Dark Harvestator - By Isn’tses

The Dark Harvestator is a psychogeographic noise synth from Isn'tses (Tim Drage & Lisa McKendrick). The synth is based on Gruinard Island, (Anthrax Island) in Scotland and the bio-warfare experiments that took place at the end of WW2. Its name is based on the mysterious group Dark Harvest who protested against the contamination of Gruinard by leaving soil from the island outside govt buildings. It is a standalone PCB-art synth circuit which can create a wide range of textural noise, tones and chaotic bleeps. Overall the sound is very noisy, harsh and brutal, evoking crackly wartime sounds, radio interference, the rage of the sea and the Bacillus Anthracis. It also can produce more subtle drone or electronic sounds depending how you play it.

The heart of the synth is a digital chip pre-programmed with custom code which generates PWM audio, this is then put through several stages of analog CMOS distortion and and EQ control to give it an extra saturated, dirty and noisy character rather than a standard digital/chiptune sound palette. There are 5 knobs; three to control the sound parameters, one EQ knob to shape the tone, and a master volume control.

The toggle switch (‘1942-1990’) on the board has a dual function. It switches between more of a continuous sound if switched upwards or held downwards, and more sporadic and chaotic noise with the switch in the centre position. Every time the switch is released the code also randomises some parameters of the sound.
It is a 3-position switch, up and centre are latching, and down is momentary.

There is also a push button (sheep) which resets the chip to between two distinct modes. If you press it (or power on the synth) while the switch is up or down, it switches to a bleepy sound palette, and if you press with the switch in the centre position, it goes into more of a noise mode. You can experiment with this and get random sounds.

The audio output is a mono 3.5mm jack. It's best to use a mono cable. (If you use a stereo lead it will work, but audio may be heard only in the left channel).

The Dark Harvestator has a power indicator LED, and three noise activity LEDs which flicker and change in intensity according to the sound.

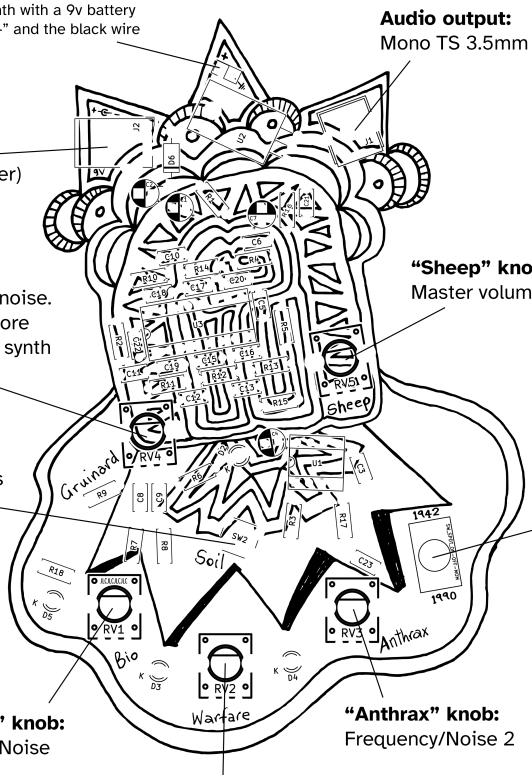
The synth runs off a centre-negative 9v DC power supply, i.e. a standard Boss-style guitar-pedal PSU. Check the voltage and polarity of your power is correct. See our blog for links to a suitable power supply.

As this is an open circuitboard synth, handle with care and make sure you don’t accidentally short-circuit anything with metal objects i.e. don’t play it on a metal/conductive surface!

Battery contacts:
Optional solder points to customise the synth with a 9v battery clip (not included.) Solder the red wire to “+” and the black wire to the pad with a ground symbol.

Audio output:
Mono TS 3.5mm jack

Power Jack:
DC 9v Centre Negative only
(ie Boss-style guitar pedal power)



“Gruinard” knob:
Tilt-EQ to shape the overall tone of the noise. The effect of this may be dramatic or more subtle, depending what frequencies the synth is producing

“Sheep” knob:
Master volume control

“1942 - 1990” 3-way toggle switch:
- Up or down: continuous sound mode.
- Centre position: sporadic/chaotic sound mode.

Up and down have the same effect, the only difference is that down is momentary for quick changes while playing, whereas the up position can be left in place continuously.

“Soil” button:
Resets the digital chip; this changes mode depending on the toggle switch position.

Combined with the ‘soil’ button, the switch also **changes noise style**. When the synth is first powered up or while the ‘Soil’ reset button is pressed, if the switch is in the centre position the synth is in **harsh noise mode.** If it’s in either up or down , it goes into **bleepy mode** instead.

Some parameters also randomise every time the switch is switched so you get a few different variations in sound.

“Bio” knob:
LFO/Noise

“Anthrax” knob:
Frequency/Noise 2

“Warfare” knob:
Frequency/Noise 1

DARK HARVESTATOR

Designed by Tim Drage & Lisa McKendric
PCB Artwork by Lisa

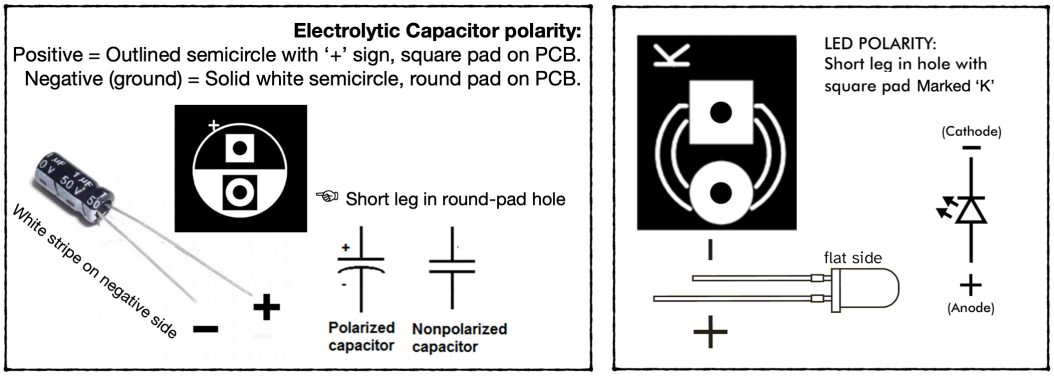
More about the develpment of the synth on our blog: https://isntses.weebly.com/blog

DARK HARVESTATOR - BUILD GUIDE

Populate the components in order of height as it makes it easier to solder them flat against the board. For example put all the resistors in first, solder them, then do the IC sockets, followed by the other components in stages. It is best to solder in stages rather than populate the whole PCB and try to solder everything at once.

Put all components in the right places, check the colour codes of resistors. They are written on the BOM and labelled in your kit. IMPORTANT: Check the capacitor values or codes which are written on them, as they can look very similar and there may be mixed varieties (looking different but with the same value) in your kit. Always check all components are in the right place before you solder.

Use electrical tape to temporarily hold components in place for soldering if you need. Once you've put the resistors in you can bend the legs to stop them falling out. Clip the excess long component legs off at the back of the board with side cutters after soldering, but take care not to pull on the component leg in case it pulls out the metal pad.



Make sure all polarised components (Diodes, LEDs, electrolytic capacitors) are placed the correct way round.

The power diode has a stripe around it at one end which should match the stripe on the PCB symbol.

Make sure that the half-circle notched ends of ICs and IC sockets match the half circle on the PCB. (the circle may be in one corner, it may be a half circle or circle depending on the particular IC brand)

Please note C23 should be left empty, do not populate this.

The switch is a 3-way on-off-(on) switch. For best playability position the momentary side towards the bottom of PCB next to the '1990'. (If you do accidentally solder it the other way it should still function).

After soldering all components, insert the ICs into the chip sockets. You may have to carefully straighten the IC legs to fit the sockets, do this by gently pressing the side of them against the table. Make sure that all chip and socket legs go in their correct holes and aren't bent underneath.

The -+ at the top of the synth is for a battery clip if you wish to solder one. Or see our blog for links to a battery clip that you buy to use with the power supply input. Having it battery powered makes it very portable.

TESTING:
Once you are sure everything is properly soldered, connect the audio output to your mixer or amplifier, set to a low volume to start with. Plug in the 9v centre-negative DC power. You should see the power LED light up and one or more of the other LEDs flickering. Turn up both the volume on your mixer/amp, and the 'Sheep' volume knob on the synth (clockwise is louder), and you should hear some noise. If you don't see any LED light up, or don't hear any sound at all, then quickly unplug the power and check that all components are in the right place and soldered properly without any dry joints or short circuits.

———

The Dark Harvestor was designed by Tim Drage & Lisa McKendrick, PCB artwork by Lisa.

To read more about the develpment and background of the Dark Harvestator visit our blog: https://isntses.weebly.com/blog/

Dark Harvestator BOM				
	Value	**Qty.**	**Type**	**Component codes and notes**
RESISTORS			*Colour codes refer to 5-band resistors -*	*If any are 4-band, look up online using resistor identifier tool*
R2	100R	1	Resistor	Brown, black, black, black, brown.
R1,R3,R5,R6,R9,R15	10K	6	Resistor	Brown, black, black, red, brown.
R4,R12,R13,R17	1M	4	Resistor	Brown, black, black, yellow, brown.
R7,R8,R14,R16	1K	4	Resistor	Brown, black, black, brown, brown.
R10,R11	100K	2	Resistor	Brown, black, black, orange, brown.
R18	220R	1	Resistor	Red, red, black, black, brown.
IC SOCKETS	**Match the half circle notch on the socket to the half circle on the PCB**			
U1	DIP-8 socket	1		
U3	DIP-16 socket	1		
DIODES + POWER				
D2,D3,D4,D5	LED	4	Light emitting diode, warm white diffused 3mm	**Check polarity, see diagram**
D6 (reverse power protection diode)	1N5817	1	20V 1A Schottky Barrier Rectifier Diode, DO-41	**Check polarity white stripe should match white stripe on PCB**
U2	LM7805 TO220	1	5v voltage regulator. **Bend legs 90 degree, insert with headsink flat against PCB.**	
CAPACITORS	**WARNING: Ceramic capacitors may look identical but with different numbers printed on them, check carefully!**			
Ceramic/film				
C3,C5,C6,C10,C11,C12,C13,C22	100nF	8	Unpolarized capacitor	104 (or u1J100 or u1J63)
C8,C9	22nF	2	Unpolarized capacitor	223
C15,C16,C18,C19,C20	10nF	5	Unpolarized capacitor	103
C17	1nF	1	Unpolarized capacitor	102
C21	15nF	1	Unpolarized capacitor	153
C23	X	0	DO NOT POPULATE - leave empty	
Electrolytic	**Check polarities, see diagram**			
C1,C2,C7	10uF	3	Polarized capacitor	
C4	47uf	1	Polarized capacitor	
JACKS				
J2	DC Barrel Jack	1	2.1mm x 5.5mm (used as centre-negative 9v DC input)	
J1	Mono TR 3.5mm audio jack	1	WQP518MA-BM (PJ301BM) - audio output	
POTENTIOMETERS				
RV1 "Bio", RV2 "Warfare", RV3 "Anthrax", RV4 "Gruinard"	B10k	4	9mm Potentiometer, **Linear** taper	**Don't get A10k and B10k mixed up!**
RV5 "Sheep"	A10k log	1	9mm Potentiometer, **Logarithmic** taper	(RV5 = volume control)
SWITCHES				
SW1 - "1942 1990"	Mode/random switch	1	3-position toggle switch: On-Off-Momentary.	Solder with momentary position **down** (facing “1990” text on PCB)
SW2 - "Soil"	Reset button	1	PCB mount 6mm pushbutton switch	
ICS	**Match the corner dot or half circle on the IC to the half circle printed on the PCB**			
U1 (insert into socket)	ATtiny85-20P DIP-8	1	Digital chip **pre-programmed** with Isn'tses code.	
U3 (insert into socket)	CD4049UBE DIP-16	1	CMOS Hex Inverter, **un**buffered (UBE) version.	
CIRCUIT BOARD	PCB	1	Printed Circuit Board	
	Stick-on rubber feet	4	(or bolt the synth to a non-conductive base, i.e. wood or plastic NOT METAL)	

isntses@gmail.com isntses.bandcamp.com isntses.etsy.com isntses.co.uk