

## PROGRAM SUMMARY:

# RANDOM AMBIENCE

## DESCRIPTION:

**RANDOM AMBIENCE** is a program that can place dry mono signals in an infinite variety of small ambient (ie. semi-reverberant) spaces. The ambience consists of up to 30 discrete early and late reflections calculated at random by a special algorithm. In manual mode, a fresh set of room reflections is calculated each time the softkey is pressed, and the signal is shifted into the newly calculated 'room'. In *auto-shift* mode, the program continuously calculates new reflection patterns at a user-adjustable rate, giving the effect of a room with continuously changing acoustical properties. A delay range parameter is supplied which can specify the range of delay times over which reflections are spread. Another parameter is used to select 1 of 4 different randomizing algorithms by which reflections can be calculated. When an ambience is found that is well suited for a particular application, it may be captured and permanently stored as an SP2016 user preset for later recall.

## PARAMETERS:

**RANGE** Specifies the delay range over which reflections are calculated, from 1 to 500 milliseconds. When used with the **RANDOM ROOM** modes, long delay ranges (say, greater than 350ms) can yield quite reverberant effects, while very short delay ranges work better with the **MULTITAP** modes to simulate small room acoustics. At extremely short times (less than 20ms) the delay network becomes a random FIR filter, producing unusual frequency-domain effects. **RANGE** can be adjusted without altering the basic random reflection pattern in order to hear the effect of delay range scaling on the same basic pattern.

**RANDOM MODE** This parameter specifies which of 4 random algorithms to use to calculate the reflections:

**RANDOM ROOM MODE 1** generates reflections whose exact amplitudes are random but are scaled by an exponential envelope, like a naturally decaying sound. The reflections are spaced more or less equally in time, but the positions are randomly jittered away from exact equal spacing.

**RANDOM ROOM MODE 2** generates reflections with the same amplitudes as in **MODE 1**, but successive reflections fall later in time at randomly spaced intervals.

**MULTITAP MODE 3** scales its reflections in the same manner as modes 1 & 2, but reflections are not ordered in time, and are positioned completely randomly within the selected delay range.

**MULTITAP MODE 4** uses completely random tap amplitudes and delays, with *no* scaling or ordering in time.

Like the **RANGE** parameter, new random patterns are only calculated when the softkey is pressed, so the **MODE** can be changed to listen to the affect that different algorithms have on the same set of random numbers.

**SHIFT RATE** This parameter turns the auto-shift mode on and off, and adjusts the rate at which shifting takes place. The shift rate parameter is scaled from 1 to 20, representing a range of about .6 to 5 shifts per second. While auto-shifting is taking place, pressing the softkey will freeze the reflection pattern and turn off the auto-shift mode. The delay range and random mode parameters may both be adjusted while auto-shifting is in progress.

## SOFTKEYS:

**NEW REFLECTIONS** Generates a new set of reflections each time the softkey is pressed, according to the delay range and randomization algorithm selected. If pressed while auto-shifting is taking place, the current set of reflections is retained and can be altered and/or saved as a SP2016 user preset program.

## APPLICATIONS:

While it can perform as a rather exotic special effect program, **RANDOM AMBIENCE** can also be quite useful for adding 'ordinary' stereo ambience and room tone to dry mono signals. You don't need to keep recycling the same old room sound for all your tracks - **RANDOM AMBIENCE** will come up with an entirely new one each time you hit the **NEW REFLECTIONS** softkey.

And if you get tired of pressing the softkey to generate new sounds, try putting the program into a slow auto-shift mode. Once it comes up with an ambience you like, just hit the softkey; auto-shifting will cease and leave you with the desired reflection pattern. You can store the complete pattern permanently by saving the program as an SP2016 user preset. The first room sound heard when the preset is subsequently loaded *won't* be a random one, but will be the reflection pattern you previously saved. (Of course, pressing the softkey will start the randomizing process over again.)

Very often a generated reflection pattern will sound pleasing, but you'll find the center of the sound image shifted to one side or the other of the stereo field. You can sometimes remedy the image shift thru panning the effects returns; other times you may find the image shift appropriate, suggesting as it might an irregularly shaped room.

At longer delay ranges, the smoothest sounding rooms will be found using **RANDOM ROOM MODE 1**. **MODE 2** will often produce similar effects, but the decay texture is generally more irregular and idiosyncratic. At short **RANGE** settings, say less than 50ms, **MULTITAP** modes 3 and 4 work better than the **ROOM** modes to produce more realistic and less colored sets of small room reflections.

Very bizarre echo effects can be achieved using the **MULTI-TAP** modes with very long delay ranges, but for a more subtle, interesting sound, try using **MULTITAP MODE 4** with a delay **RANGE** of 1ms and the maximum **SHIFT RATE** of 20. The result is a highly filtered sound, as if randomly flanged, whose image jumps around the stereo space as the reflection patterns change. The wierd spacial effects are caused both by the random panning applied to each reflection and also by precedence and Haas effects.

## PROGRAM SUMMARY:

# PSYCHO PANNER

## DESCRIPTION:

**PSYCHO PANNER** is a special effect program that can automatically pan a sound source forward and backward through space as well as left and right, producing the illusion of circular motion through a room. The algorithm takes advantage of psycho-acoustic cues to suggest spacial location, and does not depend on audition through headphones to achieve its effect. Parameters are included to vary the panning rate and direction (clockwise or counterclockwise) as well as to control the depth and width of the panning motion. Delay and feedback controls are also provided that augment the panner with a repeating echo effect. A softkey is used to freeze and resume the panning motion. An animated front panel display dynamically tracks the location of the source, giving an indication of both the panning speed and the left/right/front/back position in space.

## PARAMETERS:

**SPEED** Controls the rate of panning motion around the space. Adjustable in 25 steps from 1 to 100, representing a range of about .5 to 150 rotations per minute.

**WIDTH** Adjusts the panning width, from 0 to 180 degrees across the stereo space. Changes in WIDTH do not affect the speed of rotation.

**DEPTH** Controls the apparent depth of travel of the sound image, adjustable from 0 to 10. At the minimum depth of 0, the effect is that of an ordinary stereo panner, while at the maximum depth of 10 the sound image recedes far back into the simulated space.

**DIRECTION** A switch controlling the direction of rotation through the space. "<MOVE" indicates leftward motion (when the source is at its closest position), while "MOVE>" indicates rightward motion.

**DELAY** Adjusts delay time for the repeating delay line, from 0 to 999 milliseconds. The delay line precedes the panning circuit, so that repeated signals are coincident with the undelayed signal as they rotate through space.

**FEEDBACK** Feedback gain applied around the repeating delay line, from 0 to 96%. Above 96%, the program goes into HOLD mode (as indicated by "HLD" on the display). In HOLD mode the input signal is cut off and the audio material in the delay line will loop indefinitely. While in hold mode all panning parameters may be adjusted without affecting the signal captured in the loop.

## SOFTKEYS:

**STOP/START PAN** When the panner is rotating, this softkey freezes it at its current position. Pressing the softkey again will resume panning. When the panner is frozen, all parameters (including SPEED and DIRECTION) may be adjusted without audible effect - once panning resumes, the new parameter settings will be in force. (Note that no display change occurs to indicate stop/start status).

## APPLICATIONS:

Obviously, PSYCHO PANNER is a very unusual special effect, and you're not likely to find an application for it every day. However, here are a few guidelines that might help you get maximum use out of it:

The most effective range of rotation speeds turns out to be from about 5 to 55 - a faster rotation can be dazzling (and disorienting, if monitoring through headphones!) but much of the illusion of circular movement is lost. The circular panning effect is also most pronounced when the panned signal is mixed completely 'wet'. Mixing the processed signal in with the original is not recommended, as it will usually completely obscure the illusion.

A useful application of the effect is to sync the rotation rate with a musical rhythm. Unfortunately, exact sync is often difficult because of the coarse resolution of the rotation SPEED parameter. A technique which can help simulate synchronization is to set the rotation rate slightly faster than the beat, use the STOP/START softkey to STOP after exactly one rotation, and then START right on the beat, effectively re-syncing the rotation to the rhythm.

The HOLD mode of the repeating echo was intended as a (very crude) loop editor which could be used to capture sounds of variable length and whirl them around. It's usually most effective to find the proper loop length first, before recording the sound, as changing the LENGTH parameter while looping will introduce spurious noises. Captured signals probably will remain in the loop on the order of several hours before any degradation in quality is heard.

Finally, while not really utilizing the program as a panner, it may be useful just to STOP the panned signal at its furthest point in the rotation in order to impart some room tone or a sense of distance to dry signals.

### first order effects

digital audio signal processing

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## PROGRAM SUMMARY:

# STEREO SHIMMER

## DESCRIPTION:

**STEREO SHIMMER** is a special effect reverb program that can provide a shimmering, sparkling multitude of echoes that move dynamically back and forth through the stereo space and decay into a smooth, reverberant ambience. The echoes take on the characteristics of tiny, fluid droplets, an effect enhanced by a parameter that controls the 'liquidity' factor in the algorithm. Other parameters are available to control the overall decay time, and adjust the 'shimmer rate'. Though the program is most effective using a stereo input, with echoes from opposite channels criss-crossing throughout the space, an STEREO/MONO input mode switch is provided to allow effective operation with a mono input.

## PARAMETERS:

**DECAY FACTOR** This functions much like the decay time control in a conventional reverb, though it is calibrated in percentages from 0% to 99%. At the maximum setting the decay time is on the order of 20 seconds. At the minimum setting a dry, multi-tap-like effect of discrete echoes is produced.

**SHIMMER RATE** This parameter adjusts the rate at which the shimmering effect occurs, and ranges from about 8 to 40 echoes per second in 32 steps. At the slowest rate, individual echoes are easy to perceive, while at the highest rate the effect is more of a controlled 'buzz'.

**LIQUID MIX** This parameter can be adjusted from 0% to 100% to control the *wetness* of the shimmering effect. Higher liquid factors accentuate the fluid, liquid quality of the echoes. In fact, at the highest setting of 100%, individual droplets can be heard quietly splashing in the reverberant wake left by shorter, impulsive sounds. At lower LIQUID factors, the shimmer effect becomes less colored and more even and clean, almost mechanical.

**INPUT MODE** In STEREO INPUT mode, the program receives its input from both the left and right channel input signals; in MONO INPUT mode the signal from the left channel is distributed to both inputs. When in STEREO INPUT mode, signals originating in each channel spread out towards the opposite channel as the shimmer effect develops and decays, while in MONO mode the signals start at the center and tend to migrate outwards.

## APPLICATIONS:

For a program which is more or less a 'canned' special effect, quite a wide variety of sounds can be coaxed out of STEREO SHIMMER.

As mentioned above, the SHIMMER RATE can produce an effect ranging from a repeating echo to an insistent buzz. Higher SHIMMER RATES generally retain more intelligibility in the original signal than lower rates. When the LIQUID FACTOR parameter is set at 0 and SHIMMER RATE is at 40, a metallic sounding reverberation results. Lowering the RATE will cause the reverb to sound less colored, and the echoing shimmer effect will begin to predominate.

When using the program in STEREO INPUT mode, the shimmer effect is most enhanced if the two input signals are each somewhat distinctive - sounds from the individual channels can then be heard to mix and move through the stereo space. Even if you're using the program with only a single input, it can actually be more interesting to leave it in STEREO MODE (rather than switching to MONO) because the migration of sound from one channel across the stereo field is more obvious.

Turning the DECAY FACTOR down to 0% basically eliminates feedback in the delay network used for the program. The effect is somewhat like a multitap delay, though the signal will bounce from channel to channel. Try using an impulsive sound and bringing the LIQUID MIX parameter up to 100; each set of echoes to be followed by a distinct shower of the little droplet sounds heard in the background at higher DECAY FACTORS. You will notice that the repetition rate of the droplets matches the SHIMMER RATE, and that they are in fact just highly filtered echoes of the original sound.

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