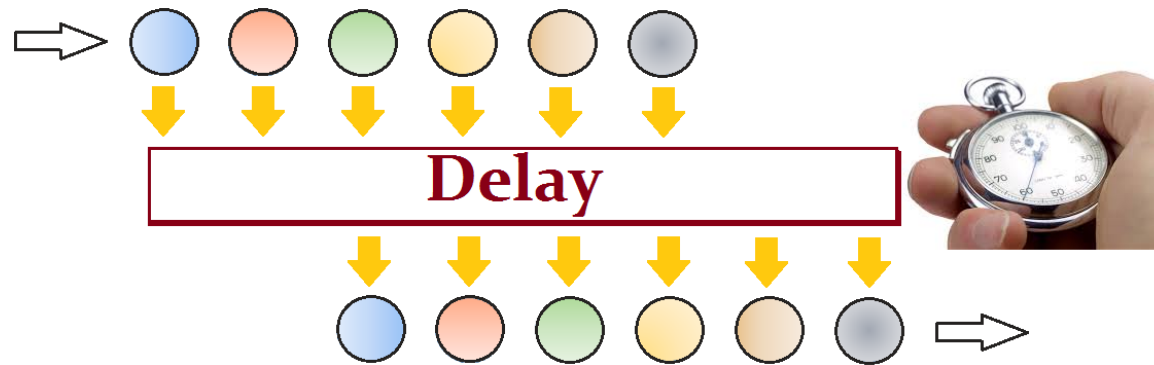


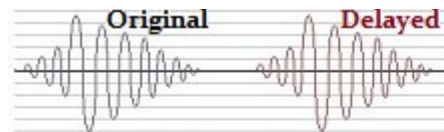


The DELAY Effect Unit





A Delay Unit (originally called a Delay-Line) makes a recording of the soundwave arriving at it's Input connector, then it waits a moment (*Delay Time*), and then plays the sound through to its Output connector.



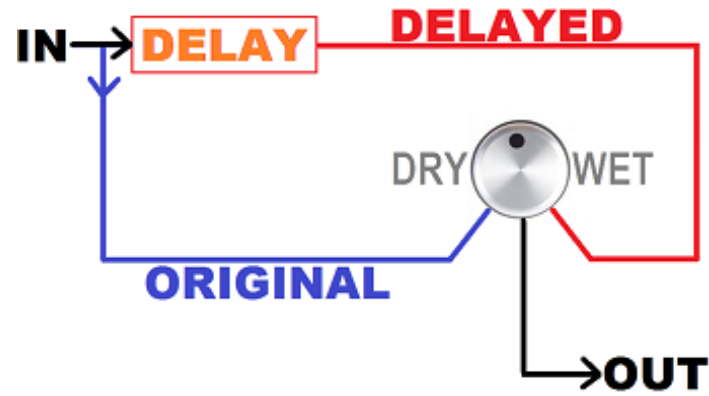
If we add the delayed signal to the original signal, it sounds like an echo. How late the echo sounds will depend on the **Delay Time** you set.



0:35 mS

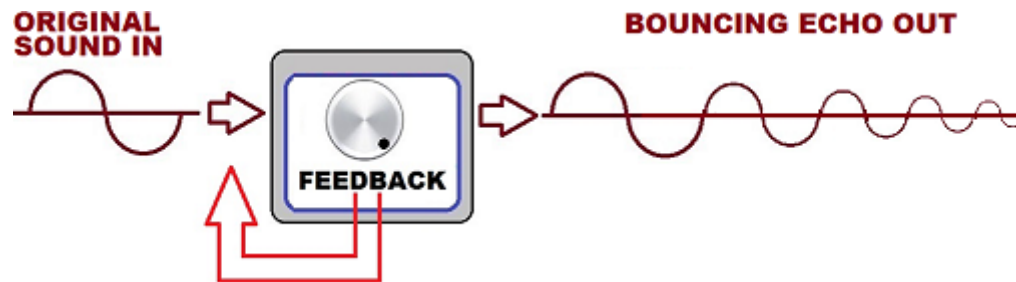
FIRST TAP= START
SECOND TAP= STOP

You can either set the Delay Time you wish using the **Dial** supplied, or there may be a **Tap Tempo** button you can use. You tap once to start the timer spinning, then a second tap will stop it. This is a great asset when you are trying to set a Delay Time to suit a song (*just tap along to the rhythm of the song*).



We can choose whether to mix the original sound with the delayed sound (and hear an echo), or just use the delayed version. The Mix control will say **Original / Effect** or sometimes **Dry / Wet**. You can have a little of one, and a lot of the other, as you please.

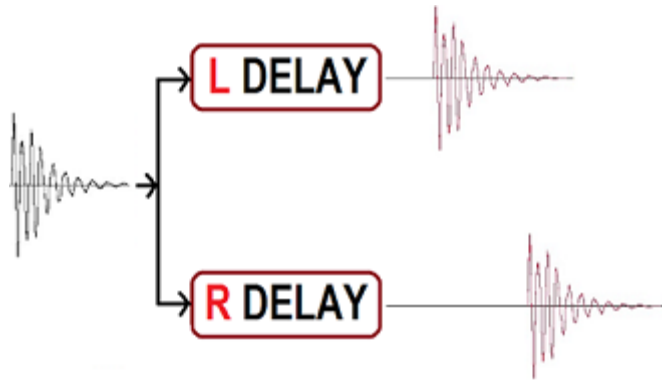




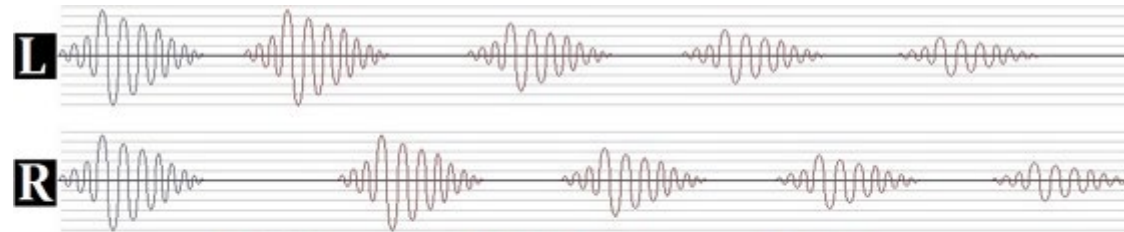
If we feed some of the delayed sound back to the input, the echo will be echoed again, and again, and again. A repeating echo that gently bounces away into the background gives a nice sense of depth and space. It works well on musical instruments that are playing solos. Professionals often use Delay with Feedback on the voice as it can create a much cleaner sense of ambience than a reverb effect does, however it's a little more difficult than a reverb to set up.



Feeding back a sound often accents the high frequencies, and the result can become quite bright and metallic sounding. Delay Units usually offer some form of high cut filter (**Low Pass Filter**) to control this. Feedback usually sounds at its best with the high frequencies lowered slightly. Start with a high number (eg. 15kHz) and slowly turn it back down below 10kHz, listening for the point where the bouncing echoes are still audible but are warmer sounding than the original sound is.



Effect Units are often in **Stereo**. There will be one input and two outputs (usually called L and R out). Stereo offers you two distinct Delay Units, so you can have a different Delay Time and a different amount of Feedback on each channel. This creates a very full sense of space.



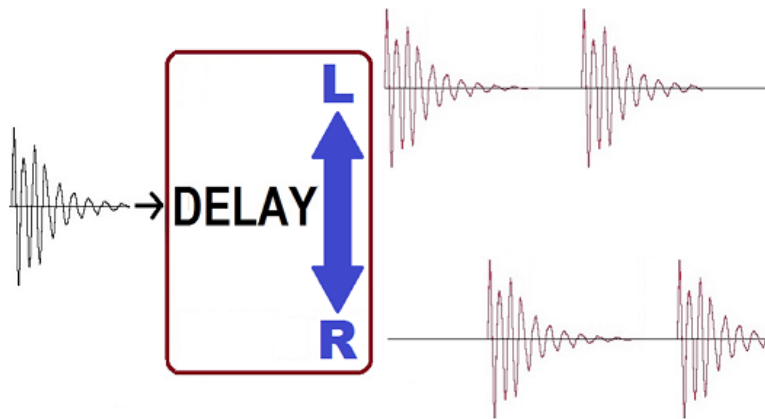
Delay L



Delay R

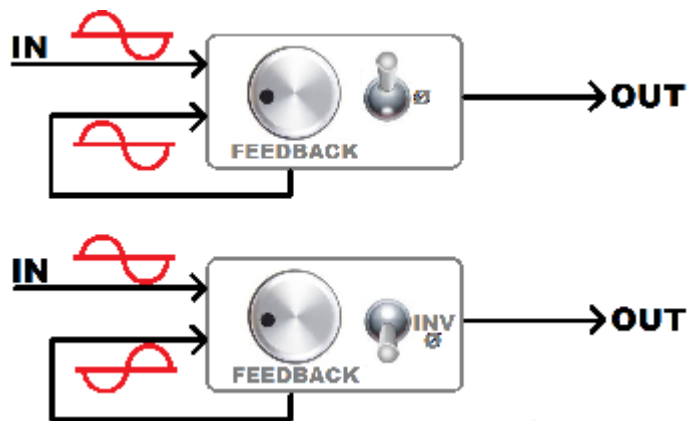


Feedback



Units that have a Stereo Output (L and R out) may offer you the feature called **Ping-Pong**. This will sweep your echo from the left to the right and back again, at the speed and pattern that you decide.

As with the Stereo Delay, used discretely, it adds a very nice ambience to a musical instrument, or voice, without suffocating the original sound.



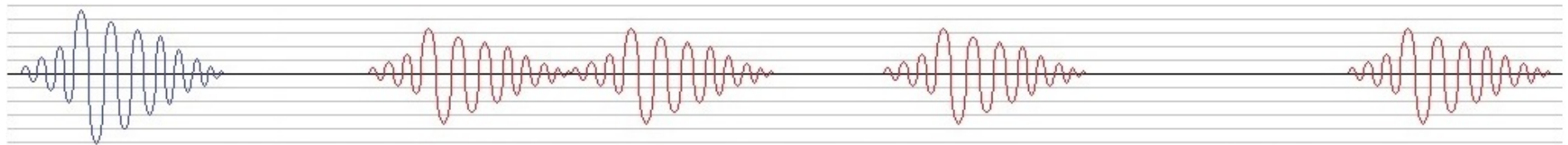
At the moment of feeding back some of the output to the input you may have the chance to invert the signal. **Inverting the Feedback** will cause clashes with the phase (cancellations and boosting) of the arriving signal.

A light feedback this will cause a tonal change that you might like (or not).

A high feedback this will cause phasing and flanging and will sound robotic (sci-fi).



Some Delay Units can offer you multiple Delay Times. These **Multi-Tap Delays** will permit you to set a number of differently-timed echoes which will allow you to set random distances causing a more natural ambience. With a light Feedback the effect becomes a natural room reverb.



40mS

Tap 1



60mS

Tap 2



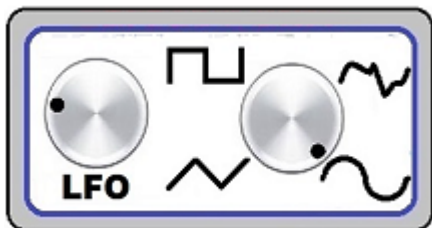
110mS

Tap 3



200mS

Tap 4



If the Delay Unit offers you an LFO (**Low Frequency Oscillator**) you will have the chance to automatically vary the Delay Time back and forth.

You set the range (how many % it can vary from the Delay Time).

You set the speed that it will move back and forth at.

You set the manner in which it will make its movements (smoothly or flicking. Now it will do it automatically.

The idea is to create more random natural echoes like a reverb.

APPLYING AN ECHO TO A VOICE OR INSTRUMENT

Slap-back Echo (Slap Echo)

Slap echo is a very short single echo, like a reflection, not as loud as the original. It gives a strong sense of space to your vocals, much like a small reflective room. Used subtly, instead of reverb, it gives depth but keeps the sound clean (reverb can make a sound a little cloudy). The delay range will typically be from 50mS to 200mS, with practically no feedback (max 10-15%). An 80 millisecond (mS) single Slap-back delay with the slightest feedback (one repeat) is a nice start. Filter off some of the high frequencies (LPF) of the delayed signal if you can. This helps it mix better with the original.

Slap-back Echo using Stereo

Very popular with professionals. Stereo means you have two delays, so you make a different delay time Left and Right, then mix it subtly with the main sound. You will get a very nice sense of ambience, with a clean sound (as usual, use very little feedback). Optionally you can invert the phase of either the Left or Right (but not both) for a nice binaural 3D effect. *A good start would be 200 milli-second (mS) delay on one side and a 150 milli-second (mS) delay.*

Automatic Double Tracking (A.D.T.)

A great way to fatten a sound (*example: a thin high-pitched female voice, or a solo musical instrument*) is to add an echo of 25-50 mS with minimal Feedback. The echo happens too quick for the ear to distinguish it from the original sound, and everything just seems fuller (and stronger in a mix). If the delay is stereo, set your delay times to 20 mS on one side and 30 mS on the other. The result is a full and particularly spacious sound.

Bouncing Echoes

In the delay range of around 150 mS to 300 mS (where you can hear a distinct echo), you can get multiple bouncing echoes by increasing the Feedback. This is great for musical instruments that are playing solos. As usual, mix the effect discretely below the volume of the original.

For Musicians: to get the echo to stay in time with the music: $60 / \text{bpm} = \text{Seconds delay for a Quarter Note}$. *Remember- Milliseconds (mS) are 1000th of a second.*

SHOULD I USE AN ECHO OR REVERB TO ADD AMBIENCE TO MY SINGERS AND SOLOISTS?

Echo, particularly a subtle slap-back with a slight feedback, creates a noticeable clean sounding ambient. It doesn't warm up the sound at all, though it does give it the sense of being in a room. If the voice or instrument is moving very quickly then this would be particularly suitable because reverb would just flood the original. Echo on a sound will make it seem "pronounced" and "up front", and it suits solo instruments or singers you want to be prominent in a mix.

Reverb does a great job of filling the sound out. It has a warming effect. Reverb makes a sound slightly less prominent, pushing it back in the mix so it sounds more distant, though it will always remain audible (a nice reverb on a sound will make it practically impossible for other sounds around it to mask it in a mix). Highly reverberated tracks sound like they are at the very back of a mix. This isn't such a bad thing and can be useful when you are trying to find a space to put everything in a mix.

CREDITS

This material is offered freely to the Christian Churches; downloadable at Pietango.com

Text: *Original, by the Author, a Christian Recording Engineer.*

Images: *Designed by the Author. Some photographs were sourced from the Internet, then re-worked.*

Ever since the creation of the world, God's invisible attributes and divine nature have been evident. They are clearly understood through his workmanship, and all the wonderful things that he has made. Therefore, those who fail to believe and trust in him are without excuse, or defence. **Romans 1:20**

All of us have sinned and fallen short of God's glory, but God treats us much better than we deserve.

Because of Christ Jesus, he freely accepts us and sets us free from our sins. God sent Christ to be our sacrifice. Christ offered his life's blood, so that by faith in him we could come to God. **Romans 3:23**

If you declare with your mouth, "Jesus is lord," and believe in your heart that God raised him from the dead, you will be saved. For it is with your heart that you believe and are justified, and it is with your mouth that you profess your faith and are saved. **Romans 10:9**

For the Scripture (*Isaiah 28:16*) says, "Whoever believes in Him will not be disappointed." **Romans 10:11**

These things have been written so that you may believe that Jesus is the Christ, the son of God; and that by believing, and relying on him, you may have new life in his name. **John 20:31**