

GEAR GEEKING W/ ANDY...

Back in 2003, I reviewed the *VersiPanel* roll-out wall (*Tape Op* #36), a freestanding partition made of LDPE (life-preserver) foam-core “runners” covered in heavy-duty fabric. I purchased two of them — 4 ft and 6 ft tall — and I use them during every session to vary the acoustics of my live room. For example, I often use the shorter wall around the drum kit to reduce direct-line bleed into the many mics throughout the room. The taller wall comes in handy when I need a more intimate sound for a quiet vocal. Manufacturer **Mity-Lite** (www.mitylite.com) has recently upgraded the product and renamed it **VersiFlex**. True to the name, it's now more flexible, and you can roll it into tighter-radius curves. Steel reinforcing has been added underneath the cloth at the edges of each vertical runner, and plastic end-caps top and bottom prevent the cloth from fraying as you drag the wall around. The first and last runners are made of MDF for increased rigidity, and rare-earth magnets allow you to attach multiple *VersiFlex* partitions together. My original *VersiPanels* have held up well over the years — they still look new — but with all the new improvements, the *VersiFlex* walls should last forever. ●●● Mity-Lite also manufactures the **Mesh-One**, a foldable, stackable chair that uses rip-stop, elastomeric mesh for the seat and back panels. Think Herman Miller Aeron meets the ubiquitous, folding chair. The Aeron is popular in control rooms because of its small acoustic footprint and engaging design. Similarly, the *Mesh-One* is acoustically transparent, and its design and build quality are top-notch. The welds on the steel frame are beautifully done, the powder-coat finish is flawless, the nylon frames suspending the mesh feel strong without being uncomfortably cold or stiff, and the feet are cleverly shaped to facilitate nesting when folded. By the way, the feet did leave a barely-discernible bit of black residue on my hardwood floor when a seat was dragged while weighted, but the residue disappeared with one swipe of my shoe bottom. Every guest who's sat on the *Mesh-One* has commented on how comfortable it is, and musicians who need to lean forward on their chair really like the rounded, “waterfall” seat front — no pressure points against the legs or butt. As an audio engineer, I love the chair because it doesn't squeak (at all!), and I don't have to worry about unwanted acoustic reflections off the chair — whether it's occupied or empty. If you record strings or acoustic guitars, the *Mesh-One* is a must-have. ●●● A third product from Mity-Lite that warrants mention is the **Mobile Buffet Table**. Although marketed to the food-service industry, this table couldn't be more ideal for a mixing desk. The main surface is 24" above the floor (or 29" with optional casters), and a second tier that's mounted on steel columns coming up from the rear legs is 38" (43"). These are perfect heights to hold a mixer on the table as well as speakers, displays, and other gear on the meter-bridge-like tier. An optional storage rack can be mounted below the table to hold cables and such. The table comes in various lengths and widths; and again, the build-quality is top-notch. An internal, hardwood frame coupled with permanently-bonded ABS plastic surfaces, with substantial edge-reinforcing and impact-resistant corners, attached with through-bolt T-fasteners to 16-gauge steel brackets holding welded steel legs makes for an incredibly stable platform for your precious gear, despite the table being foldable/stackable! The main table surface will hold a distributed load of 1600 lbs, and the tier is rated for an additional 180 lbs. Now imagine this table with a *Mesh-One* chair and a *VersiFlex* wall — a ready-to-go control room! —AH

Grimm Audio

CC1 master clock

The last chapter in the “Jitter Saga” has yet to be written. But the penultimate chapter has just been written by Grimm Audio, who have challenged the most sacred concept — the commonly-held notion that internal clock always performs better than external. Digital clocking has been a hot topic among audio engineers in recent years. Someone started the idea that the built-in clocks found in most converters were poor. And it snowballed from there. Reputable companies started selling dedicated system clocks. Before long, the notion that most digital converters needed a better clock became accepted as gospel. Add the fact that there exists a very real need to have a master clock when connecting multiple digital devices, and the market for digital clocks was established.

The *CC1* is a master clock from Grimm Audio, a company founded by four of The Netherlands' most prominent engineers: Bruno Putzeys, Guido Tent, Peter van Willenswaard, and Eelco Grimm. We tested the *CC1* in my mastering setup and with our Pro Tools HD systems at Treelady Studios. At the same time, Bob Katz ran a Grimm *CC1* through trials at his Digital Domain studios as well as with a Pro Tools HD rig at Phat Planet Studios in Orlando. Numerous converter brands were used, including those from Digidesign, Crane Song, Benchmark Media, Lynx, Mytek, and TC Electronic (in the System 6000), in the quest to answer the following questions. Does an external clock improve converter performance? Can an external clock degrade converter performance? Are there tools that measure clock jitter effectively? If not, why not? Given an impeccable clock signal, does our gear have well-implemented word-clock inputs that can take advantage of the better clock? And could we confirm or deny our hypothesis in blind testing?

Unlike many manufacturers, Grimm can buttress their claims with genuine high-resolution measurements and cogent explanations that don't stretch the laws of physics. Their claim is that there is a window of opportunity to improve a converter's jitter by using an excellent external clock that has very low levels of low-frequency jitter. The external clock enters the converter through its PLL (Phase Locked Loop), which is able to reduce incoming jitter to some extent, but below a certain frequency, it can only mirror the incoming jitter. So the Grimm clock, because of its extremely low levels of low-frequency jitter, can improve the performance of some converters.

So let's examine the unit. The *CC1* is cosmetically remarkable, being equally suited for the recording studio or audiophile listening room. The outer housing is powder-coated with a coarse adobe-colored finish. The front panel is solid wood (abachi) with the markings artfully burned into the surface. Status is provided by flush-mounted LEDs, which are nearly invisible until the unit is powered. Small stainless steel buttons provide controls for bank and source-rate choices. The rear panel offers connectivity and configurability: XLR ins and outs for AES3 links, word-clock in, and sixteen BNC word-clock outs. The WC outs are divided into two banks: 1-10 and 11-16. By the way, the Grimm has many unique features, including one that allows you to relock the signal going into the AES input of a DAC using the Grimm.

The *CC1* is capable of driving two different sample rates simultaneously, provided they are of the same multiple. For example, I was able to pitch source mixes at 88.2 kHz from a Lynx AES16 and capture them at 44.1 kHz on an RME AES-32 while keeping my entire system slaved to the *CC1*. You could not, for instance, run 96k and 44.1k at the same time, as they are not multiples of the same whole number (e.g., 96k being double 48k).

It's one thing to have measurements, but are they important to normal human ears? To try to settle the controversy, both authors set up tests using the *CC1* in combination with many commercially available converters. Both ADCs and DACs are potentially subject to degradation or improvement when fed external clock, so it was important to isolate which side of the stream was under test. Additionally, you must know if the manufacturer uses an integrated or independent clocking approach. What does that mean? With integrated units from Mytek and Digidesign, the master clock drives the ADC and DAC simultaneously. But in the Cranesong HEDD 192, the DAC is independent. Thus, the HEDD's DAC is not affected by its wordclock input. All the other integrated units in this review sync to a single master clock, so you can generalize that reported degradations or improvements affect both ADC and DAC. The moral is, “Never assume; know thy system architecture”. Bob's blind testing focused on the DAC section of the Digidesign unit, but was also confirmed by measurements and listening that its ADC behaved similarly. Meanwhile, Garrett's testing focused on the ADC.

BK: We conducted a blind test at Phat Planet with 8 listeners, 10 trials each — a total of 80 trials. Chief engineer Aaron Gandia and I carefully chose the source material, trained the listeners, and presented the comparisons in a way that made it as easy as possible to detect the differences. Nevertheless, a rigorous blind test is extremely hard to make, especially with such subtle sonic differences; while I took the test I found that if I lost concentration for even a moment, I could easily make a mistake. While having more trials increases statistical accuracy, ironically it potentially decreases accuracy because the listeners become fatigued. It's amazing that 60% of the total trials were correct; these listeners correctly identified and preferred the sound of the Grimm clock compared to internal clock on a Pro Tools HD 192 I/O interface. A 60% score from 80 trials means that the odds of getting this result by chance alone are only 2.7%, so we should regard this listening test as very indicative that the Grimm clock makes the 192 I/O sound better. That's what I heard. Listener comments on the review sheets include: “I heard more clarity with the Grimm, much more open sound and more depth.” “Internal clock: graininess in the upper mids. Low end, high end, and stereo image were better with Grimm.” “Grimm did seem to have more dynamic range. Stereo image is bigger with Grimm.”

GH: From our Pro Tools tests at Treelady, we focused on the AD side of things. We recorded sources through a Lynx Aurora 16-VT and a Digidesign 96 I/O on internal clock and also slaved to the *CC1*. Playback was done on the Crane Song Avocet to remove the DA from the equation. We agreed that the Grimm *CC1* improved the sound of our stock Digidesign 96 I/O units. Comments included a greater sense of depth, cleaner midrange, and smoother highs. Most notable was a tighter bass response. We were split with the Grimm *CC1* paired with the Lynx Aurora 16-VT. Most of us thought the low mids and bass were improved with the Grimm at the expense of a more aggressive, even spitty, top end. In that trade off, we felt the Lynx would sound better using its internal clock.

BK: Many converters' performance degrades when placed on external clock. In my measurements and listening tests, I found that the Mytek 8x192 definitely performs better on internal clock, as does the HEDD 192, so if you own one of these, it should always be the master clock in your studio. However, according to Grimm, the ubiquitous Digidesign 192 I/O converter performs better on external clock, if a superior external clock is used.



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GH: So how could an external clock degrade the performance of some units? We found some reasons. First, the design of the external clock could be faulty. It is possible to improve the frequencies in some areas while increasing distortion in others. Second, it may not be the clock's fault at all. Some converters have such noisy WC inputs that it doesn't matter if you have a space clock, atomic clock, or the Finger of God; as soon as the clean clock hits the PLL, noise and distortion are added, polluting the signal. Kind of like pouring bottled water into a toilet bowl and giving your dinner guests a ladle if they're thirsty.

GH: So what did we learn? First, there is a lot of misinformation circulating about external clocks. Whether that's intentional or accidental doesn't really matter; what's important is that audio engineers should educate themselves. (Good sources include white papers from companies like TC Electronic and Grimm; peer-reviewed journals; and books such as *Mastering Audio* by Bob Katz. Bad sources include web forums and advertisements.) The more we understand the tools of our trade, the better the recordings we can make. Second, using an external clock does not categorically improve every converter. In fact, performance can actually degrade in some units. Finally, if you need a house or master clock, realize that not all timepieces are created equally. In this regard, the Grimm CCI has no peer. With dual frequency banks, ease of use, and AES relocking abilities, the CCI represents the most advanced state-of-the-PCM clocking art.

BK: I think the last chapter in the "Jitter Saga" will only be written if and when a manufacturer manages to make a good-sounding, affordable converter that is audibly jitter-immune. There are many converters currently on the market which claim to be jitter-immune, but to my ears, exhibit slight, audible differences when playing otherwise data-identical sources — for example, comparing the sound of a converter with an AES3 input which produces different sound when fed from the DAW than from the CD player (with identical data).

Fortunately for us, the situation has greatly improved in the last 10 years, with the audible differences now so small that we can make sonic judgments without encountering any big surprises. (\$2995; www.grimmaudio.com)

—GH & Bob Katz, www.digido.com

Mark Fouxman (Marik)

Mod of the AKG C 1000 S mic

Even though I finished a review of more than 80 small-diaphragm mics last summer (*Tape Op* #72), I'm still discovering and testing SD mics and expect to do so on an ongoing basis — probably for the rest of my recording life. For those who missed that article, my tests focused on mono recordings of my Collings C-10 acoustic guitar through a Millennia HV-3 to Lavry Blue converters in my home recording studio. Anything that gets me a great guitar sound gets my attention, and I think I've found yet another mic that you need to know about — the Mark Fouxman mod of the lowly AKG C 1000 S (#35).

According to Fouxman, he stumbled onto the project when a friend of his handed him an old, beat-up C 1000 S and said it was his to keep. "Having heard numerous times that this mic works best when used as a paper weight or a door stopper, I was not exactly thrilled," Fouxman says. "Just a quick listen showed explicitly how it got that reputation — shrill tone with no bottom end that pierced my ears down to the guts."

Fouxman found some schematics online and thought he'd be dealing with an impedance-balanced circuit, but when he took it apart, he was discouraged to find a printed circuit board full of surface-mount devices. Usually this militates against any type of mod, but he spotted a capacitor that could be switched out for a better one and knew that would improve the sound straight off. Fouxman also knew it would take some more manipulations to get a great sound out of the mic, so he did this by losing the foam in the grille and changing the positioning of the capsule. This took a lathe and some rewiring, but the final result stunned him, and I got an email the next day asking if I wanted to hear the mic.

Frankly, I didn't. After all, I had just heard more than 80 this year, but I said, "Yes, send it on." And I'm glad I did. After one night of testing, I knew that this wasn't just a mic I wanted to review, it was a mic I wanted to own. The brittle high end was replaced with a sweet clarity — no harshness whatsoever. And the bottom end was huge. There's no high-pass filter on the mic itself, but I'd definitely use one on the preamp or the DAW when recording acoustic guitar — which is usually what I am recording when a small-diaphragm mic is involved. (Note: Some people would call this a medium-diaphragm mic, but I refuse to make that distinction.)

There's no need to take my word for it. You can go hear it for yourself. For the duration of this issue — until the next *Tape Op* comes out — I will keep before and after sound files of the Marik AKG C 1000 S mic mod for you to hear. Point your browser to www.proaudiobay.com/AKGC1000S, and you will find out for yourself that I'm not lying or exaggerating about the sound of this monster one bit.

The cost of the mod is a very reasonable \$149 plus shipping, and the cost of a new AKG C 1000 S is under \$300. Of course, it's pretty easy to pick up used models on eBay for less than \$200, so for around \$350, you'll have a high-end sounding mic. The catch? Like any other mod, you usually don't get your money back on resale; I don't know why that's true, but it is. Despite that caveat, if it's pure sound you're after at a low cost, this mic is a true contender in the under \$500 category. (\$149 direct; ribbonmic@comcast.net)

—Mike Jasper, www.proaudiobay.com