



# Tape Echo for Z-DSP

Design by: **Tiptop Audio**

Type: **Z-DSP Effects Card**

Character: **Analog Tape Echo, Dub, Slapback, Feedback Delay Trails**

The **TAPE ECHO** card brings emulation of classic tape based delays to the **Z-DSP**. Each of the programs has the same core processing chain:



The delay line uses techniques to give the time bending effects inherent to tape when the time control moves. In addition, the combination of the Filter and Tape style compression and distortion gives the card similar feel and operation to vintage devices only without the need to replace the tape!

The controls are the same for each program:

## **Time:**

Controls the delay time. Changing this by hand or external CV produces characteristic tape style pitch bends. The code is optimized to avoid any digital artifacts.

## **Feedback:**

Adds the output back into the input to produce multiple repeats. Up to about the center position this control operates like most delays but the higher the amount, the more the feedback overpowers the input and at the highest level it will begin to oscillate. The tape emulation section adds tape style saturation and also limits the signal to prevent digital clipping.

## **Filter:**

A 6db/octave low and high pass filter combine to form a bandpass effect. At the lower end the response is mostly low pass and the higher end is a high pass with bandpass sounds in the in-between positions. Each repeat in the feedback loop also passes through this filter.

Input for all programs sums both Left and Right channels into mono. Use Left or Right or Both inputs for the programs.

Programs #1 and #7 have a mono output that feeds the same signal to both Left and Right channels. The other programs have full stereo output.

Note about noise - At higher levels of feedback any system noise will start to leak into the delay line and with the highest levels the signal can start to oscillate with no input. Many of the classic tape echo machines have this unique sound and it is recreated here in the Tape Echo card.

### **1> Mono Tape Echo**

This is a single head style tape echo with mono output similar to the earliest tape units. The maximum delay time is 500ms so it is tuned for shorter rhythmic, slapback and associated effects.

### **2> Ping Pong Tape Echo**

A pair of 500ms delays where the input feeds the left channel and the output of the left delay feeds the input of the right delay. The feedback is taken from the output of the right side. Both delays have the same delay time for easy rhythmic effects.

### **3> 3 Head Mixed Echo**

A three head Echo in the style of some famous 70s units. The three heads are continuously blended between using the Filter control. The output is stereo.

### **4> 3 Head Switch Echo**

The Filter control also switches between combinations of the 3 heads (1+2, 1+3, 2+3, 1+2+3). Note that there may be slight jumps in the sound when switching. Stereo output.

### **5> Chorus Echo**

Like the Mono Echo in program 1, but with a stereo Chorus after the delay. The speed of the Chorus increases as the Filter control moves to high pass.

### **6> Diffuse Chorus Echo**

Adds Diffusion to the input and echo repeats creating more of a detuned wash to the sound. The diffusion is modulated by internal LFOs for detuning/chorusing and the output is in stereo.

### **7> Wobbly Tape Echo**

An internal LFO modulates the delay time slightly to give some wobble chorus/vibrato to the sound. The modulation rate is tied to the Filter control and speeds up as the filter sweeps up to high pass response. Mono output.

### **8> Warp Pong**

Stereo Ping Pong delays with internal LFOs modulating the delay time. Each side has a different modulation rate that increases as the Filter control is raised. Stereo output.

## Brief History of Time (Through a Tape Echo)

At the end of the Second World War, the US Army designated special forces units to find a working example of a German technological marvel - the tape recorder (one member of these units returned Stateside to found Ampex). Magnetic tape delivered not only the most lifelike reproduction possible at that time, but also previously unimagined manipulation of sound.

In the earliest experimental labs of Pierre Henry and Schaefer the use of tape machines to distort time quickly became one of the most important tools of their concrete compositions. They developed feedback circuits between two or more machines to create an echo effect. American inventor Les Paul integrated a simple delay technique in his tape deck which quickly became the 'slapback' sound made famous on Elvis' 'Heartbreak Hotel' - a sound many took notice of. For example, John Lennon rarely laid down a vocal without a Studer C37 tape machine doubling his voice.

By the end of the 60s stand-alone tape units for live gigs were introduced in the form of the WEM Copycat and Maestro Echoplex. Guitarists and experimenters embraced the creative potential of a portable canyon and developed new dense sounds. Tape tech went full circle in the hands of the 70s German sonic adventurers like Conny Plank, Klaus Schulze and Holger Czukay who generated immense soundscapes feeding acoustic and electronic instruments into high levels of tape echo feedback.

The mid 70s brought lower cost and more advanced Japanese units, like the Roland RE-201, added multiple playback heads and a spring reverb for deeper and denser sound. No group took these new boxes more to heart than the pioneers of Jamaican dub reggae. Keith Hudson's groundbreaking "Pick a Dub" throws disorienting stabs of echoed voices and instruments at the listener while Lee "Scratch" Perry submerged the entire mix in glorious echo on classics like "Heart of the Congos". And who could forget King Tubby's haunting treatment of Augustus Pablo's melodica on 'Rockers Uptown'?

The 1980s ushered in the digital era and tape echo was abandoned in favor of the clean and precise Prime Time and AMS 1580 boxes employed by Martin Hannett and Eno. But by the early 90s the burgeoning house and techno scenes rediscovered the grit and wobble of classic tape echoes. The Orb, enamored with all things dub and Can, sought out the deep, dank sounds to filter their samples while Berlin based Basic Channel emphasized the noise and artifacts of the machines to form a dense haze that cloaked distant and diffuse techno based rumbles. Massive Attack and Portishead would focus their aesthetic around the degraded dub echo as well.

-CC (R&D Tiptop Audio)