

# REEL-TO-REEL MACHINES IN YOUR RIG

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**T**here are many things I lust after in search of that ephemeral analog warmth, the ultimate sound to trump all sounds, the sweet release from the monotony of our digital world. Like most of you, I spend hours per day looking at a screen. I work, play, and communicate on many screens in my life, and you are most likely reading this on a screen, as I am wrote it on a screen. Almost every activity is now digital, from writing papers, to reading books, and of course, making music. However, I'm not here to shine a light on your technology habits, I'm here to show you how "outdated and obsolete" technology that has been left in the dust by the incredible pace at which our society moves, can be a genuinely fun and rewarding experience, with patience and time of course.

"So why bring up those dusty, heavy, old behemoths of audio yesteryear? Surely a good plugin could do all of that and more," you say. While I tend to agree

with you, there is one caveat. While it may be easier and more convenient to just plug into your favorite tape sim and go to town, there is no computer program that can simulate actually having your hands on the reels, threading the tape, and watching it move in real time. You can observe what is happening physically, and it gives you a better understanding and appreciation of how engineers created effects and recorded music on these cumbersome machines for so many years. And then of course, there is the sound, which we will go into below. Prepare to throw your predispositions out the window, as we dive headfirst into the past. Let our neo-vintage adventure enlighten, excite and entice you as we tackle these analog beasts of days gone by . . .

For our demos today, I have used a Sony TC-440 deck and a reel of Maxell UD 35-90 tape. The tape had some pre-recorded classical music on it, so I recorded over it with my clips. Every time a tape

is overwritten, a little bit of the sound quality degrades, so keep that in mind when you are listening. I bought a used reel to keep my costs low, so I don't know if it was used even before the previous owner had recorded the aforementioned classical music. Before I recorded the clips, I opened up the machine, lubed up all the contact points and moving parts, and cleaned the heads and tape path with a head cleaner. I also demagnetized the

heads to remove any leftover residue from previous plays. I wanted to clean this machine as best as possible for maximum performance, so you can hear under optimal conditions. This deck has a built-in echo function, which makes it handy to use as a tape echo. Most decks don't have this, but there is a feature in the works for those of you who are interested, stay tuned in the next coming weeks . . .

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## PART I: ECHO

This is a favorite among guitar players. Many have tried to capitalize on the analog warmth of tape echo in their products, whether it is the digital emulations by TC Electronic, Strymon, Source Audio, or the real "modern" tape echoes from Fulltone and T. Rex. While these units are great in their own right, I wouldn't want to pay close to \$1,200 for an echo machine, real or

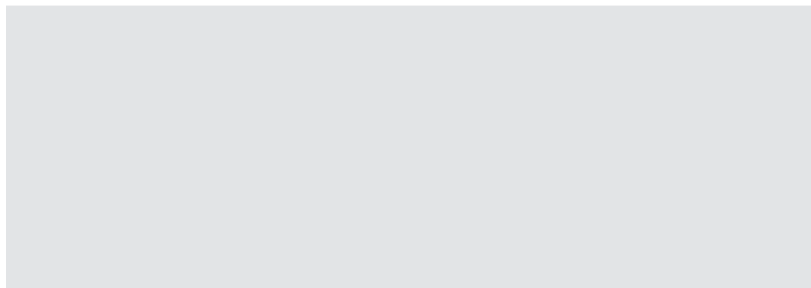
not. My TC-440 cost me \$90 in almost mint condition, which is less than most low-budget pedals cost. While it is more limited, it can still get you those wonderfully warm repeats that I'm sure many of you crave.

After you thread your tape, checked the tension, and made sure the tape path is clear, you need to choose your tape speed. There are many different standards of tape speed, but the

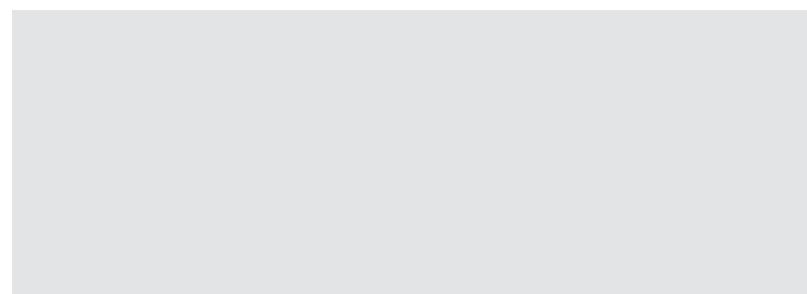
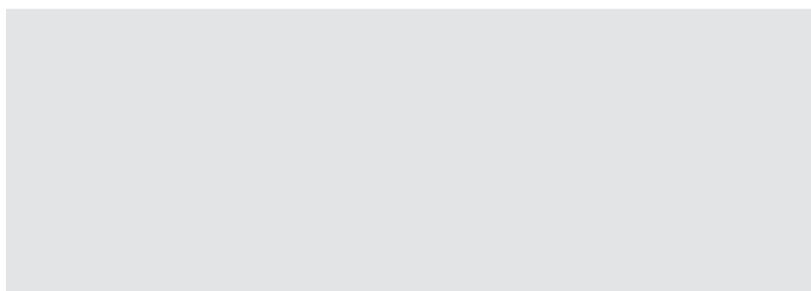
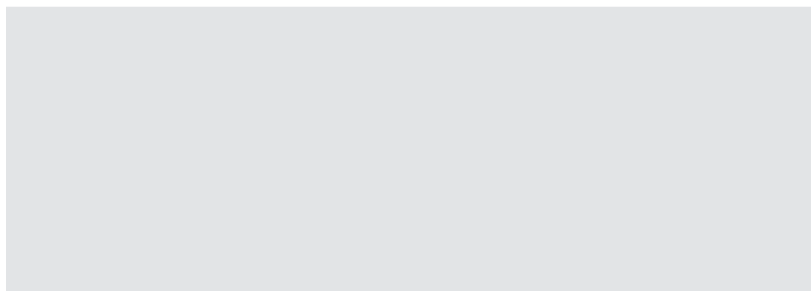


general rule of thumb is, the higher it is, the more fidelity you will get. The consumer standard for decks is 7 1/2 IPS, which stands for inches per second. When dealing with echo, the faster the IPS, the faster the repeats. So 7 1/2 IPS will have an almost slapback-like quality, while 3 3/4 IPS will have a more delay-like quality.

The Sony TC-440 machine I did these demos on has three selectable settings, 7 1/2, 3 3/4, and 1 7/8, respectively. I recorded the guitar clip into the DAW and ran the outputs to the tape machine, to hear differences in both fidelity and sonic characteristics, and to get a consistent clip through and through. I recorded it twice to the tape machine, the first pass with no echo, and the second pass with echo at that setting. Here is the reference clip that was recorded straight from the DAW:



And here are the tape sounds:



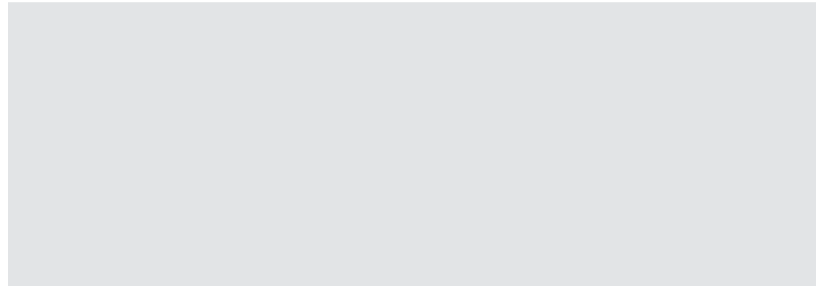
Pay attention to how the fidelity degrades as the tape gets slower, but the delay times get longer. Those into lo-fi tones are going to want to set the tape speed as low as possible, but for higher-fidelity tones that still maintain a roundedness and warmth that only analog tape can provide, aim for higher speeds. Be warned though, the tape will eventually run out unless one rigs up an endless loop mechanism, and if when running at a faster speed, the tape will run out quicker, so keep an eye on the reels.



## PART II: SPEED AND PITCH ALTERATION

This is a very old tape trick that was pioneered by Les Paul in his early days of tape experimentation. (see *I'm Sitting On Top of The World*; Les Paul and Mary Ford, 1952) The trick works like this: play a song at half tempo recording at say, 3 ¾ IPS, and then speed it up to 7 ½ IPS to get a sped-up version of the original track,

which both increased in pitch and speed. This trick was also used to get the chipmunk voices on the early "Alvin and the Chipmunks" records. I have used the same clip from above, recording at 3 ¾ IPS and then speeding it up to 7 ½ . Have a listen below:



## PART III: CHORUS/ FLANGING

This trick was used almost *ad nauseum* in the late '60s and throughout the '70s. It became almost as synonymous with the sound of the '70s as much as the hits that used them. Look no further than *Life in the Fast Lane* by the Eagles to get a good idea of what it sounds like in a record scenario. The name flanging comes from the technique of how it's actually done, by running a finger across the flange of the supply reel of tape. Flanging is usually done in the mastering stage, after the initial recording has been committed to a multi-track. Engineers will master the multi-track down to two-track stereo, which is then sent out for further mastering or to

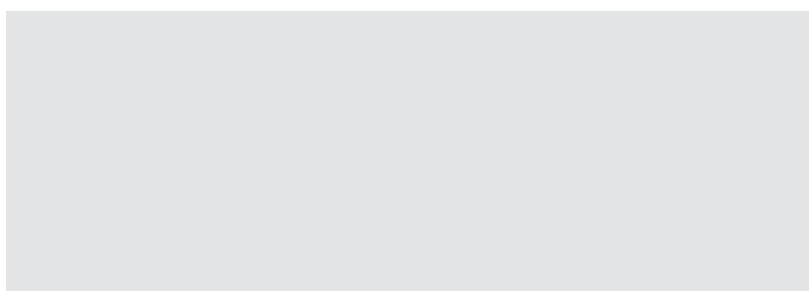
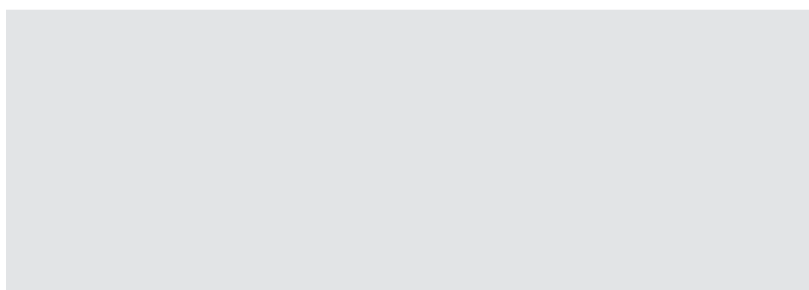
the vinyl cutting plants. Flanging is essentially an extremely short delay, which works similar to chorusing. To do this, one must have two tape machines synced up to the same speed, playing the same thing. At the exact moment flanging is needed, punch in the mastering deck and run a finger along the flange of the supply reel. Along with this, some engineers choose to alternate between the classic flanging technique and manually speeding up the take-up reel. Since slowing down tape changes the pitch as we have seen above, this very slight alteration in pitch, in addition to the same information being recorded to the two-track mastering deck, creates a phase cancellation, or "comb filtering" effect. The variation in pitches





cascading against one another is what we associate with the classic sound of flanging.

For this demo, I didn't have a fancy multi-track, so I recorded a DI track into the DAW, and then run that through the tape machine. I played the recording off the tape while running my finger along the supply reel, and captured that back into the DAW. I then lined up the two tracks and mixed them down. The effect isn't pure flanging, since we don't have two tape machines and phase cancellation, but we do get a very similar effect that is closer to chorus, and it still gives you an idea of how this would work in the real world.



There you have it, dear *Tone Report* readers, a study into a few of the inner workings of these antiquated and incredibly awesome analog mojo machines of the past. Unlike digital formats, being creative with tape requires players to think outside of the box, and forces them to really understand and evaluate what is going on with your sound. Whether it be warm repeats, jet engine sounds, or just that lovely old hiss, the reel to reel has plenty to offer, if you take the time to unlock it's secrets.

