, bell-like sounding. When voice from the microphone is modulated by an oscillator, a robotic speech effect is achieved. Set the level of the ring modulator output



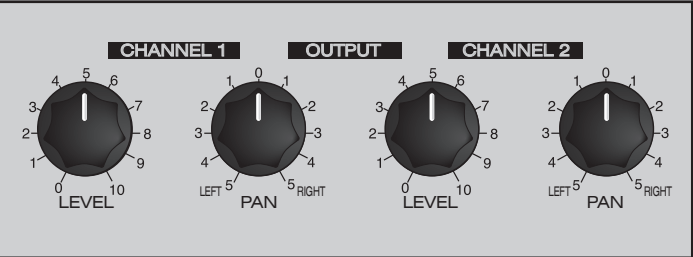
REVERBERATION

A REVERBERATION effect is achieved by feeding the audio signal through the spring reverb tank and then picking it up and mixing it with the original signal. As this is actual spring reverb, not digital emulation, the reverberation unit may make a slight noise, which can be heard at higher output signal levels. It can also pick up mechanical vibrations from other sources, and feedback from internal loudspeakers may occur. Therefore, when using the internal loudspeakers, control their loudness, unless you want to use the reverberation unit as another sound source. Fade between DRY (unaffected audio) and WET (processed through the reverb tank) signals manually! This is also a voltage controlled setting, and control voltage is added to the knob setting. The reverberation unit on SYNTRX features a manually adjustable amount of spring feedback. At far CW settings, the module goes into self-oscillation and you can basically use it as an instrument on its own, even with no audio input. For studio recordings you may want to reduce the noise from the spring reverb even more, therefore the "Matrix Off" mode is implemented. Push and hold the SHIFT button below the matrix mixer and push the RECALL button. All connection LEDs will go off, while the connections on the matrix will remain active. To resume connection LEDs, push or turn one of matrix encoders.



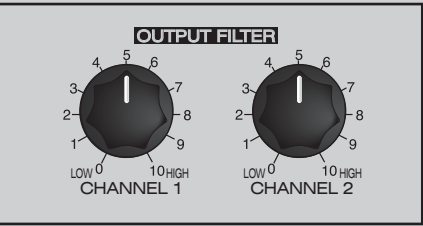
OUTPUT AMPLIFIERS

The OUTPUT AMPLIFIERS are the final treatment for the audio signal before it's sent to the internal loudspeakers, headphones and to the outputs. As there are two output channels (Ch1 output and Ch2 output on the patch matrix), and each channel has stereo panning controls PAN (the manual only control), a user can design advanced sound scapes in stereo. The LEVEL controls allow one to set the output level manually, but there's a voltage controlled amplifier on each channel, so the control voltage from the patch matrix is added to the manual level settings, providing even more versatility in sound design.



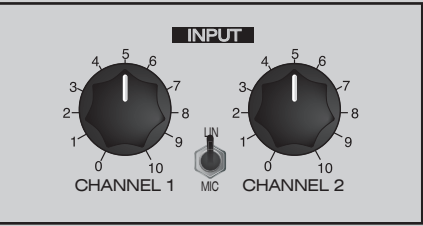
OUTPUT FILTER

Both output channels feature an OUTPUT FILTER, which is essentially a tone control. If the control is at 5 on the dial, the frequency response is flat. Turning the control counter-clockwise (towards the LOW setting) it boosts lower frequencies, while turning it clockwise (towards the HIGH setting), boosts higher frequencies. These are manual only controls. Use the output filter to do the final treatment for the sound for each channel.



INPUT AMPLIFIERS

The SYNTRX has two external audio signal inputs. You can use the instrument as an FX unit for external signal treatment or to inject the external signal into advanced patches and generate completely new sounds. Two identical INPUT AMPLIFIERS are implemented to adjust the level of the external audio signal and/or to boost it to the necessary level. The gain switch selects between line level signals on the input and microphone level signals (this setting is also recommended for guitar pickups). Select the input amplifier gain and adjust the signal level. You can also overdrive the signal in the far clockwise settings of the level controls.



METER

The METER is used to monitor both CV and audio signal levels in the SYNTRX patches. The internal signal levels in the SYNTRX are modular level, meaning, the normal unattenuated audio signal is 10Vptp. CV signals may be up to -10V - +10V . Use the switch to select between CV and audio signal measurement. In the Audio setting, the measurement starts from the left side of the scale, and the full scale is 12V. In the CV setting, the centre of the scale is 0 and it indicates both positive and negative voltages. The maximum range is from -10V to +10V.



SPEAKERS

The SYNTRX has two built in speakers for monitoring purposes and experiments with feedback loops. Use the MUTE/ON switches to turn them on or off. At louder settings, the speakers may distort the sound and with spring reverb in action, they will go into feedback loop with the spring. You can use it as a sound source for future treatments. You may also want to try playing feedback loops with a microphone connected to the input and bringing it to the speaker. Obviously, the best monitoring is achieved with studio monitors or headphones, so built-in speakers are a nice extra on the SYNTRX.

