

# THE ESSENTIAL GUIDE TO...



**On the DVD**

**VIDEO TUTORIAL**  
For a more visual guide to delay, check out the video version of the walkthrough in the Video folder

# Delay



Also known as 'echo', delay is one of the most important and fun-to-use effects in your virtual rack. Here's why...

**JARGON BUSTER**

- ▶ **TAPE DELAY**  
A specific type of delay plug-in that emulates the sound of vintage delays that used rotating loop of tape to produce the effect.
- ▶ **MODULATION**  
Some delay plug-ins can dynamically change the value of the delay time parameter, adding interest and variation to a sound.
- ▶ **SATURATION**  
The warm distortion produced by valves and tape. This is emulated in a number of delay plug-ins.
- ▶ **SLAP-BACK**  
A specific delay effect configuration, producing a single echo at a relatively high mix level.
- ▶ **FLANGING**  
A type of modulation effect that can be produced by mixing the delayed and non-delayed signal, with very short delay times (a few milliseconds).

**C**ontinuing our tour of the most fundamental audio effects in the studio (virtual or otherwise), this month we find ourselves knocking on the door of delay.

As the name suggests, the delay effect centres on the concept of mixing an incoming signal with a copy of itself that's been delayed by a given amount of time. If the delayed signal is then fed back into the effect's input, the effect is sustained and multiple artificial 'echoes' are heard.

As with many other effect types, you can get delay plug-ins that emulate the tone and 'warmth' of classic bits of vintage gear, but is this just a spurious marketing technique intended to make

us buy into a falsehood? Certainly not! When used well, a vintage delay plug-in can significantly contribute to your overall sound – so generally, they're definitely worth the extra expense.

There's a wide range of delay plug-ins out there to choose from, ranging from simple, no-frills devices to amazingly complicated models.

In this tutorial, we'll get you up to

speed with the ins and outs of this essential effect and show you how to make good use of it in your tracks. We'll be using PSP Audioware's PSP42 – a plug-in replica of the legendary Lexicon PCM42 unit – to demonstrate the concepts we're presenting, but just about all of it will be equally applicable to any other delay plug-ins you might own. **cm**

## THE DELAY EFFECT MIXES THE INCOMING SIGNAL WITH A DELAYED COPY OF ITSELF

**FEEDBACK**  
Used to control the sustain of the effect produced (ie, how many echoes are heard) by changing the amount of processed signal fed back to the input

**OUTPUT MIX**  
Turn this control to the right to hear more of the delayed signal; turn it to the left to hear more of the original signal. At each extreme, only the processed or unprocessed signal is heard

**MODE SET**  
These buttons are used to select the desired delay time; they act as up/down buttons in DLY mode, and as two separate toggle buttons in CLK mode. The switch above toggles the unit between these two modes

**DELAY TIME DISPLAY**  
The current delay setting is displayed here, either in milliseconds (when the unit is operating in DLY mode) or in note divisions – eg, 16th-note (when the unit is operating in CLK mode)

**INPUT AND OUTPUT LEVELS**  
These controls are used to adjust the incoming and outgoing signal levels. Higher input levels result in more saturation at the tape emulation stage

**HI CUT**  
This control is used to switch in a low-pass filter (a gentle 6dB per octave cut at 4kHz) which dulls the delayed signal, simulating sound reflected off walls

**REPEAT BUTTON**  
This is used to hold the current contents of the delay unit's memory, causing the same echo to repeat continuously until the control is released

**MODULATION CONTROLS**  
These controls can be used to make the delay time vary continuously over time, ranging from subtle to extreme effects

## WHAT IS IT?

Delay units started out as electromechanical devices with rotating loops of tape, a record head and one or more playback heads. The record head would capture the incoming signal, which would then be read off again by one of the playback heads. The delay time was controlled by varying the speed of the tape and the distance between the record and playback heads.

The first digital delay units converted the incoming analogue signal into a series of values (samples) which were then temporarily stored in digital memory before being read out again and converted back to analogue. The high cost and small size of digital memory placed constraints on the quality of the delay effect produced.

Today, of course, all such restrictions are gone, but plug-in manufacturers often replicate the 'deficiencies' of the old technology because they've ironically been found to be useful. The limited audio bandwidth of tape meant that the delayed signal contained less high frequency information than the original, with each subsequent echo sounding more and more dull. This side effect can actually help prevent a delay from cluttering up the mix.



▲ Echoes of the past: the gloriously retro Watkins Copycat

## WHAT'S IT USED FOR?

A simple mono delay can work wonders on a vocal or add rhythmic interest to a synth line. With care, a mono delay can also be used to add bounce to a programmed bass part. Most delay plug-ins can be tempo-synchronised, so that the delay time is some fraction of the length of a beat – this is particularly useful where rhythmic drive is important.

Meanwhile, stereo delays (where a different delay time is set for the left and right channels) can be used to add dimension and depth to a part, but care must be taken to avoid distracting the listener from the most musically important part in a mix. Ping-pong delays (where the sound bounces from side to side) must be used with particular care, but can also be extremely effective when used in the right way.

Virtually every guitar multi-effects pedal ever produced has featured a delay effect of some kind; in other words, the delay effect is an integral part of some electric guitar playing styles. Most people think of delay as producing a series of clearly discernible echoes, but when very short delay times are used (a couple of milliseconds) a delay plug-in can be used to produce a variety of modulation effects, including flanging and doubling.



▲ Tape delay units such as the TTE made great guitar effects

## HOW DO I USE IT?

Delay plug-ins can be used in either send or insert configurations. Generally, they aren't very CPU- or RAM-hungry, but it can make sense to share one instance of a tempo-synced delay between a number of channels by placing it in a mixer send channel. When used in this way, the output mix control should, as ever, be set to 100% wet. Alternatively, if delay is to be used in combination with other effects, or if the delay time is unique to one part, it may be a good idea to load it as an insert instead. In this scenario, the output mix should generally be set fairly low to stop the effect from dominating the mix.

After loading the effect and setting up the wet/dry balance, the next step is to set the feedback amount, which controls how many times the delay signal loops around. Generally speaking, it's best to be quite conservative with this, as too many sustained echoes will quickly clutter the mix. Many delay plug-ins also offer sub-effects in the feedback path, including filters and saturation units (a type of distortion), which give a subtle but very effective enhancement to the sound.

## FIVE TO TRY...

**PSP84**  
[www.pspaudioware.com](http://www.pspaudioware.com)



**Smartelectrionix Analog Delay**  
<http://mdsp.smartelectrionix.com>



**MDA Delay**  
[www.mda-vst.com](http://www.mda-vst.com)



**Karlette**  
[www.steinberg.net](http://www.steinberg.net)



**DualDelay**  
<http://bigtick.pastnote.com>



## STEP BY STEP Adding depth to a riff with delay



**1** Start FL Studio and add a TS-404 synth to the step sequencer. This aims to reproduce the sound of the famous Roland TB-303; we'll be using it to demonstrate how delay can enhance a simple riff. Program the part shown and set the TS-404 to send to **FX channel 1**. »



**2** Open the mixer window and load a Lexicon PSP42 delay plug-in ([www.pspaudioware.com](http://www.pspaudioware.com)) into the first effect slot. Switch the unit into **CLK** mode (ie, tempo synced), press the left **Delay** button once and the right **Delay** button six times to set a third-note delay. »



**3** Set the **Output mix** to about 8 o'clock and **Feedback** to about 9 o'clock. Press play to hear the delay unit in action. Switch on the **Hi Cut** filter. Notice the effect that this has on the overall sound.