

Cubic Clarity

Noel Keywood listens to Sugarcube's SC-1 digital click remover for LP. Big digital meets analogue.

The Sugarcube SC-1 from SweetVinyl of California I'm reviewing here is a digital noise removal system for LP – one that banishes ticks and pops, cleaning up old or just noisy albums. It's quite complex and must be calibrated initially using a computer's web browser – I had 'fun' here! The unit itself is a fascinating piece of wizardry, but the instructions – oh!

At £1550 the SC-1 doesn't come cheap. It's built on a high quality digital conversion system comprising 24/192 hi-res analogue-to-digital convertor (ADC) that converts analogue to digital for 'click' removal the company say, then a 24/192 digital-to-analogue convertor (DAC) turns it back to analogue.

The SC-1 is a processor, not a phono stage: you can't plug a turntable into it. It must be fed by an independent external phono stage, or linked into an amplifier via its Tape in/out sockets (rare nowadays) or Pre/Power in/out sockets. At the price an on-board MM/MC phono preamp could perhaps have been made available since nowadays the circuitry needed is simple and inexpensive, but the SC-1 is a high-end unit aimed at users likely to already have a quality phono stage. It's digitally complex and this is what you pay for: digital cleverness rather

than analogue convenience.

As a separate processor the SC-1 needs its own space in a hi-fi rack but it slots in easily enough, measuring 306mm wide, 310mm deep and 54mm high. Weight is a low 2kgs. Connections are via RCA phono plugs only (no balanced XLR), identified as Line In and Line Out. There is no gain (x1) and no volume control.

Power comes from an external switch-mode power block (supplied) rather than an internal supply and the power switch is a small toggle on the rear panel – not so convenient but the unit consumes little power, the external switch-mode supply being rated at 12V at 1A, whilst the unit's quoted power dissipation is 9 Watts. The unit can be left switched on, but it does not meet the IEC requirement of <1 Watt consumption on standby.

The SC-1 processes relative to signal level from LP so it has to be calibrated against a reference tone from LP. This is usually 3.54 cms/sec rms groove velocity at 1kHz but for some reason the company have chosen to use a 3150Hz Wow & Flutter test tone from a 7in test disc – a 'single' – that comes included. Whilst the unit calibrates internally the calibration process is controlled externally by an app or a web browser – I used a Mac's Safari

web browser. Once calibrated into the system it is set to go and use is relatively simple.

There are ten levels of noise reduction within the digital processing chain and the option to switch between processed (Repaired) and unprocessed (Original) using a central button marked Click Remove. However, the instructions and product literature don't explain that in unprocessed mode where the signal passes through the ADC and back out through the DAC, there also lurks a strong warp filter that eliminates very low bass, below 30Hz our measurements showed – probably to prevent strong subsonic warp signals affecting the processing. This explains why there is a full Bypass option that cuts out the digital chain altogether so you can hear the original analogue – warps, subsonics and all – which LP by its nature possesses.

These options make for a fascinating experience that demonstrates clearly what the SC-1 is doing. And as if all this was not enough SweetVinyl also include another very impressive way to get the hang of what is going on: a Click Monitor. Press this and you get to hear all the clicks that are being removed – the clicks and only the clicks, no music or anything else. Listening to this I couldn't help but



be impressed! It was like being hit by a high frequency machine gun.

So, onto the malarkey of setup. First, the unit must be connected to a network or computer via wired or wireless link; I used an RJ45 terminated wired ethernet link into our network but this can go direct into a computer. Press Bypass for a few seconds and info appears on the small screen including an IP address. This has to be entered into the web browser with a suffix added '5123'. I missed the suffix bit and cursed at failure to connect, but another read of the instructions solved this niggle. A menu then appeared requiring a password, that must be obtained by pressing a 'Pairing' button on the rear of unit. With this done a simple set-up screen appears that isn't in itself very helpful. But worse was to come.

With the computer set up to control the unit's internal processing system the 7in test disc must be played. Simple – except at what speed? There was nothing on sleeve or disc stating rotational speed and no mention in the instructions either! 7in 'singles' normally spin at 45rpm but I second-sensed that may not be the case here – and it wasn't.

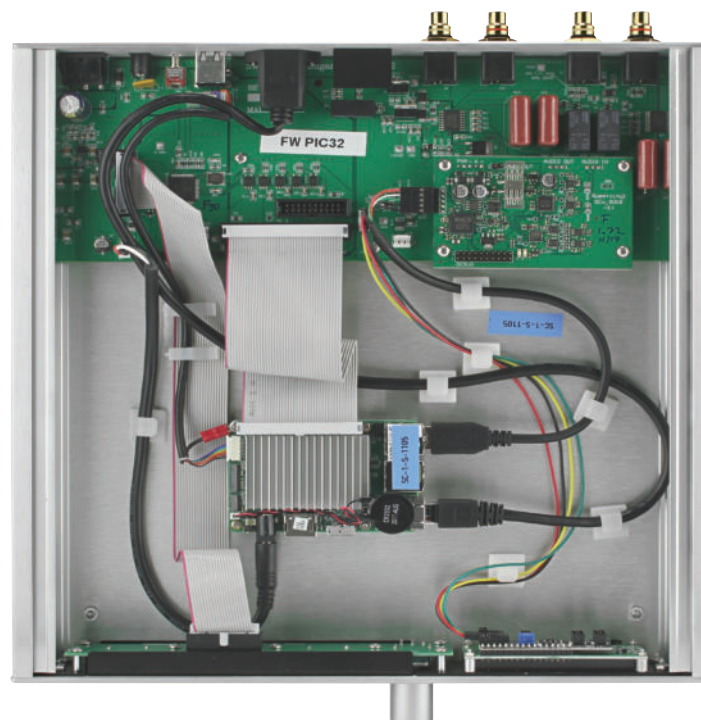
"Play Side 1" the instructions say, but there are two tracks on Side 1. Which track? The instructions don't say – absurd. The first track is a long 3150Hz speed stability test tone, the second a 1kHz reference tone comprising out-of-phase L & R. Peering at the instructions with a magnifying glass I saw SweetVinyl's published data screen shot showed a 'freq' 'avg' (frequency average) of 3217, telling me they were using a turntable running +2.1% fast to play the 3150Hz tone. I used a frequency meter to find the test disc must be spun at 33rpm to produce 3150Hz, not 45rpm as many might expect.

With 33rpm selected on our quartz speed-locked Timestep Evo Technics SL-1210 Mk2 turntable, the tone was correctly seen by the software as producing a perfect 3150Hz tone with 0.1% error. The sensing system works very well, but the disc's lack of speed info and the instruction's total blindness to the issues involved were – well – whatever! Fill in the blanks.

With the SC-1 calibrated it was time to see what it could do.

SOUND QUALITY

For listening tests the Sugarcube SC-1 was fed by our Timestep Evo Technics SL-1210 Mk2 with SME309



To the left of the analogue, gold plated input and output sockets (at right) sits a large LAN (Local Area Network) socket with connection into the processor that facilitates computer setup.

arm, carrying an Ortofon Cadenza Bronze moving coil (MC) cartridge. Phono stage was an Icon Audio PS3 Mk2 (all-valve) with volume set to maximum, so the volume control has no influence and output is high, but still well below 1V (the SC-1 has a 5V limit – see Measured Performance).

Output from the SC-1 was fed to our Icon Audio Stereo 30SE single ended valve amplifier driving

SC-1 could do I listened to the locked run-out groove. This was a fascinating demo.

The locked groove was horribly noisy, ragged sounding vinyl roar suggesting very low quality vinyl had been used (perhaps why the following album Ta Da was cut at 45rpm). Switching Click suppression in cut out sharp ticks but did not affect the ragged roar, overall not having a great deal of influence.

"It was impressive, almost turning LP into CD – without the harshness."

Martin Logan ESL-X hybrid electrostatic loudspeakers.

An Isotek Evo 3 Mosaic Genesis regenerated power supply was used to ensure mains noise and distortion did not affect the SC-1 or Martin Logan's XStat electrostatic panels.

Now, which one of our array of test LPs, used for their lack of damage, do I use to assess this unit, I thought? I lighted on the Scissor Sister's eponymously named first album that has a sharp quality, with spit and surface noise. Initially, to get a good handle on what the

This underlines the fact that the unit suppresses short-term clicks but not all noise; it does not offer a universal panacea. However, it was obvious that clicks had been largely if not completely removed at 10 (max) and selecting Click Monitor directed a shower of clicks through the speakers – those that had been removed. It was a shock!

Playing the album rather than the run-out groove showed that cymbals remained intact, if a little dulled with 10 (max) selected and the music was otherwise sonically affected little, although there is a



The rear panel carries chunky gold plated RCA phono socket inputs and outputs (at left), an RJ45 ethernet LAN socket, USB sockets and a 12V d.c. input for connection to the external power supply. Note also the crucial Pair button used during set up, situated between USB and d.c. sockets.

SugarCube SC-1 **#1105**

My SugarCube

[Click/Remove control](#)
[Audio tuning \(test record and levels\)](#)
[Wifi Setup](#)
[Control display](#)
[Support](#)

Stop Monitor Calibrate Set Default

Device also_input.usb-SweetVinyl_SugarCube_ADDA_SPDIF_r1.72-class2-00-SugarCubeADDASP.analog-stereo
 less than a minute ago

Status: Audio setup complete. Gain adjusted from -12db to -21.5db, -9.5db relative to default

The intro control screen and the adjustment screen showing completed Gain adjustment after detection of the 3150Hz test tone from supplied test disc.

whooshing of surface noise upon needle drop but this was short lived.

CONCLUSION

The Sugarcube SC-1 processor certainly worked well – listening to the Click monitor proved that. It is a click suppressor and does not make a noisy LP suffering vinyl roar silent but it does suppress clicks, as claimed and silenced classical performances especially well. I suspect classical listeners will appreciate its ability to make old performances on vinyl more bearable. It's certainly worth hearing – but setup on a web browser via ethernet/wi-fi is awkward and SweetVinyl need to sort out both the instructions and test disc issues.

slight general sense of smoothing and warming. SweetVinyl suggest 5 is an appropriate default setting and this was about right, but at 5 some ticks and pops still get through; the cleaning effect isn't total.

With classical the picture became far more positive. An Acoustic Research demo record, The Sound of Musical Instruments (1972) pressed in decent vinyl but a tad noisy after decades of use showed especially well that with this balance of degradation the SC-1 produced almost silence from LP. It was impressive, almost turning LP into CD – without the harshness.

Using Bypass to switch out the ADC/DAC digital processing line and its warp filter added some low end warmth and fullness as expected, but the filter has been well designed to leave low bass intact so bass lines in our Rumours LP remained strong for example. Also, the warp filter cleans and speeds the low end a bit so has its own sonic merits.

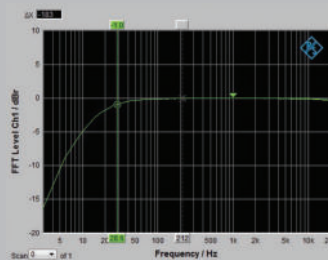
The delay line also delays needle drop and keeps the music playing after the arm is lifted – eery! On occasion I heard a hunting or

MEASURED PERFORMANCE

The Sugarcube SC-1 accepted a 5V input as claimed, but only from a balanced source. Fed from an unbalanced source as is likely in use it has a limit of 2.5 V, still high enough for most systems.

However, there appears to be an issue here, possibly balanced input op amps ungrounded. Distortion at 1V input measured a low 0.003% and noise was low too at -96dB (below 1 V).

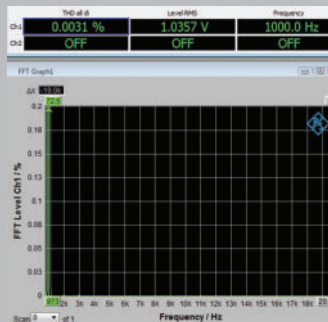
FREQUENCY RESPONSE



Frequency response within -1dB limits stretched from 30Hz to 33kHz (-1dB) our analysis shows, the upper limit being 96kHz as expected with 192kHz sample rate internal processing. The lower 30Hz limit is set by a warp filter that introduced -11dB attenuation at 5Hz – substantial. Bypass switches this out.

The Click monitor output showed frequencies above 15kHz are attenuated sharply.

IMPEDANCE



The SC-1 measured well in most areas but has a lower input limit than claimed when fed an unbalanced source, as is likely in practice, but this will not be a limitation in most systems. **NK**

Frequency response (-1dB)	
30Hz-50kHz	
Distortion (1 V)	0.003%
Separation (1kHz)	92dB
Noise (IEC A)	-96dB
Gain/overload	x1, 2.5V

SUGARCUBE SC-1 £1550

EXCELLENT - extremely capable

VERDICT
 A hi-tech LP click remover that works well, but set up needs a computer.

FOR

- effective click removal
- little affect on sound quality
- simple to use once understood

AGAINST

- very difficult to set up
- no turntable phono input
- expensive

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