Line-level processor offering (vinyl) click/pop removal
Made by: SweetVinyl, LLC, Mountain View, CA, USA
Supplied by: Henley Audio, Oxfordshire, UK
Telephone: 01235 511 166
Web: www.sweetvinyl.com; www.henleyaudio.co.uk
Price: £1549

AUDIO FILE

hi-fi news HIGHLY COMMENDED

SweetVinyl SugarCube SC-1

For many vinyl junkies, the Holy Grail is scratch-free record reproduction. This new device throws serious digital signal processing at the problem, and largely succeeds
Review: **Nick Tate** Lab: **Paul Miller**

You'd think there would be more products like the £1549 SweetVinyl SugarCube SC-1. After all, it's not as if we've never come across a scratched record before. Maybe there's still a kind of folk memory of products such as Garrard's late '70s MRM101 Music Recovery Module [*From The Vault*, *HFN* Jan '17], whose analogue filters-in-a-box were so invasive they removed the music along with the sound?

This new digital design, alongside its pricier and more sophisticated SC-2 big brother, promises so much more. It sports a high quality Asahi Kasei analogue-to-digital converter, complex digital signal processing and a well regarded ESS DAC, plus iOS/Android app-based control and fine build. Unlike that old Garrard, there isn't so much as a trace of teak-effect sticky-back plastic to be seen…

ABOVE: SC-1 is looped between a phono stage (line in) and amplifier (line out) with Ethernet for app control and USB for supplied Wi-Fi dongle

DECEPTIVELY SIMPLE

The SC-1 is a line-level device that slots in between your phono stage and a preamp or integrated amplifier's line input. It's a well turned out unit with an array of connections on the back, including gold-plated RCAs for line in and out, a 12V DC power input – a separate power supply is included – Ethernet and USB ports, plus a 'Pair' button for smart devices. The Pair feature and Ethernet/USB sockets enable app control, with a USB dongle supplied for wireless use. It's also controllable in the conventional way too, via the front panel.

Inside, there's an embedded computer solution that holds it all together [see our internal picture and PM's boxout below] while the fascia remains neat and no-nonsense, with three buttons for 'Bypass', 'Click Remove' and 'Click Monitor'. The first switches the unit out of circuit completely, the second switches in the de-clicking DSP, and the last plays the removed clicks only – a fascinating thing to listen to, giving you proof of the SC-1's efficacy.

The 'Strength' knob lets you dial in the amount of 'Repair' you want, and the display gives a graphical representation spanning from 1 to 10, the default being 5. SweetVinyl itself recommends a Repair level of 5 or 6 for general use, saying that 10 is overkill and advising that 'sometimes less is more'. Finally, a 7in Adjust+ test record from Dr. Feickert [adjacent, below right] is supplied for automatic level setting within the SC-1 and the results accessible, again, via the partnering SugarCube app.

CLICK HERE

The SugarCube SC-1 takes the precious (equalised) analogue signal, converts it to the digital domain, performs powerful DSP on it, then converts it back. This isn't a free lunch of course, and you can clearly hear the conversion process in the loop.

However, you can switch it out completely with the Bypass button, and when active it proves less invasive than you might expect. There's a slight diminution of the soundstage – especially front to back depth – and a subtle drying of the tonality, plus a slight loss of low level detail too.

SWEET SOPHISTICATION

Naturally – and given the moderate boot-up time for the SC-1 – there's a self-contained computer at work within. A casual inspection might suggest this is a module from the ever-popular Raspberry Pi stable, but it's not. In fact SweetVinyl has opted for a significantly beefier 64-bit Intel Atom x5 Z8350 processor-equipped SBC (Single Board Computer) from Up Board [*www.up-board.org/up/*]. The SBC [the 'hub', with heatsink, pictured adjacent] hosts four USB 2.0 ports, one of which is connected here to an XMOS interface board [top right] that also includes a top-of-the-range AK5572 ADC from Asahi Kasei in tandem with an ES9018K2M DAC from ESS. The ADC samples incoming audio at a full 768kHz/32-bit, which is passed to the SBC, while the DAC converts the 'repaired' audio at 192kHz/32-bit. The SBC also hosts wired 1GB Ethernet, used here to support SweetVinyl's partnering control app. PM

By contrast, there's nothing subtle about how this box of tricks removes clicks. I have a heavily distressed copy of Isaac Hayes' *Shaft: Original Soundtrack* [Enterprise ENS-2-5002] – a dog-eared old thing on the original Stax label. Even after careful cleaning it still has plenty of clicks and pops, and despite the recording's superb quality these can really distract.

At its lowest setting, the SC-1 didn't do much, but moving to Strength 6 transformed the listening experience. It was uncanny to hear a record for which I once had to make all sorts of excuses, sound so shiny and new. Like swapping a can of Coke for a bottle of vintage Châteauneuf-du-Pape, I certainly felt I had walked away with the better deal, caveats notwithstanding.

HIGHER AND HIGHER

As you turn the control higher, fewer clicks and pops get through, but there's a sense that you're listening to the vinyl equivalent of processed cheese – like a weird sort of MP3 as you head towards 10. The trick is to get the Strength as low as possible before surface noise starts ruining the party. There's also a fraction of a second delay as you adjust the level, rather like an old tape monitor loop.

Of course, the SC-1 is a de-clicker and not a noise reduction device, so it didn't remove the lead in/lead out groove rumble on my tired copy of The Dukes' *Bugatti & Musker* [WEAK 58479]. So this unit deletes clicks, rather than fixing outright disc wear.

ABOVE: Simple and straightforward – Strength dials up ten levels of click/pop attenuation while Monitor reveals what noises, or sounds, have been removed

The Bee Gees' 'Too Much Heaven' [*Spirits Having Flown*; RSO MWF 1058], from my 'disco era', always annoys because it has a quiet background that's a veritable playground for snap, crackle and pops. Yet again, the SC-1 was able to put an end to much of this, ferreting out most of the disc surface imperfections and making the song so much more listenable.

The only downside – apart from the SC-1's ever-so-slightly processed feel – is the fact that you'll find yourself tempted to twiddle the control knob mid-LP. Once it's there and you know it really works, then it can become a distraction. Each individual record side is different, so it's possible to get a little obsessed.

In fairness, this is only because the SC-1 works so well when 'tuned' to the disc you're playing. I found myself dropping the Strength setting down as far as possible before the scratches re-announced their presence – the less processing used, the better the sound. Your quest will be to find the happy medium!

HI-FI NEWS VERDICT

Although initially sceptical of SweetVinyl's SugarCube SC-1, extended use convinced me that it's actually a very well designed product that really does work. I'd not use it with pristine vinyl – because it has a sonic fingerprint – but it magically restores badly scratched record surfaces to being listenable once more. Worth investigating, for those with more distressed discs than they know what to do with.

Sound Quality: 82%

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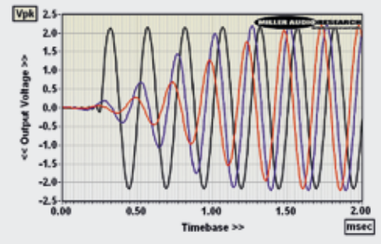
LAB REPORT

SWEETVINYL SUGARCUBE SC-1

Subjective impact of the custom DSP aside, the design and execution of this product is undeniably impressive. Input/output level matching is superb with a gain difference of just +0.2dB after 'repair' and while the maximum input level (also the maximum output level) is less than SweetVinyl's claimed 7.7V, a figure of 4.5V is more than adequate. The sub-1ohm output impedance suggests the SC-1 will be cable-agnostic while the A-wtd S/N ratio is also on a par with the very best phono stages at 91.2dB (re. 0dBV). The frequency response is suitably extended out to –0.22dB/20kHz and –25dB/90kHz, the latter figure limited by the 192kHz DAC sampling rate and analogue filtering. The sub-bass is rolled-off, however, to –1.5dB/20Hz and –6dB/7Hz so the SC-1 may 'improve' the performance of a DC-coupled phono stage used with reflex-loaded loudspeakers!

Importantly, the SC-1 is *not* a noise-reduction device but a click-removal regime based on the relative amplitude and risetime of signals within the music stream. A full bandwidth (20Hz-20kHz) impulse, sampled at 44.1kHz, for example, is completely eliminated by the SC-1 at all levels of 'repair' (1-10) while a 4kHz toneburst [black trace, below] illustrates the graduated 1msec-1.5msec attenuation window applied between minimum '1' [blue] and maximum '10' [red] settings. **PM**



ABOVE: 4kHz toneburst (bypass, black trace) showing attenuation and latency with minimum 'Repair 1' (blue trace) versus maximum 'Repair 10' (red trace)

HI-FI NEWS SPECIFICATIONS

Maximum output/Input level	4.5V
Gain (bypass/Click Remove)	0.0dB / +0.2dB
Output Impedance (20Hz-20kHz)	0.58-1.2ohm
A-wtd S/N ratio (0dBFs; re. 0dBV)	91.2dB
Distortion (20Hz-20kHz re. 0dBV)	0.0022–0.035%
Freq. resp. (20Hz-20kHz/90kHz)	–1.5dB to –0.22dB/–25dB
Power consumption	7W
Dimensions (WHD) / **Weight**	307x55x344mm / 1.5kg