

## PROGRAM SUMMARY:

# MOVING REVERB

## DESCRIPTION:

**MOVING REVERB** incorporates a repeating delay line with an 'echo directionalizer' feeding a stereo reverberator. Movement of a reverberant sound image occurs as successive echoes come from different positions across the stereo space. Parameters are included to control delay, feedback, movement speed, wet/dry mix, and to select one of six movement patterns. Patterns can also be switched dynamically using an envelope trigger, which flips the left/right orientation of the pattern on a programmable number of trigger events (eg., drum beats). The program takes a mono input and creates a stereo output, running at either 16KHZ or 8KHZ bandwidth. A softkey can be used to enable or disable the effect.

## PARAMETERS:

**DELAY** Loop delay, adjustable from 10ms to 430ms in normal (16KHZ) mode or 20ms to 860ms in extended (8KHZ) mode.

**FEEDBACK** Loop feedback percentage, adjustable from 0 to 99.5%.

**PATTERN** Repeating echoes move through the stereo space according to one of 6 patterns: LEFT $\leftrightarrow$ RIGHT, RIGHT $\leftrightarrow$ LEFT, CENTER $\leftrightarrow$ LEFT, CENTER $\leftrightarrow$ RIGHT, OUTSIDE $\leftrightarrow$ CENTER, CENTER $\leftrightarrow$ OUTSIDE. In L $\leftrightarrow$ R (and R $\leftrightarrow$ L), the echoes travel 180 degrees from one channel to the other. In C $\leftrightarrow$ L (and C $\leftrightarrow$ R), the echoes begin at the center and travel to one side. In O $\leftrightarrow$ C (and C $\leftrightarrow$ O), the echoes bounce back and forth between channels, either converging towards the center or diverging towards the edges.

**RATE** Controls the rate at which the movement occurs through the stereo space, slowing or hastening the trajectory of the echo images.

**WET/DRY** Adjusts the ratio of reverberated (WET) signal to repeating (DRY) signal. Independent reverb for each channel enhances the illusion of movement through space.

**ENVELOPE** When enabled, impulsive sounds cause an envelope trigger to switch the left/right orientation of the the current movement pattern. The number of triggers to count before switching is adjustable. Either input channel can be the trigger source.

**NORMAL/EXTENDED** Extended mode doubles the delay time (to 860ms) as it halves the bandwidth.

## SOFTKEYS:

**BYPASS/RESUME EFFECT** Disables and enables the effect signal, passing the dry input signal from channel 1 in its place.

## APPLICATIONS:

With snare drums or impulsive sounds, the movement of the repeats through the stereo space can be distinctly heard - careful adjustment of the DRY/WET mix gives the impression of the sound moving away into the distance as the repeats decay in loudness. Selecting the CENTER⇄OUT or OUT⇄CENTER patterns for use with drums gives a 'ping-pong' effect as the sound bounces between the two channels - adjustment of the delay time to the beat can give the impression of a percussion ensemble arrayed across the space.

With melodic lead instruments like a voice or synthesizer, the effect can be barely noticeable until the instrument reaches a emphasized passage or phrase - then the sound will appear to take off on its own and fly through space towards one channel or the other. This effect is especially enhanced with a high WET/DRY ratio.

Shorter delay times (i.e., less than 100ms) give not distinct repeats but a combing, *zip* sound. A sound like a drum will appear to zip off towards one channel or the other like some sci-fi laser effect. Using the ENVELOPE switch, the zips can fly around the space in different directions in response to the sound itself (by taking the envelope input from channel 1) or in response to some other, perhaps random, event (by taking the envelope input from channel 2).

A reverb effect that seems to run circles between the two channels can be achieved by selecting the OUT⇄CENTER pattern and a slow movement RATE (like -8 or -10) with a fairly long loop delay (or CENTER⇄OUT with a fast RATE). By adjusting the WET/DRY mix to full reverb (i.e., 100/0) the sound will reverberate and cycle back and forth through the stereo space, an effect that's been termed 'whirly-verb'. If you *really* want to go for it, crank the FEEDBACK up into the 90's with medium delay, hit it with a snare drum, and stand back!

## PROGRAM SUMMARY:

# SYNC'D REPEATS

## DESCRIPTION:

**SYNC'D REPEATS** is a simple repeating delay line - but with a twist. In addition to adjusting the loop delay manually, the program will sample the envelope of the input signal and *synchronize itself to the beat*. As the tempo drifts (as it normally will with a human performance) the program adjusts itself to stay in sync with the rhythm. Intelligence built into the tracking algorithm permits it to 'ride over' breaks in the music to remain sync'd when the beat starts up again. A parameter allows the selection of the ratio of the number of musical beats to the number of repeats. An EXTENDED mode allows a delay of up to 3.6 seconds. Softkeys are used to force re-sync or enable manual delay adjustment. The program operates in MONO mode (delay signal input from channel 1).

## PARAMETERS:

**DELAY** In SYNC mode the delay measured from the trigger signal is displayed. As the tempo of the music changes, the delay value changes as it is continuously adjusted by the program's tracking algorithm. In MANUAL mode (i.e., tracking off), the parameter allows manual adjustment the delay.

**FEEDBACK** Loop feedback percentage, adjustable from 0 to 99.5%.

**TRIG/REPEAT** Sets the ratio of triggers to echo repeats. As an example: a ratio of 1/1 will cause echoes to fall exactly on the next beat of the music; 1/2 will cause the echoes to go *double-time*; 1/3 creates *triplets*, etc. Ratios greater than 1/1 create delays longer than 1 beat. Example: with a rhythm in 4/4 time, a ratio of 4/1 will cause one repeat to occur each measure, and so on.

**NORMAL/EXTENDED** Switching from normal to extended doubles the available delay time (from 1.6 to 3.2 seconds) as it halves the bandwidth.

**TRIGGER CHANNEL** Selects the envelope trigger input from either channel 1 (left) or channel 2 (right). The signal to be delayed always comes from channel 1, so triggering from channel 2 allows the trigger to control the delay of a completely separate audio signal, eg., delaying a vocal in ch 1 according to the drum track feeding the trigger input in ch 2.

## SOFTKEYS:

**RE-SYNC DELAY** Forces the program to make a new measurement of the delay time between beats, necessary when the tempo takes a radical shift in speed (more than about 25% change during one beat period).

**DISABLE SYNC** Places the program in MANUAL mode, disabling the program's automatic delay measurement for situations where a standard repeating delay is needed or

rhythm tracking is inappropriate. DISABLE SYNC alternates with the RE-SYNC softkey; pressing the softkey again causes the program to re-sample the delay time and go back into SYNC mode.

## APPLICATIONS:

Best results are obtained when the trigger input gets a healthy (and consistent) level, without overloading. Tracking the rhythm is optimized if the trigger signal is a good clean impulse on each beat of the music; a kick drum is ideal. Alternatively, if the tempo stays constant and continuous tracking isn't necessary, try feeding the trigger input with just the count-off that's commonly found at the head of a song, and let the program run 'free' from there. Always remember to hit the RE-SYNC softkey *in the presence of the trigger signal* in order to establish initial sync.

When setting up the effect it will be very helpful to group-solo the trigger signal, the signal to be delayed (if not the same as the trigger) and the signal from the SP2016's output. Also, setup is facilitated and less confusing by starting with a TRIG/REPEAT ratio of 1/1.

Once the tracking is 'locked in', try other TRIG/REPEAT ratios - it's quite amazing to set it to 1/3, boost the FEEDBACK, and hear perfectly timed triplet echoes that go on and on without drifting out of sync. Ratios further out than 1/3 are less effective with typical quarter-note trigger sources, but if the trigger occurs only once per measure even a ratio of 1/16 can be useful.

This program can be also be utilized as a general-purpose audio event timer, since the DELAY parameter continuously displays the time period between triggers. It can be enlightening to see how a seemingly 'rock solid' rhythm track actually drifts in tempo by following the deviations in the displayed delay time. Dividing 60,000 by the number of milliseconds shown in the display will convert the delay time into equivalent beats per minute.

### first order effects

digital audio signal processing

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