

960L Version 2.5

Owner's Manual Addendum

Using the Documentation

This addendum to the 960L Owner's Manual contains information about the 960L Version 2.5 software. It covers features of Version 2.5 that differ from previous Version 2 software releases (such as Versions 2.20, 2.21, 2.22, and 2.4). Refer to the 960L Owner's Manual for general information and operating instructions.

About Version 2.5

The 960L Version 2.5 software contains several new Delay algorithms, as well as additional 96kHz Reverb algorithms. The list below highlights Version 2.5 features:

Stereo Delay Algorithms

- Simple Delays
- Dual Delays
- Random Delays
- Stereo Frame Delay

Multi-Channel Delay Algorithms

- Simple Surround Delays
- Random Surround Delays
- Surround Frame Delay
- Octal Frame Delay (8x8 configuration only)
- Octal Zone Delay (8x8 configuration only)

New Stereo 96kHz Reverb Algorithms

- Chamber
- Plate

New Multi-Channel Reverb Algorithms

- Surround Chamber
- Surround Plate

Stereo Delay Factory Programs

- Eight banks contain new preset programs that utilize the Stereo Delay algorithms listed here. There is also a bank containing 480L Delay programs. These programs are described in detail later in this document (see page 9).

Multi-Channel Factory Programs

- Five banks contain new preset programs that utilize the Multi-channel Delay algorithms listed here. These programs are described in detail later in this document (see page 13).



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Delay Algorithms

SIMPLE DELAYS

Simple Delay is a basic delay algorithm. It features one delay line for each input channel (in 5-channel operation, the center channel input is split between the left and right input channels). Each delay line has a single output "voice". Each voice has independent delay time, output level, feedback control, filtering, and panning. The feedback path also features high-pass and low-pass filters, as well as diffusion. Each voice has up to four seconds of delay time.

In addition to the basic voice architecture described above, Simple Delay also has diffusion control. This controls diffusors on the input and in the feedback path. Simple Delay is available in Stereo, Quad, and 5-channel configuration of the DSP card.

Parameters

There are two types of parameters available in the Delay algorithms. There are general parameters, which affect the entire algorithm, and delay voice parameters, which affect the individual voices. To toggle between the two types, press the EDIT key. Alternatively, press the ALG key and select from the popup menu.

General Parameters

LvLMST	Controls the level of all delays.
FbkMST	Controls the level of all feedbacks.
DelMST	Controls the length of all delays.
Diffus	Controls the amount of diffusion on input and feedback. At a minimum, the diffusor has no effect. As diffusion increases, the signal becomes "smeared."
FbRoll	Controls the low-pass filter in the feedback path.
FbHipass	Controls the high-pass filter in the feedback path.
Hold	Provides infinite hold for audio in delays. Each delay loops at its delay length. When Hold is set to ON, no input signal is admitted into the delay. Voices can still be panned, and filters and gains can still be adjusted. Changes in delay length or feedback will not take effect until Hold is set to OFF.

Ctr In	Adjusts center input level (this is only available in 5-channel configurations). Unless the center channel audio is discrete, it is recommended to set the center input 6dB below the InLvl parameter setting.
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InLvl	Controls input level. Normally, this value can be set to 0dB. High levels of diffusion or strong low-frequency content may require a setting of -6dB or lower.
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Mix	Controls the wet-to-dry mix ratio.
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Delay Voice Parameters

Each delay voice has a name. L1 indicates Left 1, R2 indicates Right 2, and so on.

Gain	Adjusts voice gain from positive full scale to negative full scale. Be aware of the position of LvLMST when making gain adjustments.
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Tip:

To reset the parameter to OFF, hold down the FINE ADJ key and touch the fader lightly.

Delay Time	Adjusts delay length, which can be accomplished with the fader or the +/- keys. FINE ADJ can be used to achieve the correct delay length setting. Be aware of the position of DelMST when making delay adjustments.
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Fbk	Adjusts voice feedback from positive full scale to negative full scale, although full scale will probably cause unpleasant sounds. A non-zero value will cause the delay to be fed back into the input. A voice can be fed back even when its gain is off. Be aware of the position of FbkMST when making Fbk adjustments.
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Tip:

To reset the parameter to OFF, hold down the FINE ADJ key and touch the fader lightly.

Filt	Controls the filter of each voice. In the center position, the filter is flat. Below center, the filter becomes low-pass, removing more high-frequency content as the fader is lowered. Above center, the filter is high-pass, removing low-frequency content as the filter is raised. This only affects voice output, not feedback.
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Tip:

To reset the parameter to flat, hold down the FINE ADJ key and touch the fader lightly.

Pan	Adjusts voice pan. Press the JOYSTICK button to engage the panner for the current voice.
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DUAL DELAYS

The Dual Delay algorithm is similar to Simple Delay, except with two delay lines for each input channel. Each voice has independent delay time, output level, feedback control, filtering, and panning. The feedback path also features high-pass and low-pass filters. Each voice has up to two seconds of delay time.

In addition to the basic voice architecture described above, Dual Delay provides more control over diffusion. This is explained in the parameter section.

Parameters

Please refer to the parameter section for Simple Delay. This section will only describe parameters not introduced earlier.

General Parameters

FbkMST	Controls the level of all feedbacks AND crossfeeds.
Grain	Provides further control of the input diffusor. A low value causes a very tight smear pattern (perhaps only discernable on percussion). A large value causes a more spread-out pattern.
FbkDiff	Provides diffusion in the feedback path. It creates the effect of moving echoes a little farther into the background as they loop, which is useful when modeling tape loops and other effects.
Fgrain	Controls gain for the feedback diffusor.

Delay Voice Parameters

Xfd	Adjusts crossfeed control from positive full scale to negative full scale. This injects the delay signal into the opposite delay line. It can be used to create ping-ponging effects or to cause density buildup. A voice can be crossfed even if its gain is OFF. Be aware of the position of FbkMST when making Xfd adjustments.
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Tip:

To reset the parameter to OFF, hold down the FINE ADJ key and touch the fader lightly.

RANDOM DELAYS

The Random Delay algorithm provides no-holds-barred control of delays. It features a delay line for each input channel of the machine (center input is shared between left and right). Each delay line has three output voices with full feedback, filtering, and panning. Each voice has up to 3 seconds of delay time (plus another second from the randomizers described below). Random Delay has the same diffusion controls as Dual Delay.

In addition to the basic voice architecture described above, Dual Delay features two randomizers. Voices can be assigned to either randomizer or no randomizer at all. The randomizer provides up to one second of additional delay time for each voice. There are several modes of randomization described in the parameter section.

Random Delay includes all features of Simple Delay, but is especially useful for:

- Multitap Tape Loops - Recirculate a delay using the feedback parameter. Appropriate use of high-pass and low-pass filters will emulate the bandpass effects of multigenerational tape loops (sorry, we don't add hiss). The feedback diffusor also allows emulation of azimuth misalignment, a hallmark of the sound.
- Early Reflection Modeling - Although very different in scope from Lexicon's Ambience algorithms, Random Delay can be used to carefully place early reflections in a stereo or surround field. Randomization can be used to control coloration that might otherwise occur with straight delays.
- Doublers - Short delays (10 to 50ms, depending on material) can be randomized by a number of techniques. This yields a variable delay time that can be convincing in creating a doubled voice.
- Very Strange Sounds - Using randomization and large wander times generates completely unpredictable delays - just the thing to scare talent into that 12-step program.

Random Delay is available in Stereo, Quad, and 5-channel configuration of the DSP card.

Parameters

Please refer to the parameter section for Simple Delay and Dual Delay. This section will only describe parameters not introduced earlier.

Note:

The Hold parameter works as described earlier, except that only Voice 1 is recirculated. The output from all voices is still available.

Delay Voice Parameters

Xfd Works like the Crossfeed parameter in Delay, except for the target. The crossfeed data is sent to the opposite corner. Left Front goes to Right Surround; Left Surround goes to Right Front.

General Parameters

FsLvl Sends the Front Left/Right inputs to the Surround Left/Right inputs. This is useful in situations where only a stereo input signal is present. It allows as many as 12 voices to exist for a stereo signal.

Rand1 Selects the randomizer type for Randomizer 1. Choices are:

SloRand: One delay voice at a time is changed, at the rate specified in Mod1.

FstRand: All delay voices are changed at once, at the rate specified in Mod1.

Gate: Wander time is added to all delay voices whenever the input level is above the threshold specified in Mod1.

-Gate: Wander time is added to all delay voices whenever the input level is below the threshold specified in Mod1.

Wand1 Specifies the amount of delay that is added to voices affected by Randomizer 1. For any of the Gate modes, the full amount is added. For the Rand modes, the wander amount can be anything between 0 and the full randomizer amount.

Mod1 Modifies Randomizer 1. This can be a threshold or a rate, depending on the value of Rand1.

Rand2, Wand2, Mod2 Control Randomizer 2.

V1Rand Designates the Randomizer that affects all Voice 1s (Voice Ones). This can be Rand1, Rand2, or no Randomizer.

V2, V3 Rand Designate the Randomizer for Voices 2 and 3.

Delay Tools

ZONE DELAY

The Zone Delay algorithm is intended primarily for use in live sound applications. It provides up to eight independent channels of delay for speaker groups. These delays can be controlled by either absolute value (milliseconds) or distance (feet or meters). When delays are controlled by distance, additional parameters for temperature and humidity are available. There is no additional signal processing inside the algorithm. The Zone Delay requires 8-in/8-out configuration of the DSP card.

Parameters

Temp	Set to temperature of venue.
Hum	Set to relative humidity of venue.
Units	Controls the mode of display. Settings include: <i>English:</i> Distances are shown in feet and temperatures are shown in Fahrenheit . <i>Metric:</i> Distances are shown in meters and temperatures are shown in Celsius . <i>Time:</i> Distances are shown in absolute time. Temperature and humidity have no effect.
Zone1	Controls the delay time for the signal passing from Input 1 to Output 1.
Zone2, etc.	Control delay times for the other signals.

FRAME DELAY

The Frame Delay algorithm is intended for use primarily in video post-production applications. It allows audio to be delayed in order to maintain synchronization with video.

The Frame Delay is available in all configurations of the machine: Stereo, Quad, 5-channel, and 8-channel.

Parameters

FrDly	Indicates the number of frames that all channels are delayed.
Type	Indicates the frame format. Formats include 24, 25, 29.97, and 30 FPS.
TrimL	Trims the left input by an additional delay. Choices include 0, 1/4, 2/4, and 3/4 inch Frame.
TrimR, etc.	Trims other inputs.

User Interface Enhancements

The 960L user interface features several enhancements that support Delay algorithms. To simplify delay algorithm editing, the algorithm parameters have been grouped into two separate Edit screens: the Delay Voice Screen and the Standard Algorithm Edit screen. The new Delay Voice Screen is pictured below (Figure 1).



Figure 1 - Delay Voice Screen

The Delay Voice screen displays each time a delay program is loaded and the EDIT mode button is pressed. It contains all parameters associated with the delay voices of each algorithm.

To select a delay voice to edit:

1. Use the Numeric Keypad or Navigation Arrows to select the desired delay voice. The selected Delay Voice parameters will be assigned to the faders.
2. Adjust the Delay Voice parameter to the desired setting.

DELAY VOICE PANNING

When a delay voice is selected, the panner for that delay voice is automatically assigned to the joystick. To position the delay voice, lock the joystick by pressing the JOYSTICK button, then move the joystick to position the delay voice.

FINE ADJUST

To make fine adjustments to parameters, use one of the following methods:

1. To make fine adjustments to a single parameter, simply touch the appropriate fader to select the parameter, then use the +/- keys to adjust the parameter to the desired setting. (This option does not apply for FbkMST and LvlMST.)
2. Press the FINE ADJ button located on the right side of the LARC2, then adjust the parameter to the desired setting. When FINE ADJ is pressed, the button will light to indicate that fine adjust is enabled. The faders will automatically center. To disable fine adjust, press FINE ADJ again. The faders will automatically move to their set positions.

All other parameters in the delay algorithm are contained on the Standard Algorithm Edit screen shown below (Figure 2).

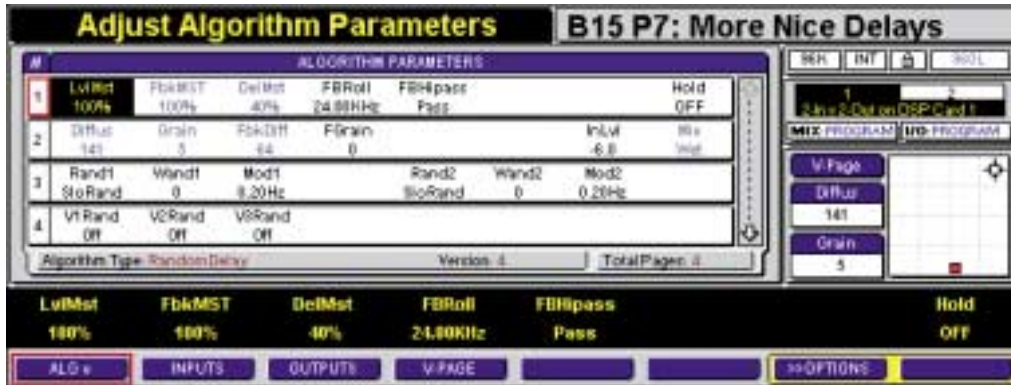


Figure 2 - Standard Algorithm Edit Screen

To select between these two screens, use the following methods:

1. When the unit is in Algorithm Edit mode, press the EDIT button to toggle between the two Delay algorithm edit screens.
2. Press the ALG soft button and select the screen from the menu. The menu is shown below (Figure 3).



Figure 3 - Algorithm Parameter Screen Selection Menu

New Version 2.5 Factory Programs

Stereo Bank 13: Simple Delays

Simple delays.

Number	Name	Algorithm	Description
B13 P1	Simple Delay	Simple Delay	A simple delay. DelMST sets overall delay time. The first four faders set individual left and right taps.
B13 P2	Filtered Delay	Simple Delay	A filtered delay. Joystick changes voice filters.
B13 P3	Slap Echo	Simple Delay	A slap echo. DelMST sets overall delay time.
B13 P4	Inverse Delay	Simple Delay	A delay with inverse feedback. Makes some interesting constructive and destructive cancellations.
B13 P5	Feedback	Simple Delay	A good amount of feedback. The first four faders control individual delay tap.
B13 P6	Boing!	Simple Delay	A short delay with lots of feedback. Like a spring reverb.
B13 P7	7 1/2 Tape Delay	Simple Delay	A 7 1/2 IPS tape delay. DelMST sets overall delay time.
B13 P8	3 1/4 Tape Delay	Simple Delay	A 3 1/4 IPS tape delay. DelMST sets overall delay time.
B13 P9	Infinite Hold	Simple Delay	DelMST sets hold repeat time.
B13 P0	Cross-Panned Dly	Simple Delay	Cross-panned outputs with a mild amount of feedback.

Stereo Bank 14: Split Delays

Separate mono delays. Left and Right sides act as independent delays.

Number	Name	Algorithm	Description
B14 P1	Basic Short/Long	Simple Delay	A simple delay. Left is short, Right is long. The faders set individual left and right taps.
B14 P2	Basic Long/Tape	Simple Delay	A simple delay. Left side is a long delay with mild feedback. Right side is a tape-type delay.
B14 P3	1/2 : 1/3	Dual Delay	Left side is 1/2 note feel. Right side is 1/3 note or triplet feel. Use DelMST to match desired tempo. Both sides will adjust.
B14 P4	Dark/Feedback	Dual Delay	Left side is a bright delay that quickly gets very dark. Right side is a nice delay with feedback.
B14 P5	Doubler/Basic	Random Delay	Left side is a doubler for thickening up drums, percussion, guitars, etc. Right side is a basic delay controlled by the first three faders.
B14 P6	1/2 : 1/4	Dual Delay	Left side is 1/2 note feel. Right side is 1/4 note feel. Use DelMST to match desired tempo. Both sides will adjust.
B14 P7	Stutter/Feedback	Dual Delay	Left side is a quick stutter-type delay. Right side is a nice delay with feedback.
B14 P8	Bright/Dark	Simple Delay	Left side is a bright delay. Right side is a dark delay.
B14 P9	Basic/Whispers	Dual Delay	Left side is a basic delay with controls on the faders using LF1 parameters. Right side is a whispery, airy delay.
B14 P0	Bathroom/Rumble	Simple Delay	Left side is a quick delay with lots of reflections. Right side is a dark, rumbling delay.

Stereo Bank 15: Dual Delays

Dual Delays, many rhythmic presets.

Number	Name	Algorithm	Description
B15 P1	1/2 Delay	Dual Delay	1/2 note feel. DelMST sets overall delay time.
B15 P2	1/4 Delay	Dual Delay	1/4 note feel. DelMST sets overall delay time.
B15 P3	1/3 Delay	Dual Delay	1/3 note or triplet feel. DelMST sets overall delay time.
B15 P4	Delay Wash	Dual Delay	A blanket of delays.
B15 P5	Swingin' Delay	Dual Delay	A jazzy-feeling delay.
B15 P6	Into the Middle	Dual Delay	Taps that start on the outside and move in.
B15 P7	Galloping Delays	Dual Delay	Delays that sound like a large, galloping, solid-hoofed, herbivorous mammal.
B15 P8	Back and Forth	Dual Delay	Taps going left to right, and right to left.
B15 P9	Long Whispers	Dual Delay	A great subtle effect for vocals and other types of ear candy. DelMST sets delay length.
B15 P0	Dual Doubler	Dual Delay	A doubler with some inverse feedback and gain to create interesting sounds.

Stereo Bank 16: Delay Spaces

The reflections of space, without the reverb.

Number	Name	Algorithm	Description
B16 P1	Golden Room	Random Delay	Dimensions of a room using the Golden Mean.
B16 P2	Tight Room	Random Delay	Tight room. Great for percussion and drums.
B16 P3	Slap Room	Random Delay	Ambience with a strong slap. DelMST adjusts slap time. Feedback adds liveness.
B16 P4	Alternate Room	Random Delay	Nice ambience for drums, voiceovers, etc. DelMST adjusts room size. FbkMST adds some liveness.
B16 P5	Downtown	Random Delay	Reflections off glass and brick buildings. Joystick adjusts building type. DelMST adjusts distance to buildings.
B16 P6	Sewer Pipe	Dual Delay	DelMST adjusts the diameter and FbkMST adjusts the length of the pipe.
B16 P7	Ballpark	Random Delay	Next up, up, up . . . Number 42, two, two . . . The local ballpark. DelMST adjusts size.
B16 P8	Hall w/o Verb	Random Delay	A hall's reflections without the reverb.
B16 P9	AM Radio	Dual Delay	Look Ma! . . . I'm on the radio!
B16 P0	Random Room	Random Delay	A good-sounding room with constantly changing reflections.

Stereo Bank 17: Random Delays

Delays that make use of randomizers to create interesting effects.

Number	Name	Algorithm	Description
B17 P1	Nice Delays	Random Delay	Works great on anything that needs subtle, nice delays - vocals, acoustic guitar, piano, etc.
B17 P2	Going Inside	Random Delay	Nice early delays. Later reflections have significantly more filtering.
B17 P3	Smart Delay	Random Delay	Low and high input signals respond differently in this delay. When input signals are higher, longer delays come out more. Mods set crossover point.
B17 P4	Vocal Delay	Random Delay	A short, doubling-type delay with longer delays coming in as the level decreases (i.e. soft singing=longer delays, louder=just the doubler).
B17 P5	Complex Looper	Random Delay	Randomized loops. Start loop with Hold fader. DelMST sets overall delay time. FbkMST controls complexity.
B17 P6	Rolling Right	Random Delay	Delay taps move from left to right, getting brighter as they travel right.
B17 P7	More Nice Delays	Random Delay	Works great on anything that needs subtle, nice delays - vocals, acoustic guitar, piano, etc.
B17 P8	Bright to Dark	Simple Delay	A simple, short delay that is rolled off and diffused with each feedback pass.
B17 P9	Redshift	Random Delay	A quick shift from right to left, and bright to dark.
B17 P0	Totally Random	Random Delay	A dark, very random delay.

Stereo Bank 18: Crazy Delays

Mildly strange to totally weird stereo delay presets.

Number	Name	Algorithm	Description
B18 P1	Smoothing Delay	Random Delay	The delay becomes more diffused with each feedback pass.
B18 P2	Robotix	Random Delay	Turns anything into a robot. The initial ring-mod gets delayed, and the feedback taps spread over time.
B18 P3	Hollow Tubes	Random Delay	Super-fast delay taps with high feedback, split off in their own directions.
B18 P4	Alien Encounter	Random Delay	Another heavy ring-mod based effect. Adjust DelMST time for different sound.
B18 P5	Spastic Delays	Random Delay	About as wild as it gets for stereo delay. Initial delay taps all converge and create a dense atmosphere.
B18 P6	Warm Ping-Pong	Random Delay	Odd delay taps on the right and even delay taps on the left create a ping-pong effect. Diffusion smoothes it out.
B18 P7	Random EQ Delay	Random Delay	Random delay taps each have their own EQ signature. Delay taps become more randomized once the signal is over -6dB.
B18 P8	Crystallize	Random Delay	A cool lo-fi sound. FbkMST changes effect level. FbkDiff and Fgrain change effect sound.
B18 P9	The Sizzler	Simple Delay	A delay that sizzles into the background.
B18 P0	Panning Delay	Dual Delay	Sounds like delay taps are moving back and forth due to the cross-feedback setup in this preset.

Stereo Bank 19: 480 Delays

True to the original.

Number	Name	Algorithm	Description
B19 P1	4-Voice Double	Random Delay	Delay voices are doubled in stereo. When added to a dry signal, it's crisp, wide, and uncluttered.
B19 P2	Double Delay	Random Delay	Two voices produce a double-effect. The other two voices provide a longer delay synced with the double. Cross-panned feedback ices the cake.
B19 P3	4-Bounce Dly	Random Delay	Very clean between left and right channels.
B19 P4	Pitter Patter	Random Delay	Delays are widely spaced with reiterative and cross-panned feedback.
B19 P5	X-Pan Double	Random Delay	Two voices are cross-panned through delays. Great for stereo background voices.
B19 P6	Delay Cave	Random Delay	Need we say more?
B19 P7	Circles	Random Delay	Long delays with cross-panned feedback create a "circular" effect.
B19 P8	There & Back	Random Delay	Delay starts on one channel, slaps to the other, and returns.
B19 P9	Soft Roller	Random Delay	Stereo echo with high-frequency cut.
B19 P0	On and On	Random Delay	Long echoes that pan across center.

Stereo Bank 20: Tools

Stereo tools.

Number	Name	Algorithm	Description
B20 P1	Frame Delay	Stereo Frame Delay	A stereo frame delay. Trim will adjust delay in 1/4 frame increments.

Surround Bank 13: *Simple Delays

Basic surround delays.

Number	Name	Algorithm	Description
B13 P1	Nice Delay	Random Surround Delay	A nice delay for surrounds. Good all around. Adds a great sense of space in surrounds.
B13 P2	Whispers	Random Surround Delay	Whispers around you.
B13 P3	Shuffle Surround	Random Surround Delay	A shuffle-feel delay. DelMST sets overall delay length.
B13 P4	Basic Surr Delay	Simple Surround Delay	A basic surround delay. Each of the four inputs has a discrete echo tap. Faders set times and feedback. Edit page pans taps.
B13 P5	Front to Back X	Random Surround Delay	Front-to-back crossing over. Changing delay times on LF1 and RF1 effects hold length.
B13 P6	For Tori	Random Surround Delay	Works great on piano and vocals. DelMST sets overall delay length.
B13 P7	Back Heavy	Random Surround Delay	LS and RS inputs have lots of content in this delay.
B13 P8	Spiral EQ Delay	Random Surround Delay	Each delay tap pans in a circle, spreading from narrow to wide. The EQ of each tap goes from dark to bright as it spirals outward.
B13 P9	Roll Back	Random Surround Delay	Stereo input moving from front to back, bright to dark. Great with sound effects or low-frequency material.
B13 P0	Repeating Dream	Random Surround Delay	A short burst of criss-crossing delays followed by another round of taps. This preset blurs into a dense atmosphere.

Surround Bank 14: *Random Delays

Surround delays that make use of randomizers.

Number	Name	Algorithm	Description
B14 P1	Warm Delay	Random Surround Delay	A nice surround delay with mild use of randomizers. DelMST sets overall delay time.
B14 P2	Smart Delay	Random Surround Delay	Delay changes with input level. When input is over threshold set in Mod2, longer taps are created.
B14 P3	X-Over	Random Surround Delay	Right front input taps migrate to the left rear, and left front migrate to the right rear.
B14 P4	Vocal Delay	Random Surround Delay	A delay with interesting use of randomizers. When input is under threshold set in Mod2, delays get longer. When above, it's a doubler.
B14 P5	Subtle Delay	Random Surround Delay	Delay taps slowly fade in, creating an interesting sense of space.
B14 P6	Busy Delay	Random Surround Delay	Lots of delay taps in this one. Use when lots of delay taps are needed without getting too mushy.
B14 P7	Random & Stutter	Random Surround Delay	Fast random taps create a dense, spastic environment.
B14 P8	Rhythmic S/H	Random Surround Delay	A timed rhythmic delay with lots of high pass EQ. Creates an interesting-sounding delay that bounces all over the place.
B14 P9	Wild Echoes	Random Surround Delay	A rhythmic preset that has your source bouncing around all speakers with feedback rolled off.
B14 P0	Random Looper	Random Surround Delay	Hold starts the loop. FbkMST controls some of the complexity. Good for ambient loops due to the constant randomization of the start/stop loop.

Surround Bank 15: *Delay Spaces

Surround delay spaces. The reflections of a space without the reverb.

Number	Name	Algorithm	Description
B15 P1	Golden Room	Random Surround Delay	62ft wide and 100ft deep (the Golden Mean). DelMST controls size. FbkMST controls liveness.
B15 P2	Narrow Room	Random Surround Delay	At maximum size, this room is 100ft long and only 25 feet wide. DelMST controls scale. FbkMST controls liveness.
B15 P3	Drum Room	Random Surround Delay	A tight, randomized drum and percussion room.
B15 P4	Wide Room	Random Surround Delay	At maximum size, this odd room is 100ft wide and 25ft deep. DelMST controls size. FbkMST controls liveness.
B15 P5	Square Room	Random Surround Delay	Reflection pattern for a square room, 100ft at maximum size. DelMST controls size. FbkMST controls liveness.
B15 P6	David's Earlies	Random Surround Delay	Early energy that reduces the harshness of close-micing. Wander values over 30 may be bizarre. Raise FSLvl for stereo source material.
B15 P7	Around the Room	Random Surround Delay	Not exactly a natural occurring space, but have fun with this one. Delays go around the room in a clockwise pattern. DelMST controls speed.
B15 P8	Hall w/o Reverb	Random Surround Delay	The reflection characteristics of a hall, without the reverb. DelMST controls size. FbkMST controls surface reflectiveness.
B15 P9	Slap Room	Random Surround Delay	A very reflective room, with lots of echoes bouncing between the back and front. DelMST controls size.
B15 P0	Stadium	Random Surround Delay	Turns the space into a stadium. Input level over Mod2 creates a stronger and longer delay off the back wall.

Surround Bank 16: *Crazy Delays

From strange to insane.

Number	Name	Algorithm	Description
B16 P1	Metal Landscape	Random Surround Delay	Crazy ring-mod taps with high feedback create a metallic atmosphere. Joystick drastically changes mood.
B16 P2	Dispersal	Random Surround Delay	A set of really long delay taps spread out. Each feedback loop becomes brighter until it disappears.
B16 P3	Linger	Random Surround Delay	A straightforward delay with a tap that lingers in the front left speaker.
B16 P4	Nebula	Random Surround Delay	Close tap groupings that spread and diffuse with each feedback pass.
B16 P5	Ambient Bed	Random Surround Delay	Great for sustained sounds, taps bounce all over the place and settle into oblivion. Good sound design tool.
B16 P6	Attack From Back	Random Surround Delay	Spaced taps that shoot forward and become darker with each feedback pass.
B16 P7	Sonic Decimate	Random Surround Delay	A very strange effect indeed.
B16 P8	Open Your Mind	Random Surround Delay	A very interesting effect with lots of things going on. Lower Mod1 to change randomization. Turn V1Rand off or pitched feedback tunable by DelMST.
B16 P9	Dark Hue Delay	Random Surround Delay	Super-fast taps fly around, but it's the low frequencies that keep feeding back.
B16 P0	Sonic Landscape	Random Surround Delay	Strange interactions are created in this preset with lots of cross-feed.

Surround Bank 17: *Tools

Surround Tools

Number	Name	Algorithm	Description
B17 P1	Frame Delay	Surround Frame Delay	A surround frame delay. Trim adjusts 1/4 frame increments.

8x8 Bank 1: Tools

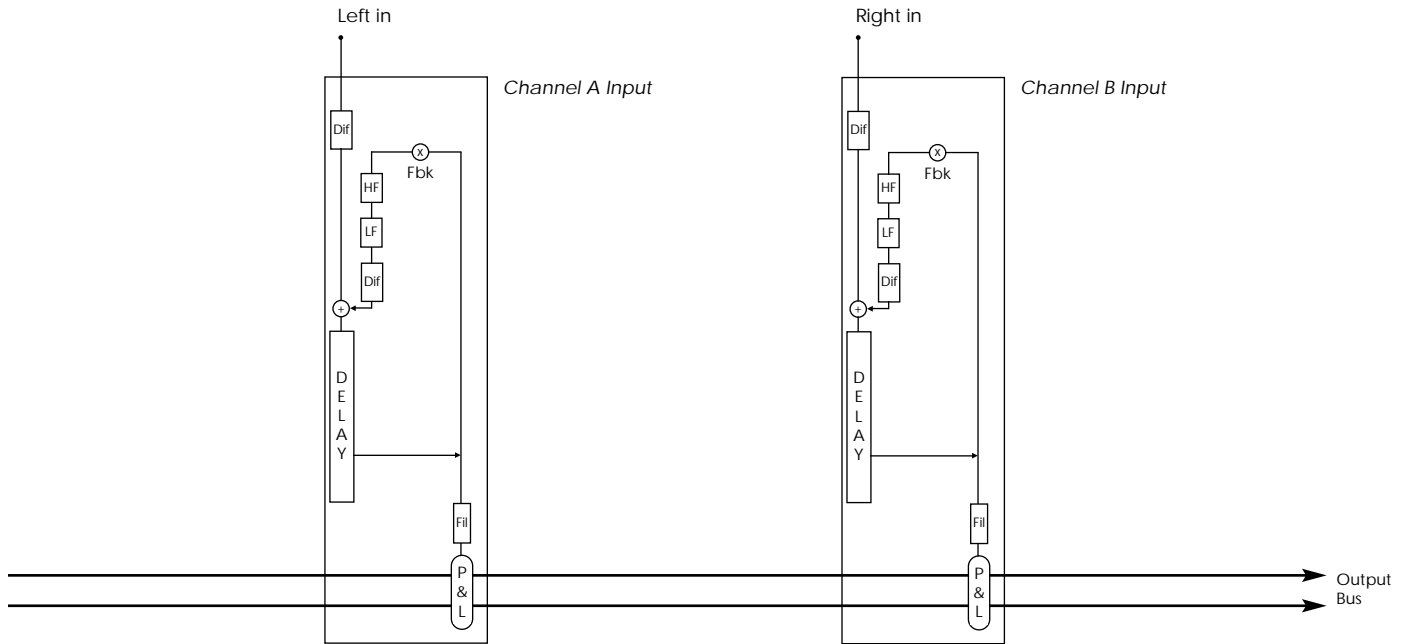
8-channel Tools

Number	Name	Algorithm	Description
B1 P1	Octal Thru	Octal Thru	Inputs go directly to respective outputs. Like a bypass mode.
B1 P2	Zone Dly/Time	Octal Zone Delay	Zone delay using milliseconds as the unit.
B1 P3	Zone Dly/Metric	Octal Zone Delay	Zone Delay using meters as the unit.
B1 P4	Zone Dly/Feet	Octal Zone Delay	Zone Delay using feet as the unit.
B1 P5	Frame Delay	Octal Frame Delay	Eight channels of frame delays. Each channel can be trimmed in 1/4 frame increments. Set number of frames to be delayed and speed with joystick.

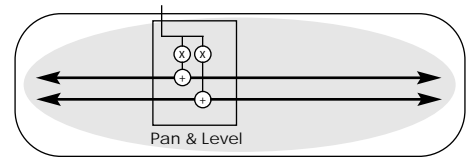
Algorithm Diagrams

SIMPLE DELAY ALGORITHM

2 Delay Channels, 1 Pannable Delay Voice per Channel, 4 second Maximum Delay



KEY			
DifDiffusion	HFHigh-pass Filter
FbkFeedback	LFLow-pass Filter
FilFilter	P & LPan & Level



Global Parameters

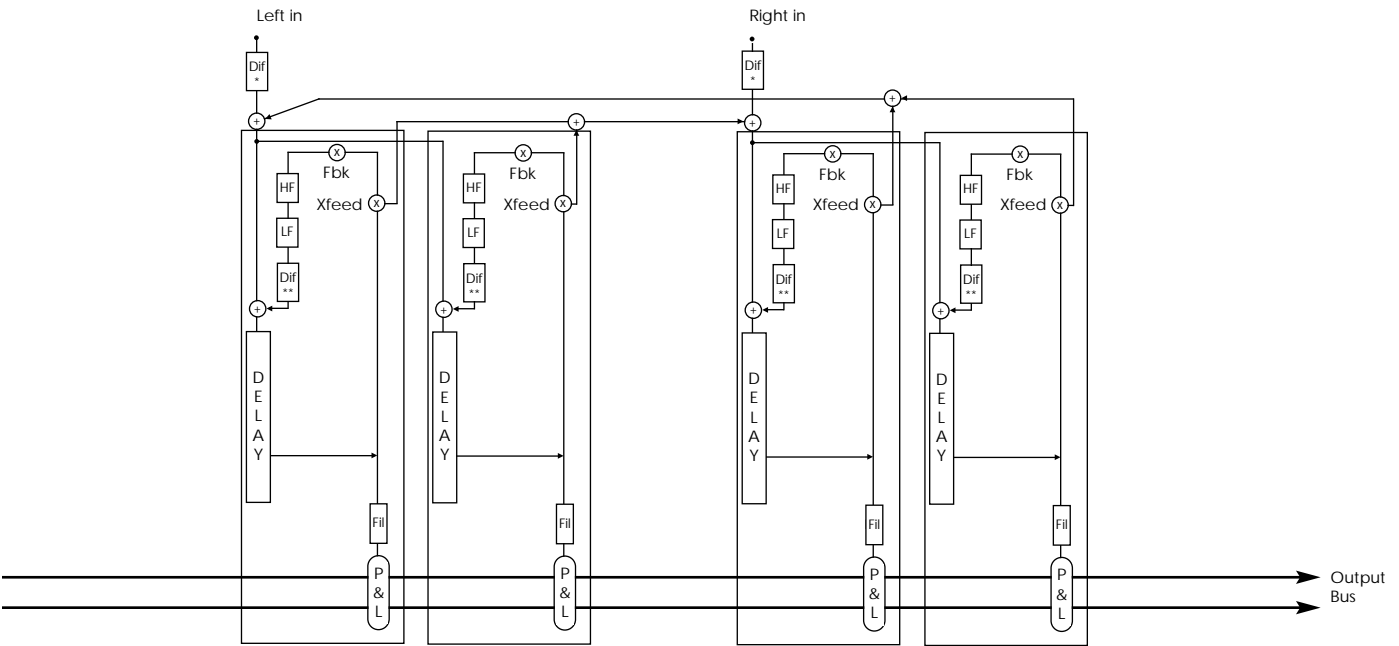
- Mix (not shown)
- Diffusion (controls input and feedback)
- Feedback High-pass
- Feedback Low-pass
- Master Delay Time
- Master Delay Level
- Master Feedback
- Infinite Hold

Voice Parameters

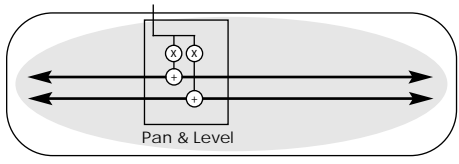
- Delay
- Level
- Feedback
- Filter (dual-mode; high-pass, low-pass)
- Pan X
- Master Delay Time (global)
- Master Delay Level (global)
- Master Feedback (global)

DUAL DELAY ALGORITHM

4 Delay Channels, 1 Pannable Delay Voice per Channel, 2 second Maximum Delay



KEY			
Dif	Diffusion	Fil	Filter
Dif *	Diffusion/Grain	HF	High-pass Filter
Dif **	Feedback	LF	Low-pass Filter
	Diffusion/Grain	P & L	Pan & Level
Fbk	Feedback	Xfeed	Crossfeed



Global Parameters

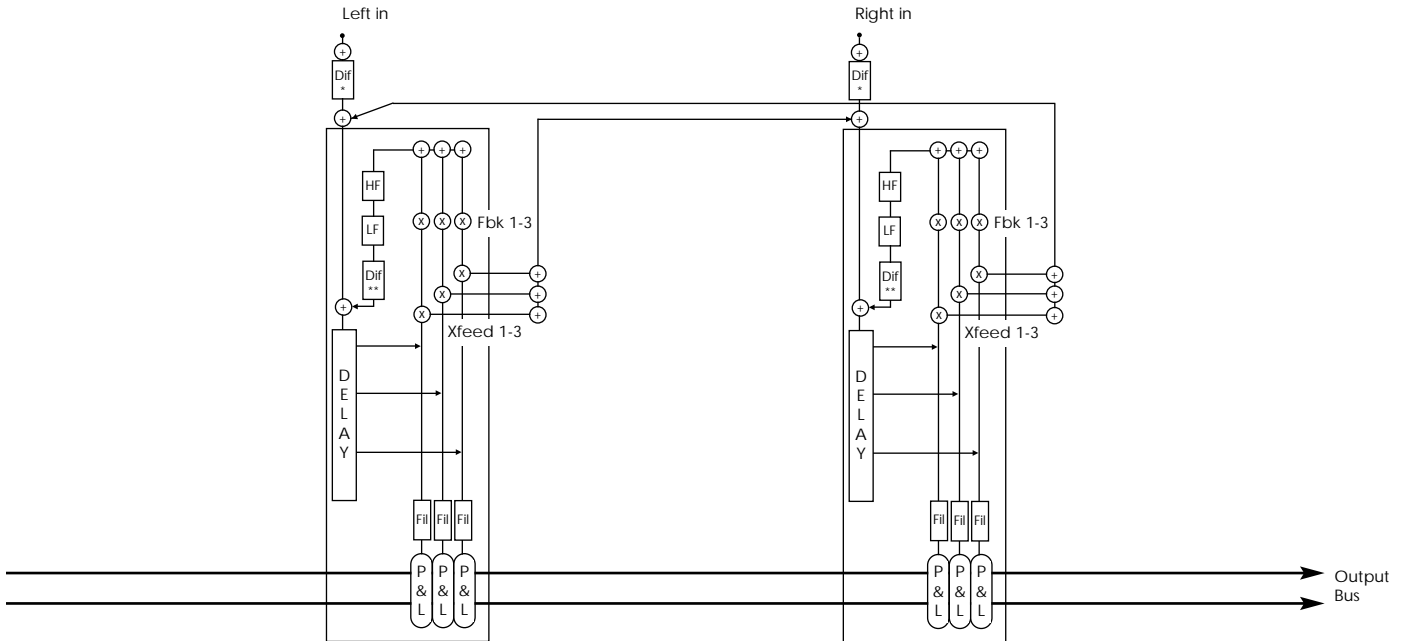
- Mix (not shown)
- Input Diffusion
- Input Grain (diffusor length)
- Feedback High-pass
- Feedback Low-pass
- Feedback Diffusion
- Feedback Grain
- Master Delay Time
- Master Delay Level
- Master Feedback
- Infinite

Voice Parameters

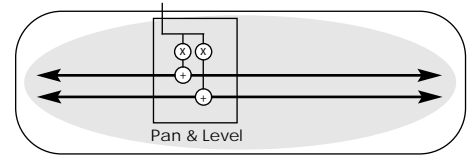
- Delay
- Level
- Feedback
- Filter (dual-mode; high-pass, low-pass)
- Pan X
- Master Delay Time (global)
- Master Delay Level (global)
- Master Feedback (global)

RANDOM DELAY ALGORITHM

2 Delay Channels, 3 Pannable Delay Voices per Channel, 3 second Maximum Delay, 1 second Random Delay



KEY			
Dif	Diffusion	Fil	Filter
Dif *	Diffusion/Grain	HF	High-pass Filter
Dif **	Feedback Diffusion/Grain	LF	Low-pass Filter
Fbk	Feedback	P & L	Pan & Level
		Xfeed	Crossfeed



Global Parameters

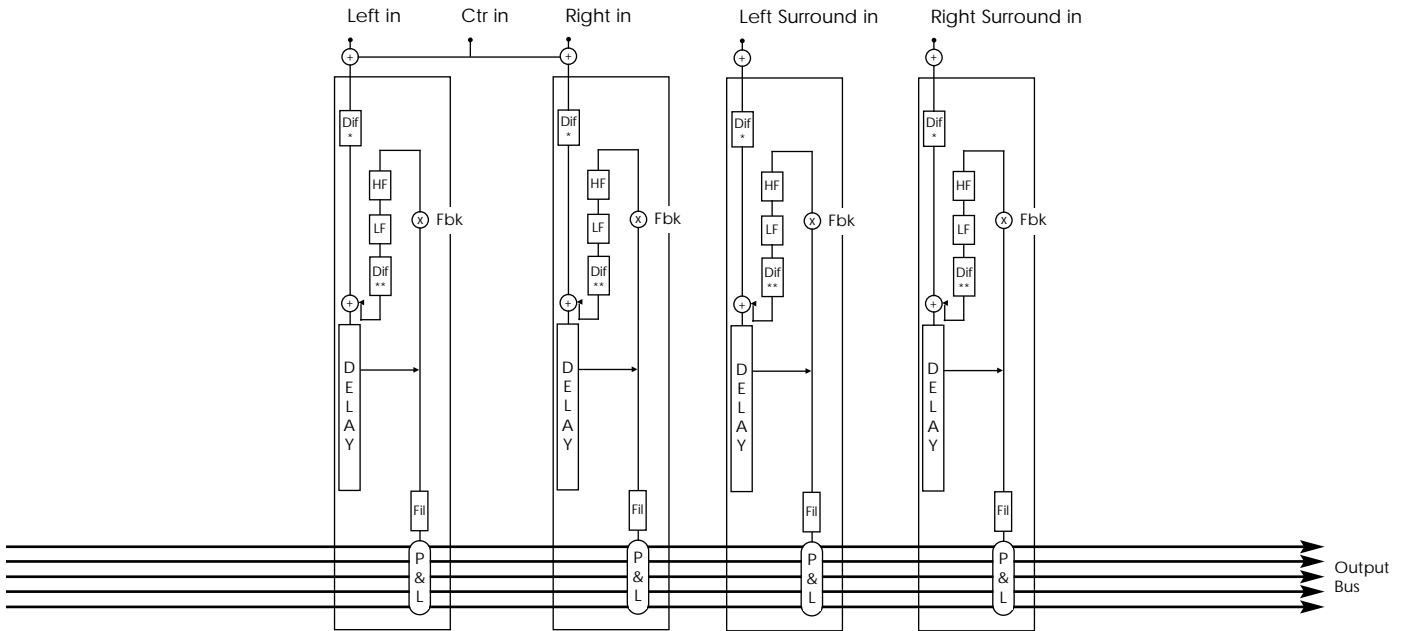
- Mix (not shown)
- Input Diffusion
- Input Grain (diffusor length)
- Feedback High-pass
- Feedback Low-pass
- Feedback Diffusion
- Feedback Grain
- Master Delay Time
- Master Delay Level
- Master Feedback
- Voice 1 Chorus Source
- Voice 2 Chorus Source
- Voice 3 Chorus Source
- Infinite (based on length of Voice 3)
- Randomizer
 - Two randomizers with several sources and types.
 - Adjustable wander for each. Not shown above.

Voice Parameters

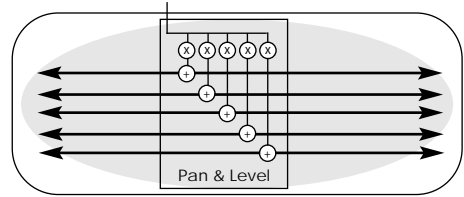
- Delay
- Level
- Feedback
- Filter (dual-mode; high-pass, low-pass)
- Xfeed
- Pan X
- Master Delay Time (global)
- Master Delay Level (global)
- Master Feedback (global)

SIMPLE MULTI-CHANNEL DELAY ALGORITHM

4 Delay Channels, 1 Pannable Delay Voice per Channel



KEY	
Dif	Diffusion
Dif *	Diffusion/Grain
Dif **	Feedback Diffusion/Grain
Fbk	Feedback
Fil	Filter
HF	High-pass Filter
LF	Low-pass Filter
P & L	Pan & Level



Global Parameters

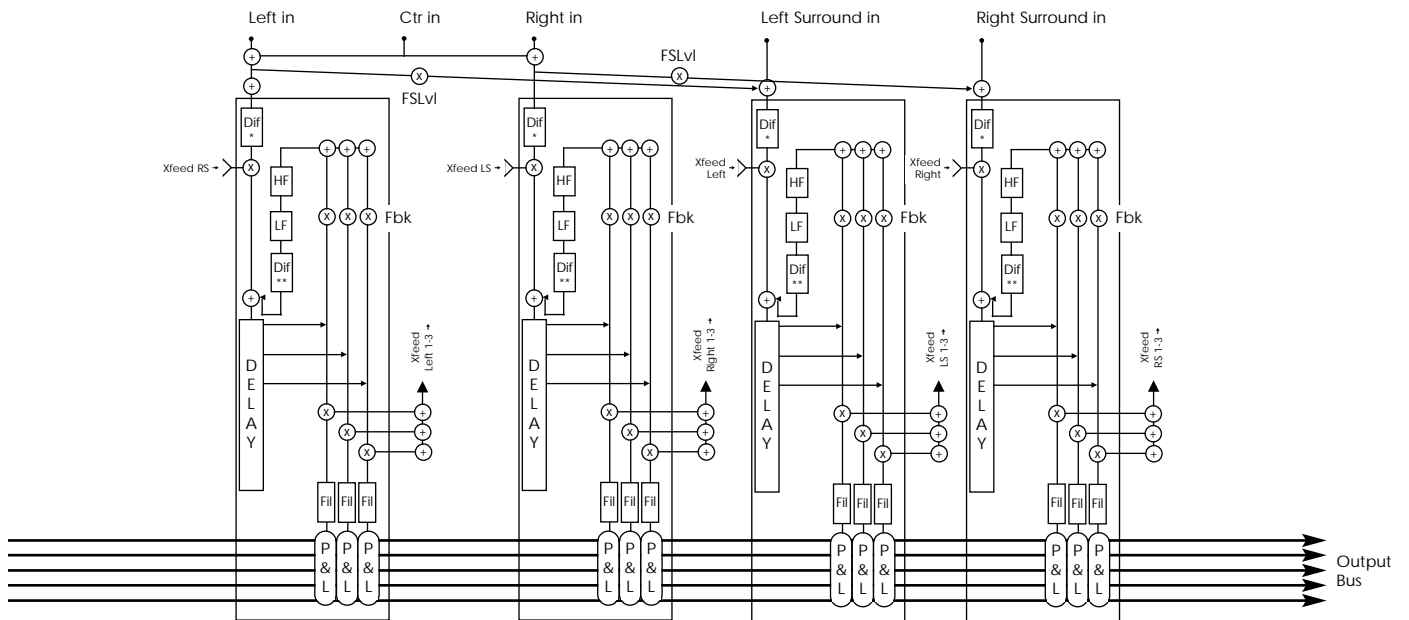
- Mix (not shown)
- Diffusion
- Feedback High-pass
- Feedback Low-pass
- Master Delay Time
- Master Delay Level
- Master Feedback
- Infinite Hold

Voice Parameters

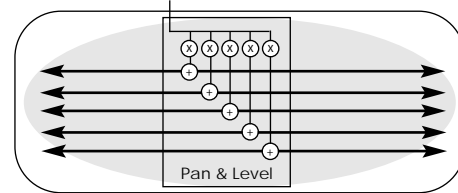
- Delay
- Level
- Feedback
- Filter (dual-mode; high-pass, low-pass)
- Pan X
- Pan Y
- Master Delay Time (global)
- Master Delay Level (global)
- Master Feedback (global)

RANDOM MULTI-CHANNEL DELAY ALGORITHM

4 Delay Channels, 3 Pannable Delay Voices per Channel



KEY			
Dif	Diffusion	FSLvl	Front-to-Surrounds
Dif *	Diffusion/Grain		Level
Dif **	Feedback	HF	High-pass Filter
Fbk	Feedback	LF	Low-pass Filter
Fil	Filter	P & L	Pan & Level
		Xfeed	Crossfeed



Global Parameters

- Mix (not shown)
- Input Diffusion
- Input Grain (diffusor length)
- Feedback High-pass
- Feedback Low-pass
- Feedback Diffusion
- Feedback Grain
- Master Delay Time
- Master Delay Level
- Master Feedback
- Infinite Hold (based on length of Voice 1)
- Randomizer 1 Type
- Randomizer 1 Mod
- Randomizer 2 Type
- Randomizer 2 Mod
- Voice 1 Randomizer Source
- Voice 2 Randomizer Source
- Voice 3 Randomizer Source

Voice Parameters

- Delay
- Level
- Feedback
- Filter (dual-mode; high-pass, low-pass)
- Crossfeed (to diagonal channel: Left to Right Surround, Right to Left Surround, Left Surround to Right, Right Surround to Left)
- Pan X
- Pan Y
- Master Delay Time (global)
- Master Delay Level (global)
- Master Feedback (global)

