# Antelope Audio

## *Isochrone OCX & 10M clock generators*

In a digital system, the word-clock signal is used to generate a common time reference amongst all system components. It not only regulates data flow so that everything works together synchronously, but more importantly, it controls the spacing between sample words during analog-to-digital and digital-to-analog conversion. Utmost consistency in that spacing is crucial for transparent conversion. Inconsistent spacing (and/or a misshaped clock signal)—commonly called jitter—results in distortion to the audio signal. All standard digital audio transmission formats have an embedded clock signal so that downstream devices remain synchronized to upstream devices. Optionally, a master word-clock signal (generated from an external device or from one of the in-stream devices) can be used to synchronize any devices with a dedicated word-clock input.

The topic of digital clocking is popular right now—on gearslutz.com, here in *Tape Op* (see issue #67's letters section), and generally among recordists. Why so hotly debated? Because changing the clock source can have a highly significant impact on sound, yet there is no solid consensus as to what clocking scheme is best. Regardless of the hard science behind the design and performance of word-clock generators, the aesthetic impact of different clocking devices remains both subjective and context-dependent, as with any piece of gear in our racks. So as reviewers, we have chosen to sidestep the technological debates as much as possible and move forward with two simple findings: different clocks make the same recordings on the same system sound different; and in some cases, that difference is big enough to convince one to buy one clock over another.

The heart of the *Isochrone OCX* ($1500 street) is a temperature-controlled oven housing a discrete, transistor crystal oscillator. According to Antelope, this translates to higher stability and four to ten times lower jitter in the clock signal compared to the competition. The *OCX* supports sample-rates from 32 to 192 kHz, and—this is a bonus—it is capable of outputting multiple sample-rates simultaneously (though we didn't use this feature). Take a look at its back panel, and you'll find eight BNC word clock outputs; two AES/EBU and two S/PDIF outputs; and a 256x Superclock (Digidesign) output. This sleek, 1RU-height silver box could easily be the classiest looking piece of gear in your rack. One design element we particularly liked is the prominent, red LED readout of the sample-rate. It is front-and-center enough to remind you of the sample-rate, which we suspect will prevent the occasional clocking mishap. (Allen confesses to having mixed a song tracked at 48 kHz at the slower and lower-pitched 44.1 kHz for about twenty minutes before catching on.)

The *Isochrone 10M Rubidium Atomic Clock*, the *OCX*'s sleeker, more expensive 2RU-height companion ($6000 street), is designed to enhance the *OCX* with atomic clocking technology. When interfaced with the *10M*, the *OCX* switches from its crystal oscillator to the *10M*'s Rubidium core. Basically, the rubidium element disciplines the crystal to its hyperfine oscillation (over 6.8 billion Hz), which produces 100,000 times better accuracy than your Swiss-made quartz-driven watch. We're talking a deviation of one second in 1000 years. This is the same technology used for satellites—about as true rocket-science as you can get. (Just in case you're worried, the manual assures us it's not actually radioactive.)

In our test of the *OCX* and the *10M*, we first utilized The Farm, Allen's mixroom in Brooklyn. Here's the setup: Pro Tools HD interfaced directly from the Core Card to a Lynx Aurora-8 converter, which is connected digitally both to a Cranesong HEDD 192 for A-D-A conversion to a stereo analog mix-bus insert and to a Dangerous Audio D-Box for monitoring. By connecting the *OCX* to the word-clock input on the HEDD, we were able to switch the system's master clock between the Lynx (PT HD sees it as the internal clock), the HEDD (PT HD sees that as the external Word Clock), the *OCX* (by telling the HEDD to use its external word-clock input) and the *OCX* with the *10M* attached. (The D-Box uses its digital input as its clock source.) If you're still reading, what this all means is that we could easily switch between four different clock sources and all the digital gear would sync to whichever clock we selected.

We threw up a number of different mixes, and our first impression was, "Hey, different clocks really sound different." Both the HEDD and the *OCX* as the masters seemed to impart a similar amount of information and fidelity to the playback, but the HEDD afforded a stronger center, while the *OCX* offered a slightly-wider stereo field. One way to describe it is that the HEDD presented a convex soundstage and the *OCX* a concave soundstage—two rather different shapes holding about the same amount of information. The HEDD also seemed to give a bit more midrange presence, while the *OCX* resulted in a little more detailed highs. In less abstract terms, the HEDD rocked out with a bit more sonic glue, and the *OCX* was a little more elegant and spacious. The Lynx clock didn't reveal as much detail, especially in the airy region, but also in the deeper lows (and Allen always clocks his PT HD system externally to the HEDD for this reason). On the whole, the *OCX* would be an excellent choice to anyone looking to find an external clock to improve the sound of any digital system with internal clocks that might be worth improving.

Where the *OCX* really showed its stripes was on a Digi 002 system, belonging to Brooklyn-based engineer Matthew Agoglia. Matt's room is a great example of a "real world" mixing and tracking room—Digi 002 running through a Hafler power amp into Yamaha NS-10Ms that were awaiting new woofers. From within Pro Tools LE, we put up Emmylou Harris's song "Deeper Well" off of the Daniel Lanois–produced album *Wrecking Ball*, a track filled with endless sonic details and effects tumbling around in the background. The difference between the 002 standalone and the 002 clocked to the *OCX* was absolutely revelatory! There were elements in the tracks that simply didn't make it to the speakers without the *OCX*. We listened to a lot of stuff and found the same thing over and over. It's hard to imagine a single purchase that would upgrade a system in this realm so significantly and pervasively. Everything one does on this system—tracking, monitoring, mixing, printing, bouncing—is going to be significantly improved.

Back in Allen's studio, we hooked up the *10M* to the *OCX* (a simple BNC patch), threw up one of Allen's mixes, and the whole world changed. It felt like there were about five extra spaces in the stereo field where one might have placed an element of the mix, and elements we hadn't heard before stood out plain as day. Things like acoustic guitar finger squeaks, the singer's moist mouth mutterings, more of a ride cymbal's over and under–tones, aspects of a kick drum's raspy attack, reverb tails, tape-echo trails, and even compression artifacts were showing up, seemingly from out of thin air. The soundstage gained a depth that seemed to reduce masking between elements that occupied the same frequency range, as if they instinctively found space in front of and behind each other based on how wet or dry they were. Apparent loudness went up a notch, without changing the volume of anything (perhaps a psychoacoustic phenomenon—we're not sure), and there was noticeable low-end extension. Beyond the details, the whole of the parts was a total pleasure to listen to and evoked a far more vivid image of all aspects of whatever mix we put up. *The10M* just made the music far more engaging and emotional (and only made the current MP3 paradigm seem more criminal).

In fact, with everything we put up, the *10M* was a mind-blower, but on one track, we actually found ourselves more interested in the lyrics. Fascinating. A stripped-down, crawling version of Neil Young's "Harvest Moon" by the nomadic singer Jess Lee with Allen backing on a simple organ part was rendered in such detail with the *10M* that individual harmonic overtones in Jess's voice (tracked with an SM58) almost seemed like individual sonic elements. The organ (run through a vintage RCA tube PA into a Sennheiser MD 421) fanned from one warm shade of orange into a complex spectrum of warm, burnished tones; and previously subtle oscillations became rhythmic pulses Allen hadn't heard so clearly since tracking it. Somehow, these details drew both of us far more deeply into the story Mr. Young weaves in his lyrics and into Jess's lonesome interpretation. The recording took on a vitality and intimacy that was, it seems, hiding somewhere in the digital code.

So, can a clock make a difference? Ha! Especially when you've got a sensitive mixer/producer and a discriminating mastering engineer geeking out on a really nice system in a well-treated room. But what about the so-called real world? Is the *OCX* going to help a recording made with the clock wheezing its weary way through the world's worst D-A converter and a pair of 10-cent laptop speakers? We printed mixes from the four different clocks to find out, and in a blind test, we were able to hear differences on a laptop, for sure. However, the differences were certainly diminished by the limitations of the playback system—if you can even call a laptop a playback system. But we don't work our butts off to make laptops bring people to tears; we do it so that no matter where a recording ends up, it has the best chance of being rendered in all its intended qualities. And as we look toward brighter days—when MP3s have gone the way of the Edison Cylinder—there is no time like the present to consider tools that will generate zeros and ones that will outlive the current lo-fi trends and shine like diamonds in the high-fidelity renaissance of the future.

Whether you're on a prosumer system and can use the *OCX* to bump up your rig, or you're a world-class mastering engineer or mixer who can afford the *10M*, both of these clocks are capable of making a big enough difference to warrant serious consideration of a purchase. In the case of the discerning, high-level professional, it's apparent that the margin for sonic improvement is often pretty narrow, yet we assure you that trying the *10M* is worth it. As we said, we'll leave the technological arguments to those with the minds for it, but if you're like us and want to do all you can to render human musical performances with as much depth, dimension, detail, and love as possible, give the Antelope clocks a listen, and hear for yourself what they can do for your recordings.

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