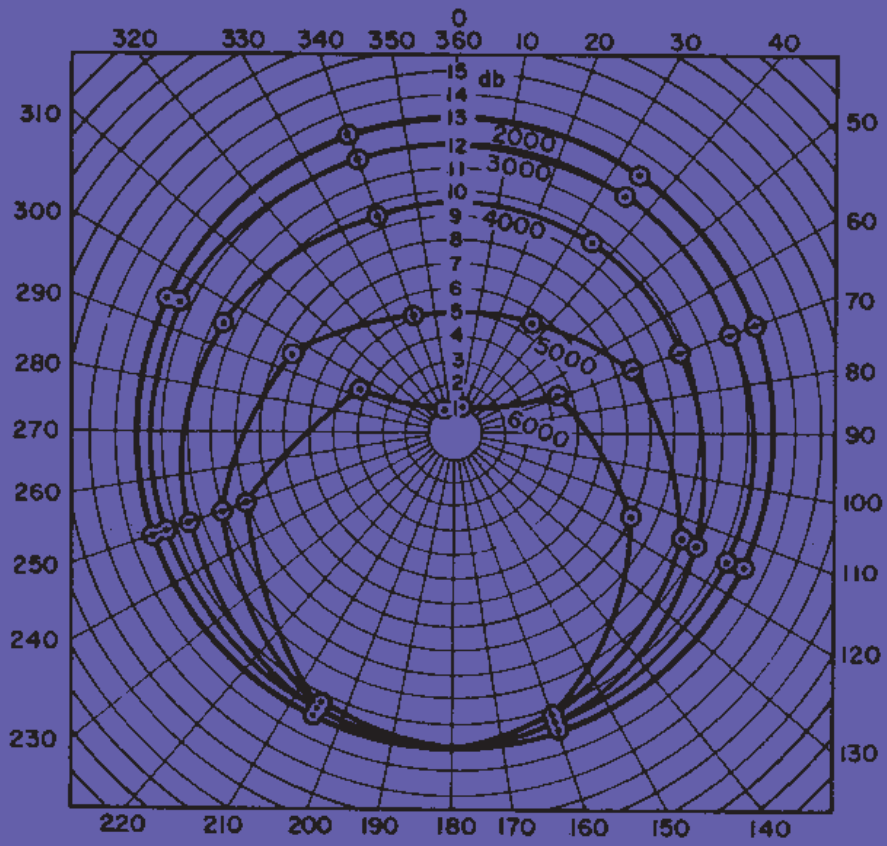
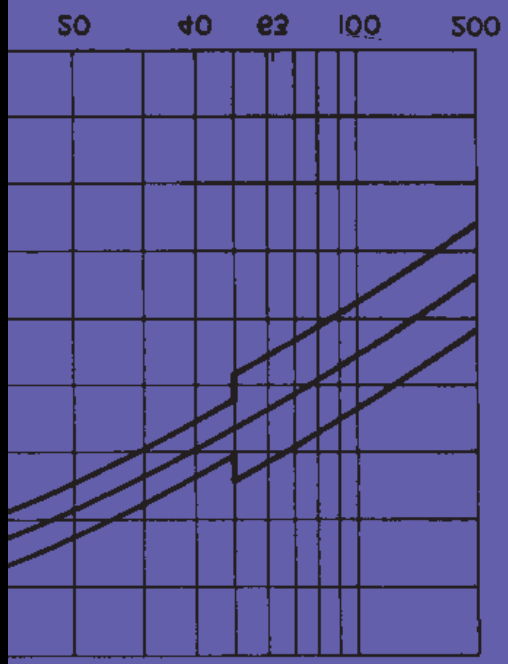
Tape Op

The Creative Music Recording Magazine

Frequency network weighted flutter measurements.





measurement

DIN 507 National Association of net casters

Allen Sides
Ocean Way & Beyond

David J
Love and Rockets & Bauhaus

Tony Green
Garage Jazz & David J

Greg Wilkinson
Oakland Metal Maven

Robin Ashley
of Phoenix Audio in Behind the Gear

Music Reviews
w/ Jon Regen

Gear Reviews

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I also passed the unit over to my studio cohort Martin Feveyear for a test drive. Martin works almost exclusively on an SSL, so I valued the opinion of someone that has logged many hours with the Quad Compressor. His impression was that the *BC1-S* is "extremely close to the SSL," with heavier compression through it sounding a little more musical than through the SSL. He also noted that the *BC1-S* is very clean, with a touch more upper-midrange presence. He thought his SSL desk compressor may have the *BC1-S* beat by a hair in smoothness and depth.

I personally used the *BC1-S* primarily on the mix bus, typically A/B'ing and printing mixes with it and my Manley Variable Mu. I produce and mix in a variety of styles, so having the *BC1-S* on hand as one of several options was a huge benefit. On a couple occasions, I used the *BC1-S* for compression duties while following it with the Variable Mu for limiting. This was really the best of both worlds for me — marrying the punch of the *BC1-S* to the warmth of the Manley.

For other compression duties, the *BC1-S* performed admirably. It was nicely aggressive on bass, as well as solid and transparent reining in vocal peaks and sticking a guitar solo in place. It was hard to find anything on which I felt this compressor was an absolute-no.

We all have our favorite pieces of gear, and this quickly became one of mine. It can operate invisibly as a utility, or it can add character when I want to dig in a bit. Once you know that this particular flavor is available, you will want to return to it frequently. There are times when this sound is exactly what an individual element or a whole mix needs to bring it home. Anyone looking for a fantastic and reasonably affordable version of the classic SSL VCA compressor cannot go wrong with the TK Audio *BC1-S*. *($1349 street; www.tkaudio.se)*

–Geoff Stanfield <geoffstanfield.com>

Audio Kitchen
The Big Trees tube amp & processor

Is it an amp or a pedal... or a DI... or outboard gear?!? *The Big Trees* really is all things to all people. Having used the Audio Kitchen Little Chopper guitar amp [*Tape Op* #82 online] a lot in the studio, I know Audio Kitchen's sound and attention to detail well. When I heard about *The Big Trees*, I had to get a hold of one. Principally, it's a 2.5 W guitar amplifier in a pedal form factor. It has two outputs: one speaker level and one instrument/line level. The speaker output is specified as "8 ohms(ish)," but Steve Crow at Audio Kitchen assured me that you can connect it to any impedance cabinet: "It will get a little hotter at 2 ohms, but it should be fine."

Using the instrument output, *The Big Trees* functions similarly to other guitar pedals — the footswitch selecting between overdrive and clean channels. The Dirt channel features gain, Root (bass), Branch (treble), Dirt, and output controls. The Dirt control operates as a power-amp attenuator or "headroom" control, and you can then balance the output level with the output control. The sound of this channel ranges from cleanish, through bluesy breakup, into classic rock crunch. It's a very defined and dynamic sound, and if you dig in hard, you get more saturation and sustain — great for big power chords and leads — but a softer pick attack or rolling the guitar volume back cleans things up, and then it'll only crunch when you want it to. Even at its highest gain, there is great note definition, and even complex chords come out very clear; there is no way to get a bad sound out of *The Big Trees*. The Root and Branch controls work in such a way that there is always a general Audio Kitchen character happening, and you're really just nudging it one way or another. Not to say that this is a one trick pony. If you cut the Root and boost the Branch, you get a great sharp funk tone that's never harsh or scratchy; and if you do the opposite, it doesn't sound muddy or "under a blanket" — it's just warm and gooey. Audio Kitchen has a very good idea about which areas their EQ needs to work in and where it doesn't — so the tone stack always feels right. The clean channel has only a level control, and in this mode, the signal ends up with a "discrete all-valve clean tone." In use as a pedal, this is the ultimate buffered bypass, but it also makes an excellent studio DI. The valve stage adds a sparkly gloss to anything that passes through it, and there's enough output to go straight into a line input. I wouldn't record a DI'ed bass without it.

As a guitar amp, its features and output may be basic, but its sound is detailed and huge, I have been running it into 4×12, 2×12, 1×12, and even 1×18 cabinets with great success. At 2.5 W of output, more conservative settings will yield good clean tones, and you can push it up through touch-sensitive crunch, up to a solid crunchy rhythm or rock lead tone. It's also a superb bass amp through my Selmer Goliath 1×18 — the combination providing a great round bottom without having to crank the Root knob unnaturally.

I (and more famous users like Gil Norton and Alan Moulder) have also had great success using it as an outboard processor. It's perfect for warming up plug-in synths or as a parallel distortion box for drums. I used it on the lead vocal for a doom metal album I mixed, after I'd already done some songs using the Thermionic Culture Vulture [*Tape Op* #45]. With the Vulture, I'd been running an EQ before and after it so I could push certain frequencies into distortion and pull out others that were getting harsh, then following that with an Empirical Labs FATSO Jr. [#24] to tame the crispy top end. The first song I used *The Big Trees* on — *The Big Trees* was all I needed. No pre and post–EQ, and no FATSO required. *The Big Trees* has the fuzz with none of the fuss!

For a guitar pedal, the price is on the high side, but I think in each of its alternate guises alone, it's more than worth the money. It's as good a recording amp as you could hope to find in terms of tone, if not features, and it offers the same clarity and refinement of its bigger brother the Little Chopper, which is twice the price. It's also cheaper than one channel of Thermionic Culture Vulture. And yet, you get all of these things in one compact box, plus that sweet DI. It's like a Swiss Army knife. I think once you work out everything it does, you could find yourself using it, as I do, almost every single day.

(£600 GBP; www.audiokitchen.co.uk)

–Al Lawson <al@tapeop.com>

MUTEC
MC-3+ Smart Clock

Master clocks are a near necessity if you own multiple digital audio devices that are interconnected. Sure, you can forgo a master clock and just chain one digital device to the next, each synchronized to the device before it, but doing so raises the possibility of introducing jitter — instability in the timing of the digital signal or clock — at each link of the chain. Also, if you repatch your chain in a different order, you'll need to change sync settings on at least two of the devices in the chain. A master clock makes life so much easier by feeding a common timing reference to all of your digital devices, and it also adds consistency to the sound of your digital studio because your converters won't be affected by changes in the sync reference.

With that said, let's be clear that there's plenty of talk — both marketing and research driven — on whether external clocks can actually improve the sound of converters, or if converters sound better when they're running on their

internal clocks. So far, the best discussions I've seen on the topic are in several whitepapers that are downloadable from the publications page of Grimm Audio's [*Tape Op* #75] website <grimmaudio.com>. These papers mirror the conversations I've had with several leading ADC and DAC designers. Here's my greatly simplified paraphrase:

To synchronize to an external reference signal, a converter typically utilizes a PLL circuit controlling an internal oscillator. Compromises exist in choosing a PLL design that favors the internal oscillator or the external reference. A converter with a "slow" narrowband PLL mated to a low-jitter internal oscillator won't change much in sound between running off its internal clock or a high-quality external one. A converter with a "fast" wideband PLL, which is often employed to reduce the jitter of the paired internal oscillator, can sound better with a high-quality external clock. On the other hand, a converter with a "fast" PLL mated to a low-jitter oscillator might actually sound worse when running off an external reference that exhibits more jitter than the internal oscillator. And a converter with a "slow" PLL driving a suboptimal internal oscillator will always sound bad, no matter the reference.

Conclusion: A "slow" PLL converter, good or bad, won't sound any better with an external clock. But a high-quality external clock *can* improve the performance of a "fast" PLL converter. Moreover, an external clock with lower close-in phase noise (narrowband jitter at frequencies close to the carrier frequency) has a better chance of improving the sound of a "fast" PLL converter.

All that is a long-winded way of saying that the *MC-3+ Smart Clock* is a great choice for a master clock because it exhibits exemplary ultra-low-jitter performance — especially in regards to close-in phase noise — due to MUTEC's 1G-Clock Technology, a variation on the Direct Digital Synthesizer (DDS) method of generating clock signals from a fixed-frequency reference clock. For the past year, I've been relying on an *MC-3+* to generate and distribute sync to my Sony DMX-R100 console [*Tape Op* #25], RME HDSPe MADI FX interface [#91], and Apogee AD/DA-16X [#59] and Antelope Audio Orion32 converters [#99].

The *MC-3+* has six individually buffered BNC outputs for word clock, as well as XLR I/O for AES3/11, and RCA and Toslink I/O for S/PDIF. It can generate clock at all the standard audio frequencies and then some — from 32 kHz to 768 kHz, plus Avid's 256× "Superclock" multiples. In addition to operating as a master clock, the unit can resynthesize and distribute an incoming clock, and it can also re-clock a digital audio stream. It even has a "10.0M" input for synchronizing to an atomic reference. Two buttons on the front panel and arrays of well-labeled LEDs make setup easy enough. I had no problems configuring the device for my studio after a quick scan of the comprehensive manual.

Sound-wise, I wanted other sets of ears to confirm the kinds of improvements I was hearing after patching in my *MC-3+*, so I asked other engineers to contribute to this review. Mastering engineer Alex DeTurk (whose credits include David Bowie, Sugar, and Willie Nelson) offers his experiences below, followed by senior *Tape Op* contributor Allen Farmelo, who worked closely with mastering engineer Matthew Agoglia (Emmylou Harris, James Taylor, Henry Butler) to test the re-clocking abilities of the *MC-3+*. *–AH*

When plugging in the MUTEC *MC-3+* for the first time, the results were immediate. I didn't have to convince myself that what was coming out of the speakers was tighter, more detailed, and expansive. My tests with the MUTEC were all done with the unit used as the master word clock, feeding into three different mastering-grade ADCs. I was most interested in how a word clock could tighten up an already good converter. I did not get into the MUTEC's interesting re-clock mode, so I'll let Allen and Matthew talk about their findings on that function.

What the MUTEC rendered to my ear was increased precision and detail in the sound stage. Where once was a ride cymbal sizzling along somewhere to the right, now became a mix element that I could point my finger at and say, "There!" In addition to the spatial detail, in more general terms, it was like a layer of gauze was removed from the speakers, and I was hearing everything a little bit more crisply. Perhaps call this better high-frequency coherence.

Gear Geeking w/ Andy...

Allen Farmelo has been writing *Tape Op* gear reviews for a decade. His reviews are always engaging, educational, and importantly, inspirational. Allen always seems to find an arc up to a concept, convention, or belief that goes beyond the specific product being reviewed. He has a way of placing the gear into a more meaningful context — how it fits into the broader spectrum of what we do as recordists. I spoke to him about his new online venture, ***Pink Noise*** <pinknoisemag.com>. "Engineers default to gear conversations because it's comfortable turf. It's not always easy to talk about ideas, creativity, vulnerable topics, and ineffable things. With *Pink Noise*, I'm often trying to take us — as an industry and a group of people making music — out of that comfort zone. I want to pull focus from the tools and get closer to why we make records." Catherine Vericolli is the co-founder of *Pink Noise*. She owns 513 Analog Recording <www.513analog.com>, a studio in Tempe, AZ with a collection of enviable gear. Allen explains, "Catherine loves gear, but often complains that conversations about gear get in the way of talking about what people are trying to accomplish. If artists ask you if you have this mic or that preamp, they rarely get to ask, 'What's the goal?' The answer to this question can eventually lead to gear choices and even to the direction you turn a knob, but collaboration should really start with the artist's vision, not the gear." The inspiration for *Pink Noise* came from a rant Allen wrote on Facebook about sexism in pro audio. "That rant flew out of me one morning while I was having coffee. I think it was building in me for a decade or more. We are anachronistically male-dominated, and in my opinion, there's a lot of unchecked chauvinism in our field. When I checked back on that Facebook post, it had been shared all over the world. I had lots of private messages from people, especially women, thanking me for saying something. Catherine was one of those people. Our conversation started with, 'What can we do to help the situation? How can we counter that trend?' Pink Noise is not just an attempt to talk about diversity. We're trying to open a channel for more intelligent thinking about our art form, and that should help build a more inclusive conversation." ••• **Joel Hamilton** has also been writing *Tape Op* gear reviews for a decade, and like Allen, his reviews are instructional and enlightening. Joel tends to move quickly into the realm of emotion, mentioning very few acronym-laced specs. He talks instead about how a product inspires him — and his artists — to capture a magical performance in a way that's far above the electrical or mechanical capabilities of whatever whiz-bang mic, preamp, or processor he's discussing. His reviews throw around phrases like "larger than life" and "romance and intrigue," while still managing to give invaluable insight into workflow and technique. Moreover, he has a way of mixing metaphors that speaks to his music-mixing prowess — with clear intentions, he wrangles together unexpected combinations to form engaging narratives that actually make a lot of sense. That's why I loved watching Joel in ***Art of Sound*** <boseartofsound.com>, an eight-part video series presented by **Bose** that covers sound and music from personal and historical perspectives. Topics include low and high frequencies; signal processing and pitch-correction; the creative process; reverb, delay, and distortion; looping with tape; and the emotional experience of sound. Each episode is paired with a Spotify playlist containing songs relevant to the subject of the video. Joel ends the series by explaining, "Perfection reads in the gesture, in the sense that that person is handing me something across time and space and through the speakers, and I'm then feeling it. When that gesture reads loud and clear, the rest of the choices are sort of the framing, or the lighting, or whatever.... That's where the perfect experience in music lives for me personally." *–AH*

Also noted was a more snappy dynamic response, especially from the drum set. The kick drum consistently across different mixes spoke more clearly in its transient attack. Again a tight coherent sound, even when the mastering got a little more pushed in level. Very defined, direct, and exciting.

I wondered while listening if this clock seemed to produce a signature sound all its own. It almost felt like an additional piece of hardware getting inserted into the chain. What I'm getting at is that I was hearing a different interpretation of the material — and I was thinking if and when this increased clarity, better-defined detail, and sharper dynamics would be unwanted. It's great for clean electronic tracks where punch, rhythm, and clarity are paramount. But what about some lo-fi, washed out, textural shoe-gaze? Would the MUTEC produce a more discrete vision than the artist intended? That of course is getting pretty subjective, but is interesting food for thought.

Bottom line is that I loved what it did for what it was trying to do, and it made each of the three converters I was auditioning sound a little better than without it. Whether it is the perfect choice for all types of music may remain to be seen — but at a street price of $799, the *MC-3+* is definitely worth checking out.

–Alex DeTurk <alexanderdeturk@yahoo.com>

When Andy reached out to me about the *MUTEC MC-3+ Smart Clock* and told me that some audiophiles were daisy-chaining two of them in re-clock mode for extreme jitter reduction, my ears perked up. Two clocks in series? Those nutty audiophiles! Of course, I told Andy to make sure MUTEC sent two clocks.

Re-clocking is different than using an external clock. Let me try to explain. In the case of using an external clock, a device accepts a clock input from an external device's clock and uses that as its timing reference. In re-clocking, the entire digital audio stream (including the clock signal of the "transmitter") is sent to a second unit downstream that strips the transmitter's clock signal and sends the data stream back out with a new clock signal — thus the term "re-clock."

It's important to realize that one cannot "strip away" any artifacts (due to jitter or other digital errors) that are encoded into a digital file during the A/D conversion that created it. What one is improving (or degrading, or replicating — or let's say "changing") when one re-clocks a data stream is the timing of that data stream's transmission. Jitter can be introduced in any number of places along the path to final D/A conversion, and "transmitter jitter" is just one of them. In some cases, in fact, improving the clock signal of the data stream can actually *reveal* artifacts that are embedded in the original data file but have been masked by distortion induced by jitter introduced in the transmission chain.

So when is re-clocking a useful tool? Whenever you must use a device that is introducing unacceptable jitter during the transmission. In my listening tests with Matthew Agoglia at his studio The Ranch <www.theranchmastering.com>, it was predictable that the *MC-3+* in re-clock mode improved the sound of a 10+ year old Sony CDP-M12 CD player, as it contains older technology (10 years is a whole era in digital tech), and it wasn't a particularly high-end piece in the first place. Also predictably, the *MC-3+* did not improve the sound of the data stream coming off of a Forssell MADA-2 converter, as that piece is very recent and of the highest quality. (Both were monitored through the reliable DAC of a Dangerous Music Monitor [*Tape Op* #34] feeding Matthew's ATC SCM100 speakers.)

What was interesting when using the *MC-3+* in re-clock mode on the not-so-great CD-player, however, was daisy-chaining two of the clocks together. I'm about to step into audiophile-speak here, but we were able to hear increased detail in the recording, improved sound staging, and more sense of space around the instruments. We didn't conduct jitter measurements, so we can't confirm that this is because double re-clocking was more stable (we assume that's the case). Regardless, Matthew and I were rather pleased with the sound of the re-clocked CD data stream, and we were more impressed when there were two of the MUTEC units in series.

Yes, double re-clocking can seem like a huge sales gimmick — rinse and repeat! However, audiophiles are a fascinating group who are interested in tiny, incremental improvements in their playback systems. I don't believe that any single small improvement is really a big deal, but I do believe that enough of those improvements (or the removal of them) can add up to something significant. For example, about 10 years ago, I bought an Equitec balanced power unit, started clocking my digital rig off of my Crane Song HEDD [*Tape Op* #26] (a great clock source all these years later), and started running sessions at 96 kHz. I got a marked improvement in my system. I'm not sure any one of those things was going to win an A/B/X shoot out, or even if it did, whether it would justify the expense. But taken together, those three millimeters start to get me a little closer to an ideal digital system. This is the game audiophiles play. Re-clocking might be one of those millimeters, and dual re-clocking might get you two millimeters closer to whatever-it-is-you're-seeking.

But more importantly, one has to weigh the expense of purchasing a re-clocking device against the expense of just getting a better transmitting unit in the first place. Perhaps the money could buy you a new CD player, or DAC, or whatever the source might be.

At only $799, the *MC-3+* is quite a find, though, because it's also a high-performance master clock. For what it did to the sound of Matthew's system, the MUTEC stood up to the internal clock in the Forssell MADA-2, and it stood up to the $1295 Antelope Audio Isochrone OCX [*Tape Op* #68] that Matthew uses to clock his Pro Tools rig. Given its price point, MUTEC may be on to something.

I dislike, even despise, the sound of so many digital tracks I inherit on projects, and more often than not, I learn that the digital conversion was the weak link. People seem to love spending money on instruments, mics, and preamps, but they chintz-out on converters and clocks — such a shame, given how much they've spent on their front end. It's like buying a $10,000 camera lens and attaching it to a cheap tourist camera body. Decades of crap-sumer crap-verters have given us literally countless digital audio files that contain undesirable distortion caused by jitter and phase noise from less-than-stellar clocking, etc. We modern record-makers swim in a sea of subpar audio files, and it's time to put that trend to an end. If you think your studio could generate better sounding digital recordings with an *MC-3+*, it might be a better purchase than the next 500-series module or whatever obviously fun toy you might have on your wish-list. *($799 street; www.mutec-net.com)*

–Allen Farmelo <www.farmelorecording.com> & Matthew Agoglia <www.theranchmastering.com>

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