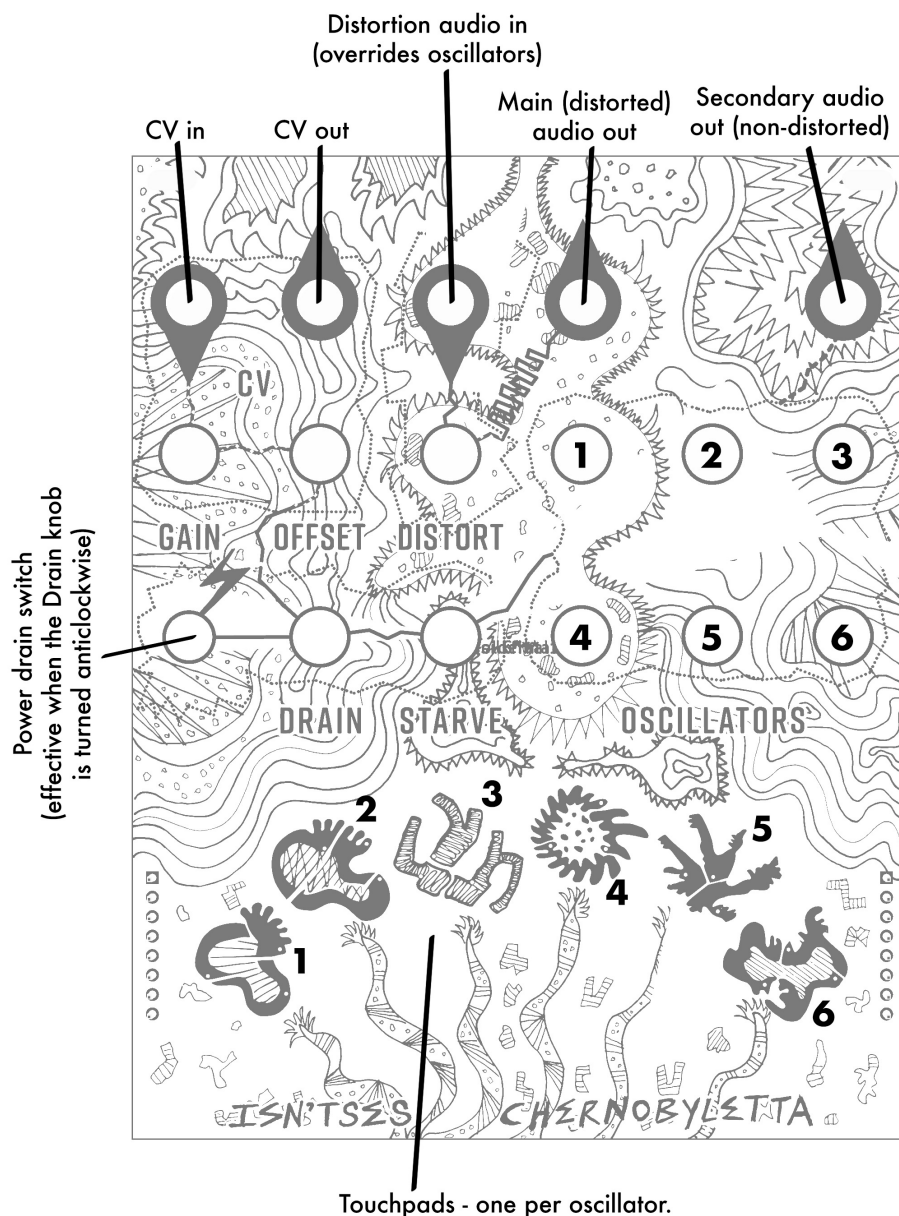


CHERNOBYLETTA

Eurorack module by Isn'tses

The CHERNOBYLETTA is a distortion/drone/noise Eurorack module developed from the 'Chernobylizer' standalone noise synth. It's 20hp wide and requires a standard eurorack power supply.

The main signal is created by 6 oscillators which are controlled by knobs, CV, power starve and a unique power drain function, and modulated by touchpads. The chip which creates these 6 squarewaves is powered by the CV input, giving an unusual kind of voltage control over the noise which gets very chaotic at lower voltages. The Gain and Offset knobs give you the flexibility to use bipolar signals, (eg LFOs or even audio) unipolar signals (eg ADSR, sequencers etc) or any other eurorack signal, and the module is also fully playable without any CV input.



Technical specifications:

Panel Width: 20HP

Module Depth: 46mm

Power: +/-12v standard eurorack 10-pin connector, red stripe down. (Doesn't connect to 5v or signal rails)

Power consumption:

+12V: about 50mA

-12V: about 10mA

Inputs + Outputs

CV input - Connect a control voltage (e.g. LFO, ADSR, sequencer or audio) here to control the overall pitch of the oscillators. Rather than a conventional VCO circuit, the CV directly powers the oscillator chip so this is not voltage-per-octave, or even HZ/Volt, but works in it's own warped and unorthodox way while being very playable and having a wide range.

CV output - This is an optional output from the CV scale/offset circuit, and can be used to send the the modified CV signal to other modules.

Distortion input - This overrides the oscillator signal so that you can run external signals through the distortion instead. When something is plugged in here, you will hear that signal out of the main output instead of the 6 oscillators. However you can still get a non-distorted version of the 6x oscillators signal out of the secondary output jack.

Main (distorted) output - (4th jack from the left) This is usually used as the main audio output. The overall loudness and distortion level is controlled by the Distort knob.

Secondary (non-distorted) output - (5th jack from the left) This is a clean signal from the oscillators without any distortion. It's usually quieter than the main output and has a different sonic character. Its overall volume may drop when the starve controls are used. This signal is mainly intended be processed though other fx/gain/distortion/filter modules for different sounds. It can also be used to make a feedback loop when patched back into the CV input of the Chernobyletta.

Controls:

CV Gain knob - Controls the CV input level, from zero all the way up to fuzz/distortion levels which can square off the CV waveform if you want. Note that if you don't have a CV input connected this knob does nothing.

CV Offset knob - Adds a bipolar offset to the CV signal so you can tweak it positive (clockwise) or negative (anticlockwise). You can take this to extremes, clipping the CV into complete positive or negative DC offset if you desire. Without a CV input jack connected, the CV Offset knob controls the overall pitch of the oscillators directly and manually.

Distort knob - Controls the amount of fuzz/distortion/gain on the main output. The distortion circuit is very high gain and can go very loud. It uses LEDs as clipping diodes, these shine through the front panel so you can see as well as hear the noise.

Oscillator 1, 2, 3, 4, 5, 6 knobs - These 6 knobs individually tune the pitch of the 6 starved oscillators, which are then mixed together and sent to the outputs. They have a wide range so you can go from near-ultrasonic high pitches right down to low rumbles, crunches and clicks below the audio spectrum. Oscillators 1 & 4 can go down to a lower pitch than the others.

Drain switch - Switching this upwards injects a fixed voltage into a bank of large capacitors. When the drain knob is turned anticlockwise this takes over the CV signal. Subsequently switching it off again cuts that voltage source and you get the classic Chernobylizer power drain effect.

Drain knob - When turned anticlockwise, this reroutes the CV through a bank of large capacitors which can also be charged by the drain switch, causing weird smoothing of the signal and a gradual draining effect. When turned all the way clockwise the drain effect is turned off and the drain switch position doesn't effect the sound.

Starve knob - Starves the CV signal, changing the pitch and increasing the chaoticness of the noise in mysterious ways. Fully clockwise is maximum voltage with no starve effect, turning it anticlockwise starves the circuit. Setting it just a tiny bit down from fully clockwise is often a good starting point for interesting sounds.

Touchpads - there are 6 touchpads which modulate the 6 oscillators. Each pad has 3 segments. The effect can be extreme or quite subtle depending on the knob settings, how dry your fingers are, finger position on the 3 segments, and which different pads you touch at once. They work best when the CV is slightly starved. You can also make contact between the pads with the ends of a patch cable. Do NOT touch them with a cable that's connected to any jack of this or another module though, as this could possibly damage the oscillator chip!

Find out more about the Chernobyletta on our blog at
<https://isntses.weebly.com/blog/chernobyletta-new-eurorack-module>

BUILD GUIDE AND BOM

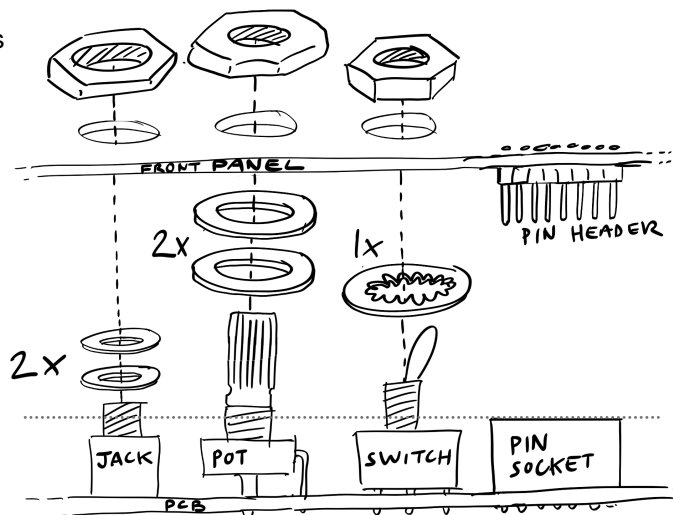
Solder the components in the order listed below, this makes it easier to get them neatly flat against the PCB

Take care to solder all components on the correct side of the PCB as noted below. Jacks, sockets, switch are on the reverse of the PCB, i.e. the opposite side from the other components, facing the front panel.

Make sure polarised components (Diodes, LEDs, electrolytic capacitors) are placed the correct way round, and that the notched/dotted end of ICs and IC sockets match those printed on the PCB.

Before soldering the the jacks, pots and switch, it's best to insert them all into their holes in the panel and loosely bolt them on to ensure that everything lines up properly and is level. Make sure the pin sockets and headers are all soldered straight.

Note that due to the height of the pin-header connections between the PCB and panel, the washers and bolts need to be put on in a certain order (with some washers doubled up) or things won't fit properly. See diagram:



	Value	Qty.	Notes
RESISTORS			
R1, R3, R4, R6, R9, R11, R15, R17, R19, R21, R22, R23, R26, R27, R33	100k	15	
R2, R14	220k	2	
R5, R7, R10, R13, R18, R20	100r	6	
R8, R28, R30, R37	1k	4	
R12, R35	1m	2	
R16, R34	47k	2	
R24, C17	10k	2	NOTE: C17 is a resistor not a cap!
R25	330r	1	
R32	470r	1	
R29	4k7	1	
R31	leave out!	0	
IC SOCKETS			
U1 socket, U2 socket	Dip14 socket	2	
U3 socket	Dip8 socket	1	
CERAMIC/FILM CAPACITORS			
C1, C2, C8, C9, C11, C12, C13, C14, C15, C16, C20, C21, C27	100nF	13	
C6, C22, C23, C24, C25, C26	47pF	6	
C7, C10	330nF	2	
(NOTE: C17 was changed to a 10k resistor, as mentioned above)			
ELECTROLYTIC CAPACITORS (polarised)			
C3, C4, C5	1000uF	3	
C18, C19	47uF	2	
DIODES + BEADS			

D1, D2, D5	LED 5mm Green	3	Reverse of PCB , to shine through panel
D3, D4	SB160 / 1N5817 diode	2	
FB1, FB2	Ferrite Bead	2	Not polarised
PCB connectors			
J4, J6	Pin Header 1x08	2	Reverse of PCB
J5, J7	Pin Socket 1x08	2	Facing J4/J6, on reverse of PANEL
J9	Eurorack power 2x08	1	
Loosely bolt the jacks, pots and switch to the panel before soldering, to make sure everthing lines up properly.			
Jacks and pots need two washers each, stacked under the panel, to get the spacing right. Switch has just one washer. See diagram			
JACKS	Thonkiconn PJ301M 3.5mm	5	
J1	Power-starve CV input		
J2	Bipolar CV out		
J3	Distortion in		
J10	Main (distorted) Output		
J11	Pre-distortion out		
9mm POTENTIOMETERS	T18 shaft - Alpha Vertical 9mm Potentiometer, no tab		
RV1	100k (CV Offset)		Reverse of PCB
RV2	100k (CV Gain)	2	Reverse of PCB
RV11	A1m LOG (Distortion gain)	1	Reverse of PCB
RV4	A500k LOG (Starve)	1	Reverse of PCB
RV3	1m (Drain)		Reverse of PCB
RV5	1m (Osc1 pitch)		Reverse of PCB
RV6	1m (Osc2 pitch)		Reverse of PCB
RV7	1m (Osc3 pitch)		Reverse of PCB
RV8	1m (Osc4 pitch)		Reverse of PCB
RV9	1m (Osc5 pitch)		Reverse of PCB
RV10	1m (Osc6 pitch)	7	Reverse of PCB
On-On Toggle Switch SPDT			
SW1	On-On SPDT miniature	1	Reverse of PCB
ICs			
U1	LM324 Quad Op Amp	1	DIP-14
U2	CD40106	1	DIP-14
U3	LM358 Dual Op Amp	1	DIP-8
HARDWARE			
Washers for jacks		10	2x washers per jack, UNDER panel
Nuts for jacks		5	1x nut per jack
Washers for pots		22	2x washers per pot, UNDER panel
Nuts for pots		11	1x nut per pot
Washer for switch		1	Serrated washer, UNDER panel
nut for switch		1	DO NOT OVER-TIGHTEN NUT
KNOBS			
RV1, RV2, RV11, RV3, RV4	Thonk 'Tall Trimmer Toppers'		
RV5, RV6, RV7, RV8, RV9, RV10	Black	5	
	Clear	6	