

ReFlex LiveLoop

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*Note: Text highlighted in brown may not be implemented in your firmware. Please check <http://www.freshnelly.com/reflex/reflex.htm> for latest firmware / updates

I. Introduction

A. Features

Congratulations on purchasing the new SDS Digital ReFlex Live Loop! This feature packed sampler will be sure to satisfy your every sampling need on the rack.

Imagine being able to easily record and synchronize a long echo to existing music, endless loop large passages of music, build a layered sound-on-sound that can be dubbed into at will, or just tweak a sample slice using Mini Loop and Granulizing within that to make a revolving drone! This can all be done from the panel of the Reflex Live Loop, so imagine now what could be done once plugged in to the 8 CV and trigger/gate jacks. It's unimaginable! ..which is why this module is a must have!

Now suppose you just wanted to layer sounds on, but not continuously as with an echo. but more like a guitar looper. A simple single footswitch (or the REC button) gives you control over when to add a Layer, or loop it, when to go back a layer to build on in a different way, or stop to start a whole new Layer set. Echo and R/P Modes can also be controlled via an external footswitch, trigger, or be synced with an incoming clock.

The Layering, R/P, and Echo modes use analog feedback so running that through the on-board EQ or the FX side through an insert can apply more and more FX with each layer/Echo... great for grungifying, thinning bass, muffling, or builds to flat top distortion!

Slicing, or cutting up a sample into manageable bites, is one of the most powerful aspects of the Reflex LiveLoop. A sample can be sliced live during recording, or after when just playing, automatically at each Echo time, or Layer stage, manually with the SLICE button, and even using audio Peaks, up to 400 slices at variable sample rates.

These slices can then be accessed from the panel, or via CV with a sequencer, length modified, sped up or slowed down, over-dubbed, reversed, or even sequenced by the Reflex's onboard 200 note sequencer! They can also all be modified on the fly with the PlayFX miniLooper and its Start/End, Position/Size, the G-Move Granulizer, and Stutter mode, under panel control offset by CV control inputs.

Here's some features beyond the obvious 16HP size, dense "more bang for the buck" panel, and ease of use:

Record Sample Rate: 174 seconds in stereo at 48Ks/s.

This isn't an "up to" spec., it's better than CD quality for almost 3minutes!

- Maximum Record times / quality per channel:

174 seconds @ 48Ks/s 16 bit >CD Quality

248 seconds @ 24Ks/s 16 bit >FM Radio Quality

11.6 minutes @ 12Ks/s 16 bit >AM Radio Quality

23.2 minutes @ 6Ks/s 16 bit Retro Sampler Quality

46.4 minutes @ 3Ks/s 16 bit Min Voice Quality

92.8 minutes @ 1.5Ks/s 16 bit LFO, Wave making Quality)

- 10 octave Sample Rate Playback range via CV + Rate Knob offset

- Knob Take-over Sample Rate recall for each Mode transition:

- LED circle direction indication (four flashes) and present Rate position indication

- "Smart Take-over" eliminates "hard" jumps by becoming active once Knob returns to previous position

- "Slide-To" for moving away from previous sample rate position

I/O:

- Trigger inputs for Record/SOS/Delay/Play/Clock, Creating Slices, Playing Slices, PlayFX start/sync/gate

- Gate input for PlayFX, only plays PlayFX definition while Gate is high.

- Footswitch (S-Trig/Gate) for Record/SOS/Delay/Play, PlayFX start/sync/stop

- Bipolar CV inputs for Sample Rate Control/offset, EQ bands, with attenuvertors

- Unipolar CV inputs for Slice Selection, PlayFX start and End Control offsets

Audio:

- Stereo Inputs/Outputs 10V p-p L&R all samples rec/play in stereo

- Feedback Return input isolated mix to sampler, Feedback insert return

- Blend Control to mix incoming audio with outgoing audio

- Feedback Level control for send, or third output channel of sample output only (for multiple amps)

- intelligent auto fade-out for echo and layer stops independent of input mix setting (1/2 cross fade)

- Spectrum Analyzer for RGB "Color Organ" audio indication/analysis.

- Absolute Zero Latency Audio, direct, no Audio DSP/processing delays!

- Zero Crossing Point Loop Lock and Soft-Mute technology for click free speed looping.

RP (record/play) Sampler Modes:

- 3 Main RP (Record/Play) Modes: Layer, Echo (delay), R/P Sampler (simple record/punch-in/append)
- Foot Switch compatibility Mode (S-Trig) for foot controlled sync'ed echo/looping/layering
- Record (Continuous) PlayFX and Slices simultaneously into delay/sample/layer for Looping afterwards
- Auto-Slices R/P, Echo (delay), Layer action points for instant recall using Slice Select/CV
- No "Memory Full" stop of recording, loops forever! Good to recall recent sequences via Play Slices
- Clock Trigger Synchronization of Layer and Echo by "Arming" Steps with /1 - /16 setting for Arm Record/Delay/Play sync and following sync of Slices looping

Sample Slicing:

- Sample Slicing during any mode (Record/Play/Echo etc), up to 400 slices,
- Slicing via T/G input &, Audio Peaks & Slice button simultaneously, or Auto-Slicing with every event (default)
- Peak Auto-Slicing by audio levels and intelligent noise floor, amplitude angle/delta algorithm.
- Slicing format controlled intuitively by Mode:
 - . Record: Sequential Slicing (Slice End = Next Slice Start)
 - . Echo (delay) / Layer (SOS) : Loop size slices starting at slice creation
 - . Infinite echo/Layer play: Loop size slices starting at slice creation
 - . R/P Record/Play loop: Sequential Slicing
 - . Play FX Start/End, Position/Size miniLoops: Loop sized slices starting at slice creation
 - . PlayFX G-Move: Present G-Move position
- Slice Modification via PlayFX and Save each slice
- Sequence Slices via CV voltage ratio / # of Slices and Slice Play trigger
- 1-16 Manual Slice Play selector/ CV offset with LED Slice# indication
- Slice Sample Rate recall + Rate knob offset + Rate CV offset
- Variable Rate Slicing to increase record time drastically when HIFI not req'd with "as created" playback
- "Slice Groove" 200 note sequencer feature: Record a tap sequence using selected slices, then loop playback!
- Slice Record Over-dubbing / replace

PlayFX:

- 3 PlayFX Modes to play sections of RP Sample at any time, slice-able
- PlayFX (all modes) inside of slices (global and unique) and Save Slice modifications to each slice
- Simultaneous Record and PlayFX/Slice to record/loop/echo out applied FX upon return to RP sample
- PlayFX Trigger input for Start/re-start miniLoop Play

PlayFX Modes:

- Loop Start/End controls & CV's for Sample/MiniLoop/Slice/G-Move Playing
- Reverse PlayFX when in Start/End Play mode (by reversing Start and End controls)
- Loop Position/Sizes & CV's for constant Loop size while panning through Sample/MiniLoop/Slice
- G-Move Flowing Granulizer Direction/Speed and Grain Size knob and CV controllable. Sizes: < 1 mS to 250 mS.
- G-Move Granulizer "roll space" defined by present Echo/delay space, Layer or Slice boundaries.
- Layered PlayFX priority: MiniLoop/Granulize inside a Slice, Granulize inside of a MiniLoop, Slice over a MiniLoop.
- Play FX or a Slice while still Recording / Layering / Echoing via Buttons or T/G.
- Built in CV band controllable EQ for fine tuning feedback and FX output. Flat band mode for CV VCA FX.
- FX (Left) channel feedback insert for external send return filter insertion. Adjustable Send 10V P-P standard.
- "Fine" adjust mode when in PlayFX can be accessed by tapping P.Sel to toggle.

Interface:

- 32 LED's, 9 for LED Circle to indicate Last Rate upon return from/to modes and Slice Select/Clock div set
- Power up panel Last Settings memory
- USART, audio and data bus Interface for possible Future Expansion:
MIDI controller, Extra audio, CV, SD Card/USB drive, Slicer/sequencer, Splitter, all of the above (Super Looper?)
- Arduino Atmega 2560 16AU with on-board USB
- Firmware Upgrade-able, ships with V1.01 as of May 2016:
 - . New additions to feature list:
 - . Slice overdub, Peak slice "back slice" alignment, Auto calibrate (Feedback Max Position), Auto Calibrate (CV's)
 - . Loop End Trigger Output. Sends a pulse on Loop (Slice, PFX)

B. Reflex In A Nutshell

At first the Reflex can seem a daunting beast, but is actually very simple once you break away from the convention of Red button=Record ONLY, Green button=Play ONLY.

This is not the case. The Red Button controls everything RP (Record Play) and the Green button "Captures" a sample (or Slice) to play and to work on from the sample recorded/played by the Red button.

The way the Record button works in all of the 3 modes in general is:

Tap to start Recording

Tap to start playing what has been just recorded, and

in Echo Mode: Keep recording as a delay. Setting also the echo time.

in Layer Mode: Switch to Play what has just been recorded. Setting also the Layer Loop time.

in R/P Mode: Switch to Play

Another tap on the Record will

in Echo Mode: Switch off record and enter infinite echo playing of the last loop/echo

in Layer Mode: Do nothing as a double tap on Record is needed to start a new Layer recording

in R/P Mode: Start Recording/Overdubbing immediately into the playing sample, while still playing.

Yet another tap on Record will

in Echo Mode: Resume echoing, with following taps to toggle between echoing and infinite echo

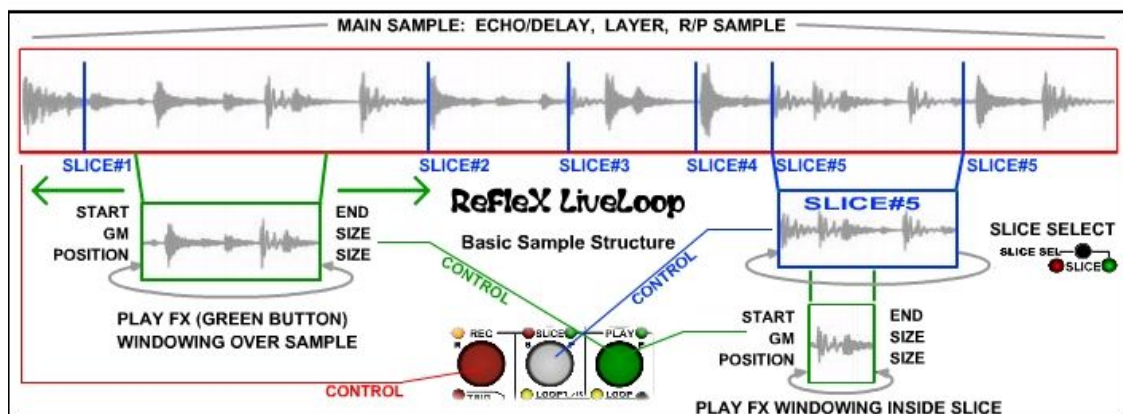
in Layer Mode: Single tap will switch to play if recording, or a double tap switches to Record

in R/P Mode: Stop Recording and switch back to play, with following taps toggling between the two.

So you can see that the Record button is Step based, and the 2nd tap always sets the initial length of the sample.

Holding the Record button (>1 second) always stops sample record and/or play.

PlayFX and Slices are best described using the diagram below



PlayFX windows over a certain area of a sample captured defined by the 2 knobs on the panel right, Start/End, Position/Size, or G-Move, depending on the P.SEL PlayFX Mode. The initial mode at power-up is Start/End.

The 2 knobs can be used to set the Start and End positions of the loop captured from the RP Sample by pressing the Play button. Subsequent presses on the Play Button will re-start play from the "Window" you have set.

To exit PlayFX, just hold the Play button longer than 1 second.

Slices are similar to a PlayFX loop when played, but are created silently during the recording/playing of an RP sample., to be recalled once in SLICE SEL mode. The heavenly White button is all about Slices!

Slices can be created by simply tapping the Slice button during Record, Play, or Echo, then after, toggling on SLICE SEL (the P LED over Slice button) will change the Slice button to play a Slice selected by the Rate knob.

As shown in the diagram. PlayFX can window through a Slice as it would a RP sample, then even modify it!

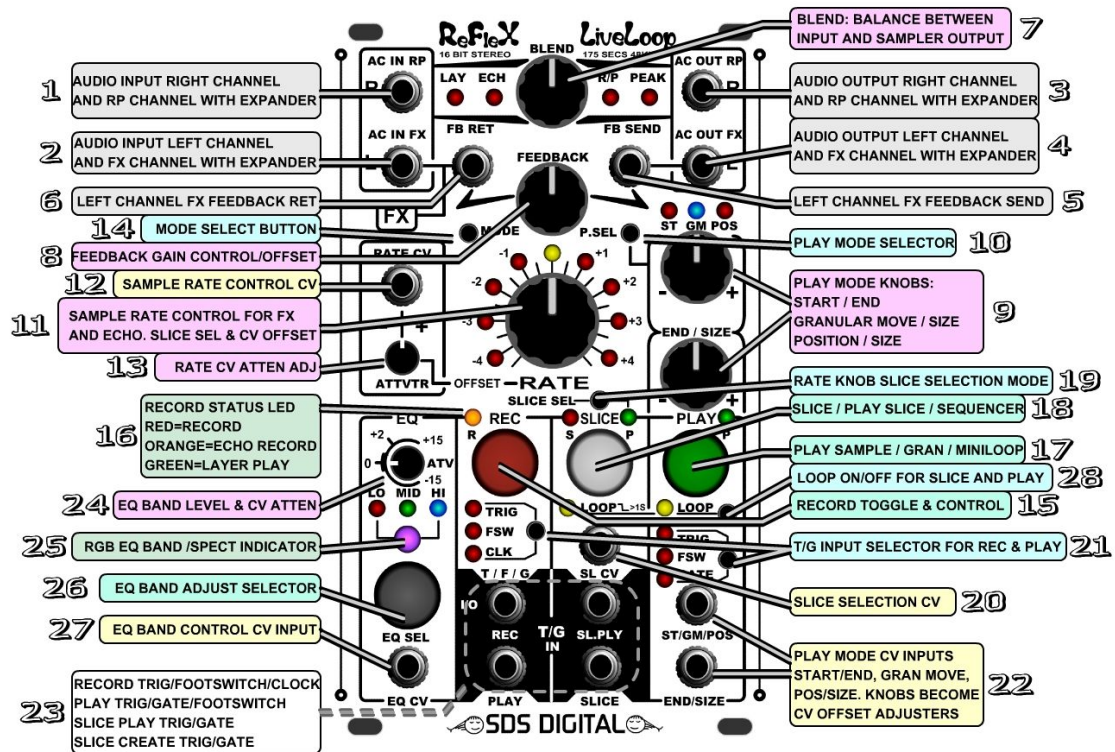
Slices can be created also by the Slice Trigger input, or Peak Audio levels, up to 400 at once.

As with all hierarchies, there are a couple of "rogues" and the Stutter and Live Pitch Shift modes are the Reflex's rogues. Stutter will run during any Mode, at any time, while Live Pitch Shift only runs in one state (during record) and one PlayFX mode (G-Move)

This is the foundation of understanding the Reflex LiveLoop. There are many many more features of course, or else this manual could end right here!

II. The Panel

This panel diagram is a breakdown of the main controls and I/O. A description of each follows below.



(1) Audio Input Right Channel

The AC in R is the right channel input for stereo sample recording. It can tolerate a maximum of +/-5V before any distortion and is capacitively coupled to respond to frequencies as low as 20 Hz. The input gain is fixed to ensure equal response between the recorded sample, the played sample, and the other channel.

If the Reflex LiveLoop is used with the expander module, this input can become a separate RP (RecordPlay) input, (This input can be used for Sample Recording, Layering, and Echo undisturbed, while FX are being applied to the left channel ACin FX) but as a standalone, consider FX (left) the channel with feedback insertion.

(2) Audio Input Left Channel

The AC in L is the left channel input for stereo sample recording. It can tolerate a maximum of +/-5V before any distortion and is capacitively coupled to respond to frequencies as low as 20 Hz. The input gain is fixed to ensure equal response between the recorded sample, the played sample, and the other channel.

Being the "left" channel, it can also be designated the FX channel as it's feedback route can be inserted into using FB Send and FB return. See (5) (6).

If the Reflex LiveLoop is used with the expander module, this input can become a separate FX input, (This input can be used to record for Mini-Looping, Granulizing, Reversing, Stuttering, Slicing RP, Slicing FX, and Punch-ins without disturbing an Echo, Layer Loop, Record, or Play on RP channel) but as a standalone it's the Left channel in.

*Note: If only a single signal is available, the Left channel is normalized to the Right so both sides become active.

**If low audio sources (non-modular) the samples may seem "noisy". Use a pre-amp to raise to modular levels.

(3) Audio Output Right Channel

The AC out R is the right channel mix output to feed sample audio mixed with input audio to an external amp, filter, mixer etc. The maximum output level is +/- 5V (10Vp-p) and is capacitively coupled to respond to frequencies as low as 20 Hz. Audio from the sampler is passed through the EQ before mixing with audio from AC in R.

If the Reflex LiveLoop is used with the expander module, this output can become the RP channel mono output.

(4) Audio Output Left Channel

The AC out L is the left channel mix output to feed sample audio mixed with input audio to an external amp, filter, mixer etc. The maximum output level is +/- 5V (10Vp-p) and is capacitively coupled to respond to frequencies as low as 20 Hz. Both audio from the sampler and audio from AC in L are passed through the EQ before mixing.

If the Reflex LiveLoop is used with the expander module, this output can become the FX channel mono output.

(5) Left Channel Audio Feedback Send

The Left Channel (FX) has the added benefit of a second output for feedback. This output level is controlled by the Feedback knob (8). If this jack is plugged in and patched to a separate module the feedback will still pass (unless a jack is in the FB Return) back to sampler. This output can be used as a monitor (headphones during play)

(6) Left Channel Audio Feedback Return

The Feedback Return feeds back into the left channel (FX) to be recorded back into sampler. Plugging into this jack bypasses the internal Left channel feedback path.

This input can only be heard once the sample is played back, or during an echo (after echo delay of course) as it isn't directly fed to any output. It can be used as a secondary Record input and will be mixed 1:1 with AC in L. The maximum input level is 10Vp-p (i.e. +/-5V) without distortion or clipping.

(7) Blend

This stereo control knob sets the balance between incoming audio on AC in L & R and sampler output L & R. It can be used to quickly cut incoming audio from the output. The Blend level does not affect the sample recording level so can be left turned fully clockwise if input audio isn't to be heard. Fully anti-clockwise fades up the input to the output jacks, muting the sampler output entirely. Centered, the blend between sampler and input will be 50/50. Blend is CV controllable with the EQ attenuvertor CV input.

(8) Feedback

This control knob sets the feedback (stereo) levels from output back to sampler input. Maximum, a software limit ensures a perfect dB gain level for nearly identical sample amplitude as compared to the original recorded audio signal. This is an important feature for Layering and Echo with minimal amplitude degradation, but can be overdriven or band muted if desired using the EQ. (See sect. VIII.A. on pg.40)

*Note: Using an inserted filter/FX/signal conditioner across the Left Channel feedback may cause unpredictable gain behavior in Echo and Layering modes.

(9) PlayFX Mode Knobs

These knobs can be configured (10) to control FX playback 3 different ways:

Start / End: The upper knob adjusts Start Point of sample being played, while the lower knob sets the end/loop point of the sample to create a "Mini-Loop".

If start Pos is higher than End, then will play in reverse. (See sect.V.A. on pg.26)

G-Move / Size: The upper knob controls Granulizer Movement forward/reverse speed, while the lower knob controls the Grain Size. Can move inside of a Mini Loop /Slice (See sect.V.C. on pg.27)

Position / Size: The upper knob selects the Position in a sample proportionately to create a "Mini-Loop" while the lower knob adjusts the size of the Mini Loop. (See sect. V.B. on pg.27)

(10) Play Mode Selector

This Button selects the function of the Play Mode knobs (9), and also sets the play mode. The Blue LED signifies G-Move mode, while the two reds are Start/End and Position/Size. (See sect. V. on pg.26)

(11) Rate / Slice Select

This knob controls Playback sample rate from -4.9 octaves to +4.9 octaves for any playback (play Button), Slice, or even Echo (Record & Play). If Rate CV input is present, then the Rate knob becomes an offset for that jack.

***This Rate is also the RECORD Sample Rate, so for maximum quality, set to SW detent at center.**

If Slice Select (19) is toggled on, this knob will select the first 16 slices via the LED circle around the knob, regardless of Rate CV input, which will "remember" Rate setting. (See sect. VI. B. on pg. 32)

This knob is also used for Advanced Settings. (See sect. IX.A. on pg.44)

(12) Sample Rate CV

This CV input (+/-5V nominal) controls the Sample Rate as does the Rate Knob to +/- 5 octaves over the unattenuated nominal voltage range. When jacked in, the Attenuvertor knob controls the gain (-5V to +5V) and the Rate knob controls the offset (-5 octaves to + 5 octaves). Voltages beyond +/- 5V will just min/max Sample Rate.

*Also works in Echo Mode, but only in lower range (less than octave 0). Infinite Echo has full range +/- 5 octaves.

(13) Rate Attenuvortor

The Rate Attenuvortor will attenuate the incoming Rate CV's affect on the actual sample rate. For full range, or gain, the attenuvortor should be set to extreme right, or extreme left. If left in the center, the incoming CV will have little or no affect on the sample rate. This can be useful when using Rate CV with Echo Mode for a phasing/chorus effect, where a large swing of sample rate makes the effect difficult to control.

The attenuvortor knob from center to (+) will control gain on the positive, where from center to (-) will invert the CV input and control it's gain. * There is a fine Setting that switches Rate to control +/- 1.25 octaves.

Note: If there is no plug in Rate CV, the Rate Attenuvortor will have no affect on the sample rate.

See (11) Rate/Slice Select, and the section (VIII. A. Knobs). on Sample Rate Control, Rate Knob

(14) Mode Select

The Mode Select button switches the RP (Record Play) mode to Layer, Echo, and RP modes. (Peak on/off)

Layer: This mode allows layers of sound-on-sound to be created by using the feedback loops during simultaneous play and record. See section on Layering (IV. C.) for a detailed description.

Echo: This mode will start an echo that can be adjusted from milliseconds to 174 seconds. The method of setting the echo time is unique in that it acts more like a looper than an effects module. See the section on Echo Mode (IV. B.) to find out how to use echo mode.

R/P: This mode has no special sequences attached as does Layer and Echo modes. In this mode the Reflex acts as a simple sample recorder/ player, with over-dub (SOS) and adding/appending capabilities. This is the ideal mode for recording a sample, then using Play FX to mini-loop, granulize, slice, or just play the sample back. See R/P Mode section (IV. A.) for more.

Peak: This isn't a Mode, but a universal switch to/from Audio Peak Slicer function. Selecting Peak will turn on the Peak Slicer, then return to the Mode you left to select it. This will hold a Record by arming it for the next audio peak to start. To turn off/cancel Peak Slicing, just tap the Mode Select button.

(15) Record Button

This button is generally used to record a sample. The way the button reacts depends on which of the 3 modes (Layer, Echo, R/P) the Reflex is presently set to. It's important to note that the Record button becomes an "Arm" button when Trig/FSW/Clk is set to Clock. Each step (rec/play/echo) won't start until Clock/div. is satisfied.

As a basic guideline, the record button tapped once will start a record, then tapped a second time to stop record and switch to Play only. In Layer mode, the 1st tap will start a record, then the next tap a new layer, or double-tap to switch to play. *Holding the record button will always stop RP record and/or play.

Following taps may be handled differently depending on the mode and stage of recording. See section IV. A, B, C on pg. 20-24 for each mode's functions with the record button.

(16) Record Status LED

The Record Status LED indicates the present sampler Record and Play status.

Red: -indicates a straight record, with no RP play occurring.

Orange: -indicates Record and Play occurring together. This would be during Echo and Layer mode.

Green: -indicates RP Play Mode (non-PlayFX) that would occur during a Layer Loop only

Off: -indicates no RP Play or Record occurring. PlayFX/slices being active won't light this indicator.

(17) Play Button

The **Play** button on the Reflex isn't a conventional "Play Sample" button as it relies on settings of Start/G-move/Position knob, End/Size knob, and Play Select modes which will determine the way the sample plays.

To play the full recorded sample as was recorded, **P.Sel** button can select either ST or POS, with the ST knob set fully counter-clockwise, while the END knob is set fully clockwise. Overrides output of any R/P Play while active.

To restart a sample, just tap Play again. To stop Play FX, just hold it down for > 1 second.

For more info on PlayFX modes, see sect. V. on pg.26 .

(18) Slice Button - Slice / Play Slice / Automate

This is the "magic" button that lets you cut up that sample manually into smaller more manageable chunks called "slices", which can then be selected manually, or via SL.CV input, for PlayFX, or just looping.

Up to 400 slices can be created, which would be a challenge to do by hand, but most of the time you'll only need a couple of dozen at most.

Tapping the slice button can be used globally, during record, play, playFX, echoing, layering, or even while playing a slice! Slices are assigned in the order they are created, so can be used to index certain points of a sample.

Slice Button...continued

*Note: If **Slice Sel** has switched the Rate knob to select a slice (green LED on) , then the Slice Button will always play that slice, even during a PlayFX event, echo, layer etc.

For a lot more info on Slicing and Automation, See sect. VI on pg.30

(19) Slice Select Button

A created Slice can be selected by pressing **Slice Sel**. The Rate knob is toggled to Slice select mode. The LED circle will display the first 8 (reds only) slices, which can be selected on the left side of the Rate knob, then another 8 slices when the knob is on the right side. Slices 9-16 selected will turn on the yellow center LED to indicate. The knob can only select the first 16 slices, but if more slices access is desired, the **Slice CV** input (0-5V) can be used to offset the slice #. The number of slices will be displayed in 8's, with the yellow LED indicating every second set of 8. Pressing **Slice Sel** again will exit Slice Select mode and return the Rate knob to it's default function. (Rate/Offset) Following taps on the Slice Sel button will toggle the Rate knob to the same slice select mode to access all slices. Slice Sequences can be recorded by selecting slices either way.

*Note: While in Slice Select (Rate knob takeover) The Slice Button becomes a play button, which will override anything else presently playing. Holding Slice > 1 second will stop play. Holding Slice > 4 seconds will erase all slices.

(20) Slice Selection CV

SL.CV will select any slice over the range of the CV input. The voltage range is 0 V to 5V only, to make this input compatible with nearly any sequencer, or positive offset LFO, VCO etc. In order for a new slice to play, there must be a trigger or gate pulse present at **SL.PLY**, or a button press .

The slice sequencer can record the slice CV as well, giving the ability to hold a sequence, then switch to a new one! A maximum of 400 slices are accessible via **SL.CV**, but if there are truly 400 slices, the CV voltage difference is only 0.0125 V, which, due to line noise, would make accessing the same slice highly unlikely, giving it a random feel. This could be a desirable feature in a play-through slice scenario! See sect. VI on pg.30 for more on Slicing.

(21) T/G Input Selectors

These buttons select the type of input that will be used to control PLAY and REC. Trigger, Gate, or Footswitch. Record T/F/C:

Trigger: Record will toggle on/off on each rising edge, as per mode setting of course.
Clock: Record must be armed (rec button) to act, as this is a sync Clock input.
Footswitch: Record can be controlled via foot switch the same way as the button does. (S-Trig)
Hold > 1 second: Will allow setting of CLK input division from 1-16 clocks / sample loop

PlayT/F/G:

Trigger: Play FX will restart each rising edge. If Loop is off, then will stop at end. (except G-move)
Gate: Play FX will only be active during the high cycle.
Footswitch: Play can be controlled via foot switch the same way as the button does. (S-Trig)

Pressing the T/G Input Selector button will light corresponding LEDs, or all off which disables the input. Because the selection isn't immediately active (after 1 second or so), and, for example, an input is present with a gate signal; the T/G selector can step through from "off" to "gate" without inadvertent triggers starting a record unintentionally. This is especially important when selecting through Footswitch, as it is active on the low side!

(22) Play Mode CV Inputs

These CV inputs are identical in function to the Play Mode Knobs (9), which become offset controls for use with these CV inputs. The default voltage range is 0V to 5V, with the knobs acting as positive offsets, but the range can be switched to +/-5V (in advanced settings) with the knobs acting as +/- offsets for full range. (Less used) See also sect. VIII.C. pg.43 for more on CV/Trigger inputs.

(23) Triggers and Gates Inputs

The Reflex Live Loop has 4 T/G style inputs, Each one can be set / defaults to respond differently:

REC T/F/C: Starts/Stops/Controls Record using Trigger, Gate, Footswitch (see Section VIII.C. pg.43)

PLAY T/F/G: Starts/Stops PlayFX using Trigger, Gate, Footswitch (See Section VIII.C. pg.43)

SLICE: Creates a new slice (during any play/record) on the rising edge of a trigger or gate signal.

SL.PLY: Plays a slice selected by SL.CV + Slice Select Offset (1-16)

These inputs are considered active if the voltage is > .6V (Trig/Gate) or < .6V (Foot Switch) at max. 15 Volts.

(24) EQ Band Level & CV Attenuvertor

The EQ is a unique feature that has been added for delicate feedback effects primarily. Without an input to EQ CV, the Attenuvertor acts alone to adjust the band selected by the EQ Button. (Band Selector) The range of adjustment is +/- 15 dB, and is linear from the center. The CV input allows a single band (or all) envelope on both the feedback and output audio, and operates smoothly, even with gate pulses! The RGB LED indicates Band levels. *The "MID" band can be changed in Settings.

(25) RGB Band / Spectrum Indicator

More than just a pretty light, the RGB is band dependent during adjustment, and displays audio spectral characteristics as a default time-out. Red represents Bass areas, Green the Midrange areas, and Blue the High end. Different audio will create different colors, indicating the intensity of each band, which can be used to "flatten" noise to "white" (literally!) for example, in fact it's more of a light "pink".

(26) EQ Band Adjust Selector

Pressing this button will select which band to adjust with the Attenuvertor knob, or which band is modified by an incoming signal to EQ CV. If all of the LEDs (LO, MID, HI) are on, then all bands will be adjusted by EQ CV, and the Attenuvertor. This is a quick way to flatten all of the bands!

If all 3 LEDs are off, then the Blend control is taken-over and adjusted. via CV.

Note: The previous band setting must be passed by before the new adjustment takes control of it.

(27) EQ CV EQ Band Control Input

This CV input controls selected band(s) level from -15dB to +15dB in 1dB steps over the CV Voltage range -5V to +5V. (3dB/V) The affect of the EQ CV input can be adjusted with the EQ Attenuvertor.(See sect. VII.A. on pg.36)

(28) Loop On/Off for Slice and Play

This single button controls both the PlayFX loop on/off, and the Slice loop on/off.

Just pressing the Loop button will toggle the PlayFX loop on/off, while holding the button for > 1 second will toggle on/off the slice loop (less used). The Slice Play and PlayFX loop functions with Slice and Play buttons are intuitively similar, but have differences in their external triggering functions and modes. See each section for more.

(??) Hidden Features & Functions

- Combinations of Buttons can access "higher" functions, allow access to less used features, and user settings:
- *Hold SLICE SEL >1 second: Enters User Settings Mode (Section IX.A.p.44) that remain even after powering down
- *Hold REC TRIG/FSW/CLK >1 second to set the clock divider for CLK input. Defaults to 1:1, every clock input.
- *Press REC when playing a Slice (no PlayFX) to overdub that slice. Tap REC again to stop recording into it.
- *Tap PlayFX button, then REC button within 1 second to save the PlayFX Modification to the present Slice.
- *Hold SLICE button and tap REC to enter Slice Groove Sequencer Mode. Tap SLICE and Select Slices with Rate.
- *Hold Slice button > 4 seconds to erase all slices and start anew, enables Auto-Slice in background
- *Hold EQ Button to toggle band cut/boost CV input between -5V to +5V and 0V to 5V range. No indication.
- *Hold MODE button to toggle Rate Lock/Rate Unlock
- *Hold PSEL button to toggle Stutter mode on/off

NOTES:

III. Panel Quick Guide By Example

For those who prefer to learn by example and hands on, this section lists some basic ways to get up and running without going in too deep. First are some Mode examples:

- The R/P (Record/Play) Sampler, a "free-range" sample recorder/ editor / player
- Layer, which allows controlled and synced looping with multiples of original loop size
- Echo, which acts as and Echo will, but paints a history (accessible via slice play) for at least 3 minutes.

Then the more exotic functions:

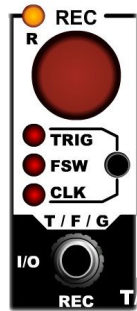
- Play FX, which works live, on RP samples recorded, Layers, or Echo's, even Slices.
- Slicing samples to be recalled by Slice Play Selection
- Slice Sequencer, a built in tap-time based sequencer that holds and loops up to 200 Slices.

In keeping things simple, the example is in no way the limit of this function, Refer to sections IV, V, and VI for a full description. Gates and Triggers/external inputs are not used in these examples (except occasional references to footswitch function if you choose to control that way), for simplicity.

A. Description of RP (Sampler) Modes by example



RP Modes are LED indicated across the top of the panel marked LAY, ECH, R/P, (and PEAK...Not really a mode.) You can think of RP functions as anything that's not PLAY(FX), or SLICE, which coincidentally (or not!) are 2 of the 3 large function buttons. RP Modes are for Looping, editing, over-dubbing, and appending a sample, sound on sound Layering similar to a guitar looper, and Echo/Delay, a free-running delay with a long memory, and are the heart of the user interface for getting samples into the Reflex in a controlled fashion. The "Mode" Button selects one. All of these Modes can be Sliced, create Auto-Slices, and can have PlayFX applied to them, even while recording.



The REC Record button is the complete controller for all 3 RP Modes and alone, always starts a record in the RP sampler.

Note: R/P is a MODE, whereas RP is the main sampler level, record/play/looping etc. anything NOT playFX playing, or a Slice playing is consider as RP sample.

A Trigger, or Foot Switch input, if used, will act the same way as the button.

Rules of thumb with the REC button are:

First Tap: always starts a record

Second Tap: Always Ends a record, and switches to Play / combination play and record.

Holding REC > 1 second: Always halts a record or play, kills RP so to speak.

Below are some examples to familiarize you with all of the main Modes/functions of the Reflex Live Loop.

1) Recording and Playing a Sample

- 1 -To record a sample, press [MODE] until R/P LED lights. This is the "normal" Rec/Play sample mode.
- 2 -Assuming audio is feeding into AC IN RP / FX, press [REC] to begin recording. The REC LED goes red.
- 3 -Once you have recorded what you want for a sample, press REC again to stop the record, which starts the Play. Because Playback is immediate, you may want to stop recording on a downbeat / same beat as the recording started, so the tempo remains the same.
* But I didn't want it to play immediately!
-Turn the BLEND control all the way to the left so only the original audio is coming through to the outputs (AC OUT RP/FX), then once the sample is to be heard, fade to the right. Don't leave it too long though if it is to sync, or the sync might have fallen out!
-That's it! You've recorded and played your first sample!
Options:
-"Over-Dub": Adjust Feedback control all the way up and tap REC to over-dub, then REC again to exit.
-"Punch-In": Adjust Feedback control all the way down. Record over a section of playing sample by tapping REC button, then tapping again to exit.
-Appending a recording: If a sample is playing, and you record past the end, the sample will be lengthened.
-Stopping Playback: Hold the REC button down until the REC LED, red or green, goes out.
-A New Recording: Stop, then just tap the REC button and a new recording will start. Repeat above.
*Note: The footswitch (select FSW input) works exactly the same way as the REC button.

*If recording a rhythmic passage, you may want to start recording on the "downbeat"

2) Recording Layers (Sound On Sound)

- 1 -To record and layer loops, press [MODE] until LAY LED lights.
 - 2 -Adjust the FEEDBACK near the top and set EQ to Flat (all LED's off) and zero dB. (Center of range)
 - 3 -Set BLEND around center so incoming audio mixes with sampler audio.
 - 4 -Starting playing some music. When ready to record the first layer, tap the REC button.
 - 5 -At the point you want to switch to:
 - Play what has just been recorded, just tap REC again at a beat point, or
 - Record another layer immediately, double tap the REC (2 taps within 1 second)
- The Layer Base Timing has now been established:
A new layer can be created by double tapping REC at any time, but actual recording won't start until the Layer loop point happens. This allows for multiples with the same tempo/time.
- Double Tap REC to record the next layer, watch the REC LED change to red once recording begins.
- Let the Layer loop to play a 2nd time before tapping on REC to stop recording and switch to just play. The new loop time will be double that of the original.
- * See Section IV. for an illustrated in depth look at Layer.
- Options:
- To Record the next Layer, always double Tap. This can even be done "late" as Reflex will anticipate it.
 - To Switch to just Play the Layer, single tap at any time or "on time" to switch to Play at the loop point.
 - To "Peel Back" to previous layers, triple-tap REC (max over 2 secs), but preferably between loop points.
 - To end/stop Layer play, hold the REC button/Footswitch (>1s) and release at the point you want to stop.
 - ! If a Footswitch is held for more than 3 seconds, the Sampler audio will begin to fade out over 3 seconds, so if you want a hard stop, the REC button must be released before then.
 - This feature acts well as a soft fade to blend back into "live" music without abruptly.
- *All record button functions are duplicated with a Footswitch, except the fade-out.

3) Recording Echo's / Delays

- * Echo is similar to Layer except that once initiated, it will run forever, always recording.
- 1 -To start an Echo, tap the REC button, at this point the Reflex is only recording.
 - 2 -At the time you would like the echo to begin echoing, tap REC again.
- Options:
- To put Echo into "Endless Echo" loop, just tap record again. The last echo will continuously loop. Tap again to resume normal echo.
 - To End Echo, either change the mode (MODE button) or hold the record button > 1 second. The REC LED will go out after 1 second.
- * If the RATE knob is adjusted, the echo will be controlled by it. The rate will speed up/slow down the echo as a normal delay module would. A Rate CV input or REC T/G will also control the echo speed.
- Rate Characteristics (Quick Guide):
- During record, the rate can only drop downward from the maximum sample rate. This sets a standard (48kHz) sample point, and allows recording/echoing at lower sample rates, to be sped up later. To set the echo to an extremely fast spring reverb, Karplus Rich, adjust the rate all the way down, then quickly double tap to start record, then an echo. Then bring the Rate knob back to or past center. Carefully adjust Feedback.
- During "infinite echo", the Rate can be adjusted up to the full +5 octave range, which for the most part is too fast to be useable (remember the old Star Trek episode?) See section IV. B. for more on using Rate with echo.
- * Tip: For a smooth infinite echo, don't have loud & different audio playing just before it as it will be "chopped" when the echo loops. (unless you want that effect!) Reduce your feed to the input just before, or do it between notes etc. Normally leaving the echo run once first without incoming audio is enough for a clean "freeze".
- * Tip: If sampling in a long passage, try to remove the source right after the echo start (2nd tap) as it will pile up with the original, or double tap REC to switch to infinite echo immediately.
- * Tip: Switching to infinite echo works best when Feedback is at or near 100%
- * Note: The footswitch (select FSW input) works exactly the same way as the button.
- * If a trigger signal is used to start and set echo, it should be removed once time has been established as subsequent triggers will toggle into infinite echo and echo may not be smooth as expected. If you are attempting to sync to a clock, perhaps try the CLK setting that starts and stays in sync. See section VIII. B. (pg. 38) for more on clock sync'ing.

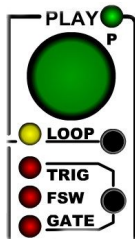
*2 tap / trigger echo time can be useful when matching tempo to a rhythm/beat already in progress.

B. Description of PLAY FX functions by example

The second section of Examples is Play FX. Play FX is simply taking an area of a sample recorded/recording by one of the RP Modes, (R/P, Layer, or Echo) and looping it, speeding up or slowing down, reversing, granulizing, pitch shifting, etc. using different methods and CV inputs. This is non-destructive to the original sample, which still plays in the background to be returned to in a timely manner.

Tapping the PLAY button starts Play FX. Play FX will take either a full sample (R/P Mode), the present Echo/Delay Size (Echo Mode), or the present Layer size for manipulation of size, speed, direction, and Granulizing.

The "Entry Point" of the PlayFX loop will vary depending on the RP Mode, but if controls are at their extremes, the change will be seamless. i.e. If Start Knob is all the way to the left, then PlayFX entry will continue an echo (infinitely).

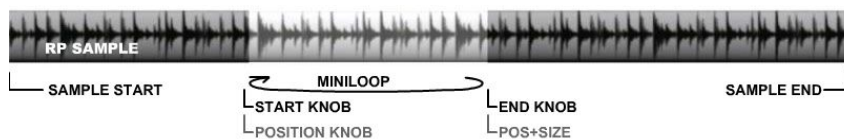


There are 3 modes of PlayFX:

- Start/End: To control the start and end points of the loop playing inside of PlayFX, also reverse.
- Position/Size: To control where in the sample the start is and the loop size
- G-Move: To Scroll through the sample at various speeds, forward or reverse, and with variable Grain size.

1) "MiniLooping" an Area of a Sample

A "MiniLoop" is a smaller loop that will play within the RP Sample Loop, or a Slice, without changing the flow of the larger sample. A miniLoop can be reversed, paused at a position, (G-Move), or set boundaries for a Slice.



To start a "MiniLoop" from the RP sample playing, or last sample recorded (from the first RP example) use the following steps:

- 1 -Configure PLAY FX knobs (right side of panel) with the P.SEL button. Select the ST LED (Start/end).
- 2 -Adjust the PLAY FX knobs, now Start/End knobs, to the relative sample area's start and end points. -Make sure the Loop LED (under PLAY button) is on. If not just tap its tiny button to turn on loop.
- 3 -Tap the PLAY button and the loop you have defined will start, replacing the RP loop (if was playing)

Options:

-Exiting PLAY FX MiniLoop. You can either:

Hold the PLAY button to exit, and return to previous state (RP) PlayFX entry point is also reset, or Toggle off the Loop LED (under PLAY button) so PlayFX "falls out". Entry Point is Saved for re-use.

*Turning Loop back on, when not in PlayFX, will reset PlayFX.

If in Echo Mode and still echoing, this is useful for smooth exits in reverse, then being able to start a new playFX on the previous playFX still echoing!

-Play the MiniLoop in reverse: Setting the Start knob higher than the End Knob will play reverse!

-Exit the loop: If the Loop LED is turned off, the MiniLoop will stop at the loop point, returning to previous state (RP loop playing or recording, etc)

At this point, tapping the PLAY button will play the point of the Start knob as a 1-shot, with restart.

2) MiniLooping in an Area of a Slice

Please refer to Slicing in section C below for more on Slicing. This example assumes a sample has been recorded and sliced already. (If you have been using Echo Mode, then likely there have been some Auto-Slices created)

- 1 -Press SLICE SEL button to enter Slice Selecting by Rate Knob. Tap SLICE button to find a slice.
- 2 -Use P.SEL to select either ST , POS MiniLoop controls. (Start/End style, or Position/Size)
- 3 -While still playing/looping a Slice, or in SLICE SEL mode, tap PLAY button to begin the MiniLoop, and adjust Play FX knobs. (If PLAY is on, switching P.SEL to G-Move will granulize inside of MiniLoop.)

Options:

- To Exit back to the slice's beginning, hold the PLAY button for >1 second, or turn off Play FX Loop.
- Try G-Move (P.SEL to GM) and start Play FX. You can pan through the Slice in either direction!

* If Slices LOOP LED is off, the MiniLoop's Start/End and Pos/Size is still limited to the slice.

* If Play FX LOOP LED is off, the MiniLoop becomes a 1-Shot from Start/End and Pos/Size.

Once PlayFX exits this way, it saves the Position so can be recalled repeatedly!

Turning Loop back on resets PlayFX for a new sample point to "capture".

- Try Modifying the Slice with PlayFX, then save to the slice. This can be done by tapping the Play button, then tapping the REC button, so it "records" into the Slice being edited.

Entering PlayFX on this modified slice will recover it's original size to be modified again.

* Tip: If the slices were created from an Echo or Layer Playing (not during initial recording) then the Slice length will be the entire size of an Echo or Layer Loop cycle. This is very useful for keeping a sync, or rhythm while playing slices. These of course can be modified. See Section VI. for more on modifying, reversing, over dubbing, and changing rates of Slices.

3) Granulizing an Area of a Sample

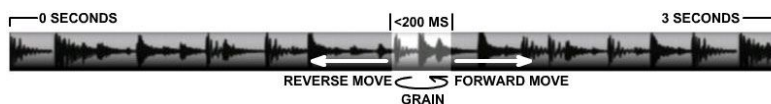
If the RP sample created in the first examples still exists, it's time to G-Move it! G-Move is a sliding loop that is engineered (in the Reflex hardware and software) to be quite small. It's a Mini-Mini-Loop comparatively, and can yield some really great FX, drones, stutters, and odd timbres. The trick is to control it, as it is very tiny.

That's where "G-Move" comes in. When in G-Move Play FX mode, the Start knob becomes the GM knob, which controls the Granular Movement. It can move forward, or backward through a sample, and even remain in one place. If the GM pot is to the left some, then G-Move will move backwards through the sample, even though the grain is playing forward still in tiny loops set by the second PLAY FX knob, SIZE.

G-Move can also be started during an initial Record (no Play Yet) so can be used to instantly granulize from a sound that has just happened, or is still happening, even reverse over what has just been recorded!

But we'll digress back to playing a sample first . . .

Here's the Example, which will allow access to the entire sample:



- 1 -In Echo Mode, Record a Sample, Echo and Start it playing as Infinite Echo to do this Example.
- 2 -Configure PLAY FX knobs (right side of panel) with the P.SEL button. Select the GM LED. (GMove/Size)
- 3 -Tap the PLAY button and G-Move will start, replacing the RP loop from it's present play position:

* If RP wasn't playing or recording, then G-Move will start at the beginning of last played sample. Only G-Move can do this.

-Try adjusting G-MOVE knob, to move around sample both ways.

-Now try the SIZE Knob to adjust the grain size.

*Notice the SIZE has no effect on G-Move and vice-versa.

Once G-Move has reached the end of the RP sample it will "loop".

Options:

-Try adjusting the sample RATE! This one of the combinations that makes the Reflex shine!

-Exiting G-Move: Hold PLAY button >1 second. RP (if playing) will resume where it would have been.

-Exiting by turning off PlayFX Loop.

-Exiting to Silence (if RP Playing) Hold REC to stop RP, (R/G LED over REC off) then exit G-Move.

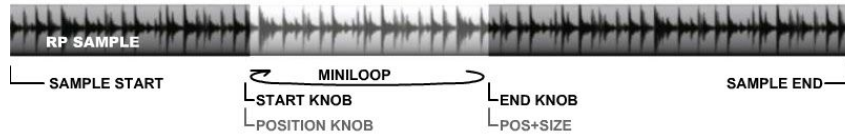
* Try recording your G-Move, but be careful not to record over the sample, which can happen!

* Try G-Moving during a fresh record of a sample. The G-Move loop point becomes the record point.

If a Sample (echo, layer, R/P) is initially recording, G-Move will start at Record point, allowing a DJ dragging effect! Tap PlayFX again to set end limit. This also works for any PlayFX!

4) Positioning a MiniLoop in a Sample

POS PLAY FX Mode is similar to **START/END** in that it's looping position is absolute. The difference is the **POS** knob sets the relative point to start the MiniLoop in the sample, while the **SIZE** knob sets the size of the loop. Note that, while the loop can approach grain size, it has a much wider range...to the whole size of the sample, so would be fairly coarse to adjust at that end. This is normal and can't be helped.



Position and it's relationship to Size is how the MiniLoop is controlled (grey lettering in above diagram)

Adjusting **POS** will quickly move around the sample, sounding similar to a DJ Cue search, or skipping through a CD if you remember the players that could do that. The loop tries to play, but if the **POS** knob is moved before it can loop, it'll keep updating a new start position. This is also normal! As before, make sure you have a sample to work on playing, then follow this procedure:

- 1 -Configure **PLAY FX** knobs (right side of panel) with the **P.SEL** button. Select the **POS** LED. (*Pos/Size*)
- 2 -Tap the **PLAY** button and **POS** will immediately jump to the relative position of the sample.
Options:
 - Hold **PLAY** >1 second to exit. If **RP** playing/echoing, then will continue where it would be now.
 - PLAY LOOP** on:
 - Causes a loop at the End point (set by knob) or Start point if playing in reverse.
 - PLAY LOOP** off:
 - Acts as a 1-shot play. Stops at point set by End or Start if playing in reverse.
 - Once **PlayFX** exits this way, it saves the Position so can be recalled repeatedly!
 - Turning Loop back on after an exit will reset **PlayFX** start position, ready for new.

5) Granulizing "Freeze"

One very cool effect involving **G-Move** is the on-the-fly "Freeze" ability! This can be done manually or via the **Play** trigger input, which should be set to **Gate**. Switch to **R/P** mode and start Recording some audio. In **R/P** mode recording can be done indefinitely as part of the "last 3 minute recall" feature, so take your time!

- 1 -Set **PlayFX** to **G-Move** with **P.Sel** button (blue LED) and set both knobs about half way
- 2 -Start a **G-Move** by tapping the **PlayFX** button
- 3 -Find the "Freeze" sweet-spot by adjusting the Start knob (Blue **GM** LED will go off)
- 4 -Hold to exit **G-Move Freeze**
- 5 -At any point in Recording, tapping **PlayFX** will freeze at that point in recording
Options:
 - Set **PLAY T/F/G** input to **GATE**, then introduce a slow gate pulse to freeze automatically!
 - Try different pulse widths on **Gate** and swinging **Blend** knob over to hear only **G-Move**.

6) Granulizing inside a Slice

It's pretty much the same method as Granulizing an **RP Sample** with **PLAY FX**, except the **SLICE LOOP** LED controls whether or not **G-Move** is limited by the Slice boundaries. A Slice play is not affected by **Start/End** or **Position/Size** knobs, but is affected if **P.SEL** is set to **GM**.

- 1 -Create slices on an **RP Sample** as described in Section C. below, (or try to use auto-slices if exist.)
- 2 -Tap **SLICE SEL** button to switch the **RATE** knob to select slices. (Green **P** LED will light)
- 3 -Select a Slice, indicated by LED Circle 1-8 (yellow LED off) or 9-16 (yellow LED on)
- 4 -Tap **SLICE** to play the selected Slice.
- 5 -Set **GM** knob (top FX knob) to center, so the grain will pause at start of slice to begin with.
 - Set **Size** Knob (bottom FX knob) to the left, say 10 o'clock, so the grain size is fairly small.
 - Set **Play LOOP** LED to your preference as follows:
 - On: **G-Move** will loop at Slice loop point
 - Off: **G-Move** will exit (if not in freeze setting) once it reaches the slice loop (or start if reversed.)

Options:

- Tap and select different Slices, which will all have G-Move applied to them while G-Move is active.
- Hold PlayFX >1 second to exit back to Slice playing.
- Hold Slice >1 second to exit both Slice and PlayFX (G-Move in this case) back to RP Sample.
- Adjust GM forward some to get a Time scaled playback of the slice.
- *Any slice played will have this GM setting while GM is selected.
- *Note: PlayFX Loop off method doesn't Exit with G-Move, as there is no defined "end" point.

7) Granulizing/MiniLooping for Echo

If a PLAY FX is started during a running Echo Mode, and echo is long enough, while the PLAY FX is brief enough (less than the echo time), this PlayFX sound will be echo'd along with any audio input present. If PlayFX Loop is off, the PlayFX will "1-shot" out a single play defined by the start-end knobs. This is key to reversing a sample (ST/END mode) as it allows a smooth transition.

Depending on the PLAY FX mode, the way the play point is handled changes as follows:

- Start/End or Pos/Size: relative positions in last echo cycle (present record minus echo delay time)
- G-Move: Starts exactly 1 echo cycle back from present position.

This can be used for cyclic effects if Echo is then set to "Infinite Echo". The example is to use POS and Size:



- 1 -Start an RP Echo as described in Section A. and make it long, say 5 seconds or more.
- 2 -Tap P.SEL to select the POS LED and turn on PLAY LOOP (Yellow) LED if not already on.
- 3 -Set The POSition and SIZE knobs to relative values to describe the MiniLoop in the echo cycle.
- 4 -Hold PLAY button at any time in the echo (Remember POS will choose the MiniLoop Position in echo)
- 5 -After a second or two, release the PLAY button to exit the MiniLoop
The MiniLoop should now be punched into the echo.

Options:

- Try this with G-Move and Start/End Play FX Modes.
- Turn off Play LOOP LED so the PlayFX loop exits by itself. This is useful for longer echos.
- * This can also be done in LAYER RP Mode while recording a new layer. if within loop time.

8) Reversing Echo

A desirable effect with echoing/delaying is the ability to reverse an echo and have it included in the delay train. This is easy with the Reflex as shown in this example.

- 1 -Select PlayFX mode Start/End (ST) with the P.SEL button,
- 2 -Set the top knob fully clockwise, and the bottom knob fully counterclockwise
- 3 -Tap the Loop button to turn ON PlayFX loop LED
- 4 -Start an RP Echo as described in Section A. with some sound input to the AC in's.
- 5 -At the point you want to reverse, tap the Play button to start looping
- 6 -At the point you want to return to echoing, turn OFF the PlayFX Loop LED. PlayFX will exit
*There will now be a smooth transition with everything playing in reverse as an echo.
- 7 -Turn PlayFX Loop LED back on to reset playFX (unless you want to recall this loop!)

Options:

- You can play a reverse with the playFX Loop LED off, but it may not be as smooth as it may have not yet completed a cycle, and could include the abrupt entry point. Give it a try!
- An earlier echo can also be recalled if PlayFX Loop is left off. Turning it on will reset.

C. Description of Slicing by Example



One of the more powerful features of the Reflex LiveLoop is the ability to Slice samples. Slicing is basically chopping up a sample to be recalled at will. Think of it as an index of times in a sample. It is not destructive to the sample when creating slices, but if a slice is over-dubbed it, of course, will modify the sample.

A particularly great feature of slicing is the ability to intelligently slice while recording, playing FX, echoing, or creating layers, so a section of FX (While recording), an echo (Auto-Slice), a layer or audio sample can be recalled instantly by playing the slice. Audio Peak Slicing uses audio Peaks to create slices as well making many Slices very easy to acquire! Up to 400 Slices can be created, unless Slice Sequencing Mode is used, at which point it's 200.

For more depth on Slicing, Peak Slicing, and Slice Sequencing see Section VI. These examples use the buttons/controls on the panel for simplicity, not the Slice CV, Slice Play T/G or Slice T/G, and are to familiarize you with the basic Slicing Options.

1) Live Manual Slicing



The simplest/fastest way to slice is to record some incoming audio, or play a previously recorded sample, , and tap SLICE at the appropriate times to create slices. If the audio being recorded (which this example covers) is known, and has a beat or rhythm, then slicing it is as easy as 1,2,3...slices!

- Use the MODE button to select **R/P** Mode, for a simple sample recording.
- Ensure SLICE SEL is off, or hold >4 seconds to erase previous slices (Slice P Green LED should be off)
- Turn on Slice LOOP LED (Yellow), if off, by holding the LOOP button in PLAY section > 1 second

- 1 -When an audio input is present, and ready to go, tap the REC button.
- 2 -Now Slices can be created by tapping the SLICE button. LED Circle will briefly indicate the Slice #.
- 3 -Once finished, switch to play by tapping the REC button a second time, or hold REC to stop.
- 4 -Turn on SLICE SEL by pressing the SLICE SEL button. The Slice P LED should light green.
- 5 -Turn the RATE knob to select a slice to play.
- 6 -Press the SLICE Button, and turn the rate knob to play different slices you've created.

Options:

You can create a Slice Sequence with your new Slices! See (4) in this section

You can apply PlayFX to these Slices that will start according to playFX Mode and Knobs Settings

You can modify these Slices length, pitch, direction, overDub into it, or remove. See Sect. VI.

*Up to 16 slices can be *accessed* via the slice knob. (Up to 400 can be accessed via SL.CV input)

When used with the Slice CV input (0-5V), The Rate knob will act as a 16 Slice positive Offset.

*These slices will remain until erased by holding the SLICE button for 4 seconds or more, or a new Record Start (RP Mode), new Echo start (after Echo Stop), or New Layer start (after a stop)

2) Sample Scan Manual Slicing

If a sample has already been recorded, slices can still be created by just playing the sample back and tapping the SLICE button, but for precise loops to be captured and turned into slices, really good reflexes with the finger on the button would be an asset! Fortunately, the Reflex has it's own reflexes, which are quite a bit more accurate.

At this point it'd be great if you have tried creating a MiniLoop before this, as it will be used to "scan" the sample (hopefully you have one playing!) for that perfect slice of musical pie:

- 1 -Ensure SLICE SEL is off or hold >4 seconds to erase previous slices (Slice P Green LED should be off)
 - 2 -Start a POS MiniLoop Playing (P.SEL to POS, Play LOOP on, tap PLAY) and set the SIZE fairly quick.
 - 3 -Use POS to scan across the RP Sample (or echo/layer) to find the start for the Slice
 - 4 -Use SIZE to set the end of the slice. (If the slice won't be looping, then this won't matter)
 - 5 -Tap the PlayFX repeatedly to get an idea of how the Slice will sound
 - 6 -Tap the SLICE button to create a Slice.
- Do steps 3 - 7 again until you have enough slices
 -Switch to SLICE SEL (Green P LED on) and use the RATE knob to select a slice.
 -Tap SLICE button to play slices.

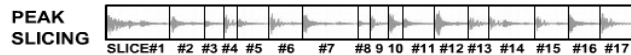
Options:

You can play a Slice, then apply PlayFX to it (ST or POS) and create more slices from that!

* This method isolates slices so they don't have to be created sequentially.

* If this is done with G-Move instead of MiniLoop, the slice should play a "snapshot" from when the slice was created, not the whole G-Move slide. Slice Play won't recall Sample Rate at the time.

3) Peak Slicing Mode



Peak Slicing in a modular sampler is very rare (Reflex may be the first) like a jewel in the LiveLoop crown! It is what it sounds like; a sample slicer that creates slices from audio peaks. It's not as simple as that, but the results are usually ideal, and can be used to turn canned music into a frenzy of breakdowns, grooves, or chaos. The best part is that once set, Peak Slicer takes over until the sample or recording is done, or it's stopped by you. Because peak slicing is sensed at the Output of Both Channels, you can have audio at either, but no audio, no slices. Also as the sensor is at the output, Live Slicing, or Slicing from a sample can be accomplished. This example dives right into Peak Slicing an echo. The slices will be from various points in the echo, and all have echo length. This will result in many slices, the first 16 of which you will be able to access from the panel:



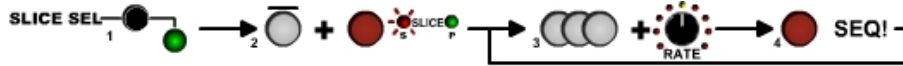
- Select Echo Mode with P.SEL button
 - Make sure you have some audio feeding into the Right and/or Left channel AC inputs (Left =mono)
 - Hold the Slice button for over 4 seconds to erase any previous Slices
- 1 -Set BLEND to center, and FEEDBACK to a bit down from maximum, so echo fades.
 - 2 -When ready, Tap the REC button, then tap again to set echo size, relatively short.
 - 3 -Turn on PEAK Slicing by selecting it with the MODE button.
 (The Mode LED will flip back to R/P, ECHO, or LAY after a moment)
 *By this time a slice or two may have already been created. Watch the LED circle increment. Once it has passed the 8th LED twice you have over 16 slices.
 - 4 -Tap MODE button to Stop Peak Slicing.
 -Tap the MODE button again to exit Peak Slicing Mode.
 -Switch to SLICE SEL (Slice P Green LED on) to play back slices as usual.
- Options:
- Try turning Blend over to the left, maybe 10 o'clock (toward input side) which will slice more with input.
 - Try moving the RATE control while Peak Slicing an echo. Rate will be recalled when slices are played!
 - *Record can be Armed by the Peak slicer to Start Recording once there's audio, whether slicing or not!
 Refer to Section VI. for more on the Peak Slicer algorithm and "Back Slice" timing

4) Slice Groove Sequencer (Automation) Mode

A special feature of the Reflex LiveLoop is the Slice Automation Mode. This allows "recording" of a sequence of Slice Play back actions on the slice button, or SL CV and SL.PLY T/G inputs. A sequence or "groove" can be accomplished with this simple mode. Advanced use includes a Clock signal & quantizing (see more on "SGS" pg. 33)

Furthermore, depending on how SLICE SEL is set (Green Slice P LED on = Slice Select on the RATE knob, Green Slice P LED off = Sample Rate on the Rate knob) the Slices can be selected to play during SGS recording, or the Sample Rate can be changed on a single slice. If you're quick (or CV'ing), both can be done in a single recording!

The following example assumes some slices have been created, the Slice LOOP is on, and you have a bit of rhythm to tap into the SLICE button:



1 -Switch to Slice Select Mode by pressing Slice Sel so green P LED comes on

2 -Hold down the SLICE button, then tap the REC button. Slice R LED will light indicating Ready to go.

3 -When ready and in sync, etc, tap the SLICE button to a rhythm.

Use the Rate knob to select different Slices. The LED Circle will indicate which Slice you have selected.

4 -Once done, tap on the REC button when ready to start the Automation playback. Once Playback has started, the REC button is "normal"

Options:

-To end the automation playback and start recording a new one, start tapping the SLICE button again.

This allows a continuously changing update as you tap in new "grooves"

-To Exit Slice Groove mode, press and hold the Slice button for > 1 second, but no longer than 4 seconds or you will erase all of the Slices!

-Shift the Rate of your playing Sequence. Press Slice Sel to exit Slice Select (Green LED will flash) so you can use the Rate knob. Adjusting the rate knob can shift all of the slices up or down!

-Try entering PlayFX modes while your Sequence is playing! (Hold PLAY button to exit PlayFX)

To find out how to slice with T/G inputs and Play slices with SL.PLY and SL CV inputs, clocking, see section VI.

Treat the "end tap" on REC as the start of a new SGS loop to keep the beat!

5) Modifying Slices

A fairly recent addition to the Reflex Slicing arsenal is the ability to modify a Slice using PlayFX.

Sometimes a slice is too long, especially if it was acquired from a running Echo or a Layer, which makes a Slice the length of a single echo or layer, which in of itself could be quite long. Fear not, for there is a way to shorten, shift the start, or even reverse it!

It has already been mentioned above that PlayFX can be used on a Slice, but that modification can easily be saved to that Slice as well! This short Example will show you how.

The following example assumes some slices have been created, and the Slice LOOP is on:

1 -Switch to Slice Select Mode if not already there by pressing Slice Sel so green P LED comes on

2 -Select a Slice to modify by using Rate Knob and tapping the Slice button

3 -Decide on which PlayFX mode you want to use to Modify the Slice (ST or POS, not GM)

4 -Tap the PLAY button to start a PlayFX on the playing Slice and adjust Start-End knobs to suit.

5 -Once ready to save it as is now, tap SLICE then REC immediately afterward. (You have 1 second.)

The "new version" of the Slice will be playing as PlayFX exits, ready for another Slice.

Options:

-Try Changing the Slice's sample Rate (you must exit Slice Sel for Rate Knob) and Save it

-Re-Editing an already modified Slice will act as an undo, but if the Rate was changed it must be returned manually.

-It is possible to "copy" a slice to a new location by selecting a different slice once PlayFX is playing.

You will hear the newly selected Slice in PlayFX, but when you "save" it, it will save to the originally selected Slice "slot". This will not damage or alter the "source" Slice or other slices.

*Note: At the writing time of this manual, G-Move is not implemented to be a Slice Modifier, mostly because of the nature of G-Move and a single "grain" of sound wouldn't work well as a Slice.

*Note2: If the Rate knob has been moved to a new Slice position, a PlayFX modified Slice will be saved to the new position! By re-entering PlayFX, the original Slice can be recalled and saved if this is accidental.

6) Over-Dubbing Slices

A very new feature of the Reflex LiveLoop is the ability to Over-Dub, or record into, a Slice. This is a true Record, so Record cannot be active prior to entering Slice Play (Slice Sel), so if you are echoing just switch to Infinite Echo (One more tap on REC button) before Playing Slices.

Setting the Feedback level for this feature is important as it operates as a "Mix" between incoming audio, and the Slice itself. To "Punch-In" new audio and erase the old, turn the Feedback level right down. Contrarily, if you want the original to remain, turn it right up. (Watch you EQ levels as this will also have a big affect)

- 1 -Switch to Slice Select Mode if not already there by pressing Slice Sel so green P LED comes on
- 2 -Select a Slice to Over-Dub by using Rate Knob and tapping the Slice button
- 3 -When ready to Over-Dub, with Slice Playing, tap the Record button to add incoming audio
- 4 -To stop Over-Dubbing (as it will continue in a Loop) just Tap REC button again.

Options:

-Leave the Record degrade the slice, or modify/grungify on-the-fly with the EQ

-Change the Slice Sample Rate with a CV input to Rate, or switch to Rate knob

*Note: Slice overdubbing is destructive to the original sample always. This can give an interesting effect when Slice Mode is exited back to the now modified sample presently looping! This of course requires that the Slices were created from this particular sample looping, and not a previous sample slice point.

Try Changing the Rate (Must exit Slice Sel first!) while recording for some great FX!

*Remember to put Rate back to original once done as you have adjusted the global Slice Rate.

*Note: If a Slice has been Modified to play in reverse, over-dubbing cannot be done on it for obvious reasons.

7) Auto-Slicing

As mentioned in sections above, Auto-Slicing is yet another method of "gathering" slices from a sample. This function runs in the background and in no way impacts performance in any Mode. This allows one to "recall" an earlier moment of recording, which can be handy for "winding down" a sequence.

If there are no Slices set by you, each RP mode has it's way of creating Slices automatically:

Layer: Creates a Slice at each Layer recorded.

Echo: Creates a Slice at each echo, but pauses when switched to Infinite Echo.

R/P: Creates a Slice at every End of record, from the start point of record. This includes over-dubs, appends.



Auto-Slicing an Echo is shown above. As long as the echo is running, new slices will be created until there is no more room (400 slices) at which point Auto Slicing will cease. Sometimes the recording (as is usually the case with Echo) will overwrite the previously Sliced memory. this will play back as out of sync on the "old" slices, which can create serendipitous effects.

"Erasing" Slices:

If you have played AutoSlices then they become Valid, and further Slices created by you will be appended to them. While this can be desirable, you may want to start fresh without stopping Record/Play.

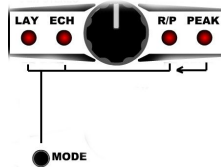
Hold the Slice button for >4 seconds and they will all be erased and Slice #1, if played, will default from Record start until written over by a "real" slice created by you.

Note: Auto-Slicing is only active after all Valid slices have been cleared (Hold SLICE>4 s) and a Mode becomes active, such as echoing, or Layers being created. A tap on the SLICE button when not in Slice Sel (where the Rate knob becomes a Slice Selector), or entering Peak slicing will reset and auto-erase AutoSlices in lieu of a "real slice".

If Auto-Slices have been created and you proceed to Play them (Slice Sel then SLICE button) they become valid and won't auto-erase if more slices are added.

IV. The Record Modes (RP)

The Reflex LiveLoop has 2 "sides". The first is the RP side, which is covered here. The RP, or Record Play, side is for sampling in stereo audio for clean looping, sound-on-sound, and echo, with performing in mind. The samples recorded by these modes can be "worked on" by the other side, the Play FX Modes. Both of these sides can operate simultaneously, but also affect each other. The 2 sides aren't so much physical as they are conceptual, and isn't to do with stereo sides as sampling is always in stereo!



The 3 Record modes; R/P, ECHO, and LAYer, are separated to make maximum use of the Reflex LiveLoop's capabilities in a logical fashion. These Modes can be selected using the MODE button.

PEAK Mode is also selected by the MODE button, but isn't on it's own a record mode, but is set to use with one of the RP modes, or a Play FX mode. (D.)

A. R/P (Record/Play) Mode

If you want to get a no-frills sample into the Reflex, this is the easiest way to do it. 175 seconds of stereo audio @ 48 KHz sample rate can be recorded uninterrupted in R/P Mode. Use the MODE button to select R/P Mode, which is the 3rd LED across the top.

R/P Mode is not time/length dependant like Echo and Layer, but can be used in a timely fashion if desired. A sample can be recorded, then immediately played, then, while still playing be recorded into/over, and finally appended to become longer. This allows over-dubbing new passages into an already playing sample, or replacing sections of it. If the record passes the end of the sample, the whole sample is appended to become longer.

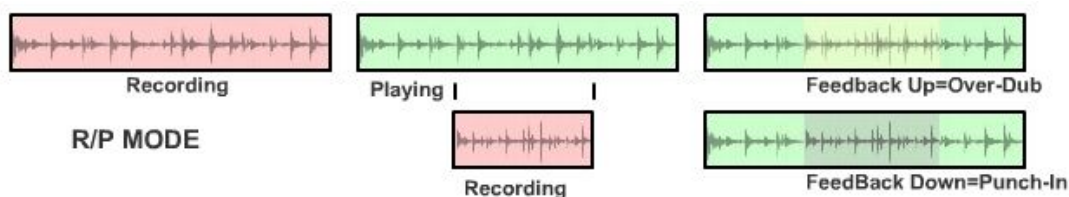
Longer sample times can be realized by reducing the Sample Rate. As you rotate the Rate knob to the left from center, the -1 LED will light. At this point you are 1 octave below maximum rate, or 24Ks/s. If there isn't a lot of cymbals crashing or sharp squares in the recording, it's a barely noticeable drop in fidelity, and doubles the record time to almost 6 minutes.

To Record in a sample, connect an audio source to AC IN RP (Right channel) and AC IN FX (Left Channel), then tap the REC button. To finish recording and switch to Playback, just tap the REC button a second time.

The sample just recorded will continue playing indefinitely, but if you want to stop it, hold the REC button for more than 1 second.

If you want to do another recording, you can tap the REC button, even while the sample is playing, and record will begin.

As a bonus, a "Punch-In" (Feedback knob down) or "over-dub" (feedback knob up) can be used to overwrite/mix a section of the previous recording while in play mode. At the appropriate time, just tap REC to record over playing sample from that point on. Exit record by tapping REC again.



The sample(s) can be edited this way endlessly, but no undo!



If left recording, the old sample will be appended with new recording from that point until end of memory (EOM) if not switched back to play, at which point recording will loop. This allows a recall of the past 3 minutes at any time. Play will resume once the REC button is pressed again in any case.

When appending a sample, the Playing sample "under" it will end at it's loop point with a soft stop. Once the now longer sample is played, it will sound the same way it did during recording.

Holding the REC button will stop all Play and Recording.

Keep in mind that abruptly different audio signals present on the input at record time will sound abrupt in playBack despite softening techniques. To avoid this, as with a DAW/sound board edit, make sure there is very little sound until immediately after the overDub/punch-in Record is started...unless you want that effect!

Using the T/F/C REC input to control R/P record and play

In R/P, triggering or gating the Record playback may seem limited, but can be used for many effects and enables remote control. Pressing the small button below the REC button will select which type of input is preferred.

All trigger/gate inputs on the Reflex LiveLoop become active at 0.6V @>10uS. This allows relatively low audio levels or even a piezo to act as a trigger!

The T/F/C REC input can act the same way as the button, but has 3 different input types:

TRIG: Acts like the button. The first rising edge pulse starts record, while the 2nd pulse switches to play, etc.

FSW: This is an S-Trig, meaning it is inverted for use with ground switches like a footswitch. The first drop to ground will start a record, and the second will switch to play as with the button. This can be good for remote controlling the record/play when in R/P Mode. Holding to ground (or ring) will also do an all Stop.

CLOCK: Record start and Record End/Play Start can be synchronized to a Clock input on REC T/F/C. This Clock input can be Divided by up to 16 clocks on Record button taps after the initial Record, so even R/P Mode (play only of course) can be in sync by any multiple of the Clock Division. Reflex will try to play the entire sample within the clock division period, so the sample, if intended to be used with clock, should be on the shorter side.

Clock can also be used to sync and initiate a record in R/P mode.
Feed a clock into the Rec T/F/C input while CLK is selected.
Record always commences on the next clock pulse, regardless of the clock division.
R/P play will begin once the clock division has passed.
See CLOCK section on **Echo Mode** for more on how to use the Clock Trigger feature.

Stopping R/P Play or Record

Just Hold the REC button or Foot Switch for longer than 1 second, and all is stopped. Slices created will still be playable, which poses an interesting possibility of starting a new recording (with feedback turned down so only input audio is recorded) while the slices are still being played or sequenced.

As the area of memory that the slices were assigned to becomes the new recording, the slices will all change every 3 minutes!

B. Echo Mode

The Echo Mode uses the same method as R/P mode above. This gives the echo the advantage of being immediately sync'ed to other rhythms playing, similar to a 2 step tap tempo.

To start an echo, first use the MODE button to select R/P Mode.

Connect an audio source to AC IN RP (Right channel) and AC IN FX (Left Channel), then tap the REC button. REC R LED will turn Red.

To set the echo length, just tap the REC button a second time at which point echo will begin.

REC R LED will become amber.

To stop Echoing, just press and hold the record button for longer than 1 second

Tweaking Echo

Because Echo is an analog beast, the feedback level will control the fall rate of echo's following the original audio. The on-board EQ is also in the feedback loops, enabling echo dynamics such as softening, or telephone effects. See Section VII. EQ for more on that.

The FX channel (left) can have a filter (or other audio processor) inserted via the two feedback jacks, FB SEND and FB RETURN. The feedback send level is standard 10V P-P, and the return expects the same.

The Feedback Send output is straight from the sampler with no mix from the input, so can be used as an extra dimension of sound, or 3rd speaker, during a performance.

If the feedback send is patched over to the Right Channel (AC IN RP) and a mono signal is fed into the Left Channel (AC IN FX) the sampler's output can feed back in doubling the echo time, and causing (on short echos) a ping-pong effect. This is especially interesting with very fast echo.

Shifting Echo Pitch

The Rate control will shift the echo sample rates around, thus changing the pitch. This works well for chorus effect, or shifting the frequency with an external LFO connected to RATE CV input jack.

If the rate knob is adjusted down far from center then the echo speed will change noticeably.

*Note that when the Rate CV is plugged in to, the Rate knob still acts as an offset in either direction, but if your CV goes to the positive side, and the Rate knob is already at center (maximum record speed) then there will be no change. Try turning the attenuvertor to the negative side, or lowering the Rate a bit to accommodate the positive CV swing. When switched to infinite Echo, the Rate can vary the full +/- 5 octaves!

*If the Rate knob is too wide for your uses, the width can be changed in settings. See IX. A. Settings.

Infinite Echo

Echo has a special feature not found on a regular delay module, "infinite echo." The echo will loop continuously forever if invoked.

To activate infinite echo, while echoing, double click the REC button. It will begin immediately.

To resume normal echoing seamlessly, just tap REC once.

*Infinite echo works best when feedback is near 100% so the drop in level won't be noticeable at loop point.

Stopping Echo

To stop echo/delay, just hold the Record button > 1 second. This applies to the Footswitch input as well.

Using the T/F/C REC input to control ECHO

For external control via the T/F/G REC input, select one of the following:

TRIG: Acts like the button. The first rising edge pulse starts record, while the second pulse switches to echo. If used with a stable clock source, this will keep the echo in sync indefinitely. After the first 2 pulses the rest are basically ignored. Infinite Echo and Echo Stop must be invoked by the REC button as above.

FSW: This is an S-Trig, meaning it is inverted for use with ground switches like a footswitch. The first drop to ground will start a record, and the second will switch to play as with the button. This can be good for remote controlling the echo as hands-free, and works exactly as the REC button does.

CLOCK: Setting the input format to Clock will cause the Record action to start only after a trigger/clock input is sensed on the REC T/F/C input. Record must be armed (REC button) to act, as this is a sync Clock input. The division of this clock input is settable from 1 to 16 clocks, but the first Record will start on the first clock trigger once armed. This allows for sync at your discretion no matter where a sequence is positioned.

The advantage of using Clock in Echo Mode is that it allows precise echo lengths to stay in sync with an ongoing sequence or clock source already in motion, without a whole lot of effort.

Setting the Clock Divider

To set the Clock divider so that [x] clocks must pass before the 2nd Record Button Tap takes affect:

-Press and hold the REC T/F/C button for 1 second until all of the LED Circle flashes.

-Dial in a Clock Divider value 1 to 16 using the LED Circle. (Note: You must pass previous setting)

-The LEDs will light 1-4, then 5-8, then the center yellow will light to indicate 9-12, then 13-16.

-Tap the REC T/F/C button to exit and you're done.

Using Clock Trigger input

Now you know how, set the Clock Divider to 16, then select the Echo Mode if not already there.

-Connect a slow active clock from a sequencer or LFO to the REC T/F/C input.

-When ready, tap the Record button to arm just before the clock you want to start recording at.

-Record will start on the next Clock

- Now you can tap Record button again to arm the echo length.

-After 16 clocks, the echo length will be set, and the LED will turn from red to orange.

The Button works in exactly the same way as normal, except changes only take place on Clock divisions, except the "Hold to Stop" function is instantaneous.

* Note: Clock can track very well during infinite Echo, and fairly well during regular echo, but a jittery clock signal will result in noticeable shifts in tones, not so noticeable in percussive sounds.

This factor can also generate some very random glitches when used with a non-pulse input.

**Note: During Record, if the sample rate was at Max when clock mode selected, then the clock cannot be much faster! Set the Sample rate down a bit if you need some "overhead" during record.

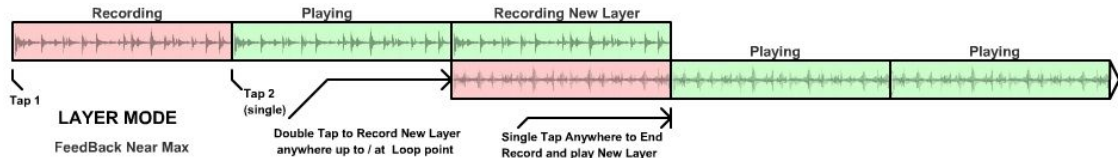
C. Layer (Sound on Sound) Mode

Layer is very similar to Echo mode in that the first two REC taps defines the size of the Layer. The differences are that there's the option to "grow" the layer size in steps of the original length, and layers can be "undone" by reverting to the previous layer.

The terms "double tap" and "triple tap" refer to sequential taps on the record button (or footswitch) no more than 1 second apart. So even if you're uncoordinated (like me!) they can generally be tapped on a beat: 1,2,3

Setup

When using Layer, it's always better to set the feedback to near 100%. If set too low, the "old" layers will disappear quickly into oblivion. Setting an EQ Band higher, or reducing the Low EQ band can stop the Bass from piling up as it tends to, thus keeping the sound clean for many Layers.



Starting a Layer

Usually Layering happens within a piece already playing, i.e. a guitar, so it's important to choose the "downbeat" to start recording as the audio is already there and at a sync point.

Tap REC button to begin the record. The next Tap on REC will set the base Layer size, and can be a

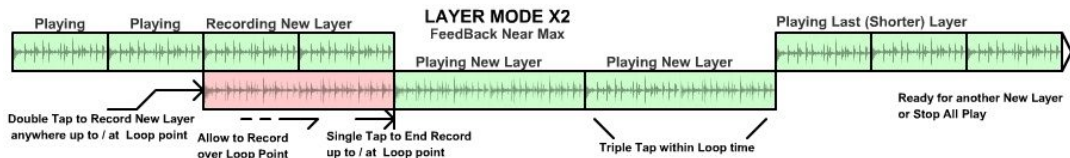
- Single tap: Switch to play the Layer just recorded, or
- Double tap: Start a new Layer and mix (SOS) the previous layer in.

A single tap any time after this (wait>1 second) will cause this record to end

Adding a Layer

If the new Layer is just playing, a double tap will get it recording again on the next loop point. This is where the real control begins. It's ok to double tap on the loop point as the Reflex has already anticipated that move and begun recording a short segment, just in case!

Don't forget to single Tap after it loops (or on the next loop) to switch back to play, or you risk "bridging".



Bridging a Layer

Let's say you want to double (X2) the length of the Layer now playing. With the Reflex it's as easy as double tapping to switch to Record, then leaving it record over a loop point, then single tapping to switch to play at the following loop point. The loop will now be doubled, with two of the original loops inside of it.

This can be continued to 4x, 8x, but be careful as there's only so much memory, and if you want to "peel" a Layer, you'll end up in uncharted territory!

Peeling Back to a Previous Layer

If you want to peel off a Layer, it's as easy as 3 taps on the REC button (triple tap), or footswitch, and the next Layer will be the previous. It will of course be in play mode. This can be done all the way back to the first Layer.

Stop Layer Play

To stop a layer from playing (or recording) hold the REC button or footswitch down for longer than 1 second. Once released, all play and record will stop and Layer is reset.

Slicing and PlayFX can be applied during Layer, but Layer was intended more as a performance mode specifically for building loops as accompaniment.

Using the T/F/C REC input to control Layering

The Trigger/Gate/Footswitch input can be used to control the creation and playing of layers in the same way the REC button does.

- TRIG:** To duplicate the buttons functions, switch the input format to TRIG (Trigger).
A Clock pulse into the Trigger input will add a layer on every pulse. If the trigger pulse isn't uniform, i.e. slowing down, then Layer length may double as the command to create a new layer would happen after a new Layer loop has begun. This can produce some desirable/undesirable effects.
- FSW:** This setting inverts the Record T/F/G input to an *S-Trigger*, meaning that a switch to low, or ground will act as a button press. Most footswitches are wired this way. If you have a footswitch, give it a try. While performing, it's a huge benefit to have both hands free for playing, tweaking etc.
- CLOCK:** Using Clock when in Layer mode is more to ensure continuation of sync with other instruments/sequences in a piece. It is very subtle so won't affect the pitch as Clocking in Echo Mode does.

Setting the input format to Clock will cause the Record action to start only after a trigger/clock input is sensed on the REC T/F/C input. Record must be armed (REC button) to act, as this is a sync Clock input. The division of this clock input is settable from 1 to 16 clocks, but the first Record will start on the first clock trigger once armed. This allows for sync at your discretion no matter where a sequence is positioned.

The advantage of using Clock in Layer Mode is that it allows precise start/layer/play Sound On Sound Layering synchronized to an already flowing pattern or clock. Larger division times are recommended for Layer use, (8 -16) mostly because a Layer can't be less than a couple of seconds to function properly

Single clocks are continuously monitored for alignment, slightly adjusting the sample rate from time to time to keep alignment. Note that this isn't a license to adjust the clock up and down to see how far the Rate will follow, although it is an intriguing possibility! It will fall out of "phase" as the clock changes, rather than shift the pitch as a last resort.

Setting the Clock Divider

- To set the Clock divider so that X clocks must pass before the 2nd Record Button Tap takes effect:
- Press and hold the REC T/F/C button for 1 second until all of the LED Circle flashes.
 - Dial in a Clock Divider value 1 to 16 using the LED Circle.
 - The LEDs will light 1-4, then 5-8, then the center yellow will light to indicate 9-12, then 13-16.
 - Tap the REC T/F/C button to exit and you're done.

Using Clock Trigger input

- Now you know how, set the Clock Divider to 16, then select the Layer Mode if not already there.
- Connect a slow active clock from a sequencer or LFO to the REC T/F/C input.
 - When ready, tap the Record button to arm just before the clock you want to start recording at.
 - Record will start on the next Clock
 - Now you can tap Record button again to arm the initial Layer length.
 - After 16 clocks, the Layer length will be set, and the LED will turn from red to orange.

The Button works in exactly the same way as normal, except changes only take place on Clock divisions, except the "Hold to Stop" function is instantaneous.

** An Important Special Note On Recording:

Because the Reflex is designed to be more of an experimental sound machine to be used in a modular system, and not so much a polished digital sampler (with all its buttons/menus and such) it was decided to not put a limit/stop on the Record function passing the end of memory, or "protecting" areas of RAM.

This requires due diligence when recording. If slices have been created at a point from an echo continually echoing, eventually (3+ minutes) the recording echo is going to come around and "run over" the slices, thus creating new sounding slices. Echo Mode uses the entire memory, not just a portion of it. This gives the advantage, when auto-slicing, (runs in background) to be able to recall old Echo's, or "re-vamp" a decaying echo which will now echo.

A good practice when creating slices during record/echo is to switch to play (not keep recording) which will preserve the Slices until power-down. This works for PlayFX as well!

Tweaking Layers

Like Echo mode, Layers can be influenced by EQ settings, external filter/processor on the FX side, or just Feedback level. Reducing the Feedback level can reduce clutter over time, dropping the previous layer's level by a certain amount until it's gone.

EQ band levels can be adjusted during a layer record to get some great FX, but can also take out the bass clutter frequently ailing any SOS loop but reducing the bass response by a couple of dB. Be careful if raising EQ levels above 0 dB (center) as they will amplify on each layer very quickly!

Feedback can be set to be a positive gain as well, so, unless you want each layer distorting after a few, make sure it's not set to absolute maximum.

Adjusting up a band on the EQ can be easily tested using Echo mode. Create a short echo that will change quickly, then return to Layer mode to use it.

Layer Limitations

Minimum Layer length: Because the double-Taps can be as slow as 1 second apart, the minimum first layer size can't be shorter than 2 seconds, or the Reflex will interpret it as a double tap. The first layer can be very short if desired. As fast as you can tap the REC button twice, but no following taps will register.

Maximum Layer Undo: The maximum amount of layers you can go back into (using hold REC between loop points) is 16. This limitation for the most part won't be an issue, but it's good to know. Also if the sample memory runs out, and loops, old layers will be overwritten with new, so going back to them will produce erratic behavior.

Maximum Layer Size: There is only the sample memory limit, but if a layer was 175 seconds long, then there could only be one layer!

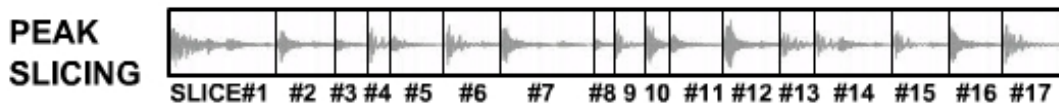
Subsequent Layer Size: After the initial Layer length has been established, all following Layers created will be a multiple of that first layer, i.e. 1x, 2x, 3x, 4x etc. This has been done intentionally, so loops can retain a tempo.

Feedback 0 dB leveling: In layering mode, sometimes it's desirable that the layer levels remain the same for many layers. Because of the very low noise floor of the Reflex LiveLoop, several Layers can be created without significant noise being copied from one to the next. Therefore, getting as close as possible to "zero gain" may be desirable.

By default, the Max knob position Feedback gain has been set to +3 dB, but if you want to set it down or up, there is a procedure in advanced settings to permanently change this gain limit.

D. Peak Slicing Mode

Peak Slicing isn't really a RP (Record Play) Mode, but can start a Record if on and the Record button is Armed. This is one of the more "fun" aspects of the Reflex LiveLoop, as one can create a lot of slices very quickly, that are aligned to Peaks in the Audio during Record or Play/ Echo.



To turn on Peak Slicing, use the MODE button to select PEAK. This must be done in a timely fashion as the selector will time out and jump to which ever mode is selected. Once the Peak LED is on, the LED for the Mode you were in will re-illuminate after a second or two.

If there's no Record or Play happening at this time, then Peak Slicing will standby, and the Record button can be pressed to "Arm" for starting on any sound. The REC LED will flash to indicate it is Armed.

Once there is sound coming into the AC in jacks, Peak slicing will begin.

If there is already a record/play/echo running, then Peak Slicing will begin immediately, indicated by the LED circle as each Slice is created.

Up to 400 Slices can be created this way, and then accessed via SL.CV and SLICE SEL as a 16 Slice offset! The Peak Slicer has an AGC to deal with peaks of high or lower levels (i.e. a cymbal followed by a tap on a hat) and will try to differentiate level rises versus actual Peak Points.

Because it takes a short amount of time for the circuitry and Audio Peak to be recognized as such, there is a slight delay between the actual audio peak and the Slice time. For this reason there is a setting called "back-slice" which calculates that time, and applies it to the Slice result.

This setting is factory set but can be permanently changed by you. See section IX. A. Advanced Settings for more. It's especially important that synth stabs or percussion is well aligned, for very fast looping FX etc.

V. The Play Modes (FX)

The Reflex has the ability to Sample, SOS, play, Echo, and sync, but the unusual PlayFX sample "capture" while leaving the original sample proceed in the background won't be found on any other modular sampler. PlayFX allows a sample to be "windowed" over, reversed, sped up/slowed down, enveloped, modulated or Granulized (pitch-shifted, time-shifted) without affecting the playing RP sample or it's position in play in any way. This allows one to jump into PlayFX then exit while the original sample keeps time as intended.

PlayFX loops can also be duplicated into a Slice, and saved for recall using SLICE SEL and related controls. Because this can be done on-the-fly, it can become part of a performance seamlessly. PlayFX can also capture a slice to apply playFX antics to.

*PlayFX is entered by simply tapping the PLAY button, or, if connected, tapping a footswitch, which incidentally acts exactly as the button. In most cases it will capture the sample point at which it was pressed, so if PlayFX is in Start/End or Position/Size modes and the Start knob is all the way down, then it may go unnoticed that PlayFX has captured a sample and is now playing. This can be very advantageous for shortening a loop on-the-fly.

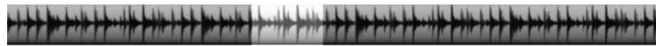
*Each time the PlayFX button is tapped, the Loop will restart from the same position the knobs (and entry point) dictate. This gives a simple one button restart of a sample section that has just played.

*If the Play LOOP LED is off (LOOP button toggles it) then PlayFX will smoothly self exit at the Loop Point, but saves the start position so repeated taps on the PLAY button will actuate from the same original place. The LOOP LED will flash every second to indicate this "standby" condition. Hold PLAY or turn on LOOP to cancel.

*Holding the PlayFX button for longer than 1 second will exit and Reset PlayFX.

Each of the 3 PlayFX Modes are unique and useful.

A. The ST/END MiniLoop



The Start/End controls are the most popular in any modular sampler that has "windowing" over a sample. The Start Knob (top right) sets the beginning, or "loop-to" point of the loop, and the End knob (bottom right) sets the end of the loop, or "loop at" point. While this isn't the best solution for panning over a sample (in my opinion) it does have the advantage of being able to reverse a sample.

*Use the P.SEL button to select the ST LED if not already there

*Make sure the Play LOOP LED is toggled on

*Adjust the Start knob all the way to the left, and the End knob all the way to the right

*Get a RP sample playing (maybe use infinite Echo) to capture a PlayFX from.

*Press the PLAY button to enter PlayFX

You shouldn't have noticed much difference from the RP sample looping, but believe me, you are now in PlayFX! Try adjusting the End control to half. You'll notice the Loop is now cut to half the size.

Try adjusting the Start knob. Notice that you can hear a mini-preview of the position PlayFX is starting at. This makes it easier to find a specific point in a sample. If the End setting is lower than the Start, play will reverse.

Fine Setting:

If the sample is longer than 10 seconds, the Start/End controls become fairly coarse if you're trying find a specific point in a sample (even though that knob is divided into 1000 sections). This is why there is Fine control.

*Select the lower point where you want to have Fine control from on the start knob, and upper point with the End control. This will set your Fine range for knobs and/or ST/END CV inputs.

*While still in PlayFX (Green LED on) tap the P.SEL button to toggle to Fine mode.

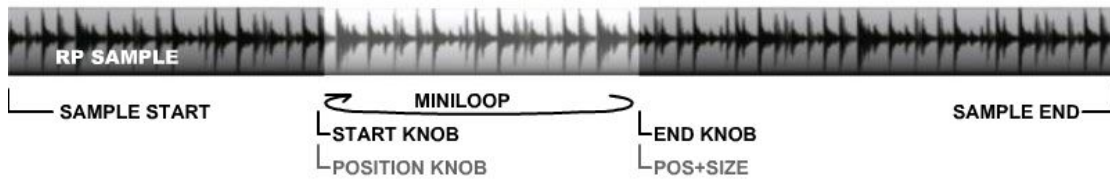
Now the full range of the knobs is much smaller and will allow more precise adjustment.

Note: The fine mode may not work with a RP sample that was too small as it may end up "stuck" between sounds, or just hardly move at all. If ZC Option (LED 2, see Addendum & pg.39) is off, then you will hear a waveform "buzz " as there's not enough room for waveform to fully cycle. This can be a desirable effect for some!

Once you have a good sounding PlayFX loop, you can save it as a Slice by tapping the white SLICE button! If there's more than one Slice, PlayFX can be used on that Slice to further modify it. See sect. VI. Slicing

Start and End positions can also, of course, be controlled by the Start/End CV inputs as a positive offset, which means keeping the knobs lower (in non-Fine mode) will give the best range of control, but then that's up to you.

B. The POS/SIZE MiniLoop



The Position/Size PlayFX Mode is great for panning through a sample without the loop length changing, unless you want it to of course. The loop in POS Mode will always be within the constraints of the original loop from which it was "captured". This means if the Size is fully up, then as the Position is moved up, the loop becomes shorter as it runs into the End limit.

*Use the P.SEL button to select the POS LED (farthest to the right)

*Make sure the Play LOOP LED is toggled on

*Adjust the Start knob all the way to the left, and the End knob all the way to the right

*Get a RP sample playing (maybe use infinite Echo) to capture a PlayFX from.

*Press the PLAY button to enter PlayFX

As with Start/End, there won't be any initial difference to the Loop, but turning down the Size (bottom) knob will speed up the loop as the Size is reduced. With the default "scrubbing" Option enabled, turning the POS knob will scrub through the sample so it's easy to find your target. If the scrubbing Option is disabled, then the POSition will only be updated on each loop. The Size can be reduced to duplicate scrubbing. (See more below*.)

With the POS CV input (turn down POS knob for max range), updates only happen once the Size loop has looped. Try connecting an LFO to this input. This can create some great mangling FX as the Size is adjusted., or just cruise through the PlayFX sample in either direction!

* Note: If User Settings SubMenu Scrubbing Option (LED 5) is off, then knobs will act this way also. (pg.40/42)

The Size CV input, will change the Loop size like the knob, but also only updates once a loop is complete, so this input is best kept "low voltage" with any signal that changes rapidly, that is unless you switch to "Fine" mode!

Fine Setting:

If the sample is longer than 10 seconds, the POS/SIZE controls become fairly coarse if you're trying find a specific point in a sample (even though that knob is divided into 1000 sections). This is why there is Fine control.

*Select the Position (POS) point that you would like to be the Fine Bottom limit. The Size knob setting will set the upper limit of the Fine Size, so set that before entering into Fine mode.

*While still in PlayFX (Green LED on) tap the P.SEL button to toggle to Fine mode. POS LED will flash continually.

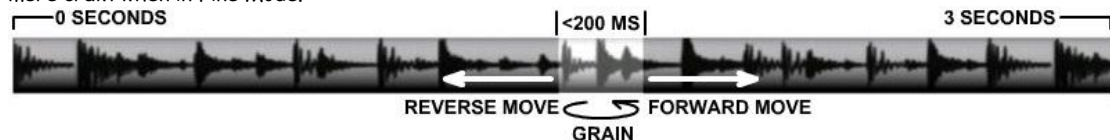
*Adjust as required, or apply CV inputs to control the parameters.

In Fine Mode, the Size CV controls the very fine Loop size, but the POS CV remains full range over the sample so it can still be accessed from one end to the other. Using the two CV's together can yield some surprising rhythms.

C. The G-Move Granulizer

The G-Move granularizer is an entirely different mode from Start/End & Position/Size. Instead of setting limits with the 2 PlayFX knobs, G-Move lives up to it's name by Moving through a sample on it's own. Because this rate of motion can remain the same, even if the Sample Rate is changed, it has the ability to pitch shift, or time shift.

In addition to this, G-Move can move forwards or backwards at up to 2 times the original sample speed, down to a mere crawl when in Fine Mode.

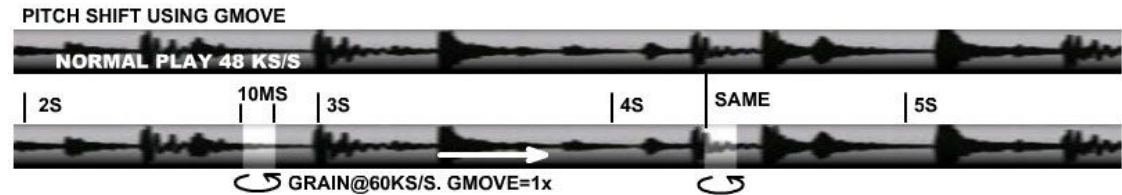


The Top Knob, GM, controls the Move rate, and the bottom knob, SIZE, controls the Grain size. Grains are simply very tiny sections of a sample that can be so short, the waveform of the sample can be singled out, which with motion through the sample can create some very odd sounds indeed!

The largest a Grain can be in size (Size knob fully clockwise) is about 1/4 second, and the finest (depending on sample Rate) can be single digit milliseconds.



G-Move can play through the sample or slice loop point seamlessly if PlayFX Loop LED (yellow) is on. If Loop LED is off, then G-Move will exit back to RP sample, or a Slice if the loop was "captured" from a Slice playing. If the Move speed is slow, this can take a while!



Pitch shifting, while not tempo locked in any way, can be a great effect to align one note to another, or just crazy up some percussion without changing the tempo with the sample rate. As the diagram above explains, the G-Move speed remains the same no matter the sample rate.

Inversely, the tempo can be increased or decreased without affecting the pitch at all, which is great for putting swing in a triggered loop by patching an LFO into the GM CV input.

Because the sample is basically being chopped up into small chunks, a smoother reproduction can be accomplished by finding the "sweet spot" in the grain Size. It changes with the type of sample (synths, percussion, vocal, etc) so there's no recommended setting. I find between 10 and 11 o'clock on the Size knob is good for most.

With lower sounds, like bass or a kick drum, a small grain size is always going to sound choppy as only part of the waveform is being played in each grain. Higher sounds, especially cymbals, are amazing in G-Move!

Freeze:

When the GM knob is centered, the blue LED will go out indicating there is no Grain motion at all, essentially "frozen" in time at whatever waveform happened to be in the grain. This can be used as a waveform selector for a de-facto wave-table synth by sequencing the Size CV input as "notes" when in "Fine" mode (see below). Panning up the Sample Rate + a bit of G-Move = A truly amazing and changeable timbre!

Using G-Move:

- *Use the P.SEL button to select the GM LED (blue) if not already there
- *The Play LOOP LED state has no affect on G-Move, but will exit G-Move if turned off (fast exit!)
- *Adjust the GM (top) knob just right of center, and the End knob about halfway
- *Get a RP sample playing (something with a beat is best) to capture a PlayFX from.
- *Press the PLAY button to enter PlayFX G-Move

Try turning GM knob more to the right, then over to the left.

Try changing the sample Rate up and down. You may notice the sound disappears if the Rate is too low? This is because G-Move is time based, and the loop time is too short to accommodate the Grain at that rate.

Fine G-Moving:

When the G-Move PlayFX, tap on P.SEL button to toggle into Fine mode. The GM knob becomes half speed, so about the original speed of the sample, and the Size knob becomes 1/8. This allows for a less steppy slide down to grain sizes of 1 or 2 milliseconds. Try CV'ing the SIZE in fine! It's not 1V/octave, but similar to a F/V oscillator.

A Note on Gating PlayFX:

It is mentioned elsewhere in the manual, but it's appropriate to mention PlayFX gating action here as well! If PlayFX T/F/G is set to Gate, the PLAY T/G input will start PlayFX whenever there is a High (>.7V) on the input, then stop/exit PlayFX back to the RP sample playing. If PlayFX LOOP is on, the PlayFX loop will happen until low. Each Gate will "capture" from that point in the sample, so the PlayFX start point will constantly change. If the LOOP is off, then PlayFX may exit before the Gate ends, and is always the same as captured initially from a PlayFX "off" state. (Not updated) This can be thought of as "standby" as the yellow LED will flash.

Note: In G-Move, the Fine mode will be remembered as on or off when Gating it..., even after exiting PlayFX. This is so a live effect (during record) with very tight grains can be applied instantly!

D. Recording PlayFX

The Reflex has the ability to Record a PlayFX action, even if taken during Recording an RP sample! This is the way to reverse an echo, or add an effect to an echo or R/P Mode overdub.

This example will reverse an echo

*Use the P.SEL button to select the ST LED if not already there

*Make sure the Play LOOP LED is toggled on

*Adjust the Start knob all the way to the right, and the End knob all the way to the left

*Get a echo going, perhaps 3 or seconds long, to capture a PlayFX from.

*Press the PLAY button to enter PlayFX

You will now hear your echo in reverse, continually looping.

Turn off the LOOP LED and the playFX will exit, and as echo was still recording, this will now be echo'd.

**Turning LOOP LED back on will reset PlayFX so when started again, will capture this reverse echo and switch it to forward again. If the LOOP LED is left off, and PlayFX is started, it will play the earlier grabbed loop, and that single loop will "revitalize" the echo.

LOOP LED turned on when not in PlayFX always resets PlayFX so it will capture a new section of the sample playing or recording, at the point the Play button was pressed. This is good to "re-arm" PlayFX after dropping out of a Loop.

Please keep in mind that if the two sample rates are close, there may be some distortion as the two rates line up then fall out of alignment. Most of this has been filtered away, but, in the interest of keeping the Reflex's high range (above human hearing) sampling ability, filtering isn't 100% in the hearing range, and may produce undesirable artifacts at certain sample rates. Most of the time they are unnoticeable.

Recording G-Move

Because a G-Move that is moving can be captured as a slice (only a single grain will capture) Recording in Echo Mode can be used to capture a G-Move progression.

Echo Mode is constantly recording, so if you are G-Moving from an echo loop still echoing, then slices can be created manually, by SLICE trigger, or even Peak Slicing, although not recommended for use in this case.

Once the Slices are created, you might want to tap the REC button to switch echo into infinite echo, so it doesn't come around in a couple of minutes and record over your newly created slices.

This method will work for any of the PlayFX modes, but as slices can be directly created from the other 2 it's probably not a useful way to do it.

PlayFX Clock Trigger Output

If the REC T/F/C trigger input is switched to CLK, each PlayFX loop will output a trigger. This can be used to trigger other modules in sync with a PlayFX loop, or even auto-create Slices!

*Note: This function does not work with G-Move.

**To Record a Slice Sequence, you can directly hit the Record button or Slice will think you want to overdub the present slice. Just set PlayFX to Start/End with full range, which will sound exactly like the Slices playing, then hit the Record button instead.

**Remember a fresh record always starts from the beginning of memory, so if the continuing PlayFX you are recording was sourced from an area too close to the start of memory, it will be run over by the present recording active.

This can yield some interesting results (i.e. cycling), but is usually not a good thing, and will produce unpredictable sounds!

Recording with Feedback all the way down will bring in new audio to twist with the present PlayFX mods. or Slices playing.

Tip: PlayFX without any RP sample playing:

By design, PlayFX won't play if there isn't anything to capture while in any Mode, and all has been Stopped. There is a way to recover a sample for PlayFX and/or Slicing:

First Hold the SLICE button to clear all Slices, (or play a Slice with Slice LOOP off.)

Tap SLICE SEL play Slices, and tap SLICE to play the entire memory as one big Slice. This can then be captured by PlayFX, but it's a full memory size so you may want to consider creating Slices from it.

To do this, start PlayFX from the big Slice, then:

Tap SLICE SEL to exit Slice select (green LED flickers) then find a spot with the PlayFX knobs and tap SLICE to create some baby Slices from the big Slice. This works with any Slice by the way!

VI. Slicing

Slicing is probably one of the most powerful features of the Reflex LiveLoop. It can divide up a long sample into useable parts that can be more easily manipulated by PlayFX and related CV's and triggers. Myself, I couldn't imagine a sampler without slicing!

Slices can be created while recording, while echoing, while Layering, playing a loop, from a PlayFX playing, or even from other Slices (as a Slice copy function).

Slice Controls and Inputs

The controls involved with Slicing are mostly inside the white button's section, with exception to the Rate Knob, which is used to select the first 16 slices for play manually, or to add as a Slice # offset to the SL.CV input.

To Play a Slice, **SLICE SEL** must be tapped to toggle between:

P LED on: Rate Knob becomes a 16 Slice Selector

White Slice Button is tapped to play a Slice

P LED off: Rate Knob returns to controlling a sample rate.

White Slice Button is tapped to create a Slice

LOOP LED is turned on or off by holding the Loop button (not shown) for more than 1 sec.

SL.CV is a 0-5V CV input that will select a slice based on # of Slices/5 per Volt. So if there are 20 slices, then SL.CV will access them as 4 per volt. The Slice Select 1-16 can offset up to 16. If a slice is selected that is beyond the maximum Slices, then it will roll and add.

SL.PLY is a trigger input that will trigger the play of a Slice, regardless of SLICE SEL mode.

SLICE t/g is a trigger input that will create a slice on each trigger. This can be useful for making small slices that will match/sync a sequence or master clock.

It is triggered at 0.7 volts and fast, so can slice from unlikely sources, like a piezo (drum pedal) or even raw audio.

P LED indicates SLICE SEL mode, the Rate knob is a Slice Selector, and the Slice button triggers Slice Play.

R LED indicates Creation of a Slice (flash) or Slice Sequencer Record mode (sect. C. below)

RP Mode Dependency

The way a Slice is created depends on the RP Mode, and the *step* of the RP mode (record/play/echo etc)

Slices created during:

Initial Record (all modes): will start at the record point, and end at the start of the next slice created

Echo Mode: will make a Slice from point of Slicing, which will end/loop 1 echo later.

Layer Mode Playing: will make Slice from point of play, and end one Layer cycle later inside same Layer

R/P Mode: will make sequential slices (as with initial record) with each Slice button/trigger during play.

This makes R/P Mode the best method to create sequential Slices, one after the other.

**Slices can be created from a very tight echo, but will play as 1-Shot Slices. Slice LOOP can be turned off to play the Slices through, which is usually more pleasing when created from such a flowing reverb!*

PlayFX Dependency

If a Slice is created from a PlayFX (while playFX is playing) it will always start at the same point as PlayFX does when tapping the PlayFX button. It makes an exact duplicate of PlayFX making it a powerful "index" for many (up to 400!) different PlayFX sounds. In *G-Move*, only a single Grain is captured (as if it were frozen at center) but using Record can capture a full *G-Move*. See end of last section (Sect.V. page 29)

Stopping Slice Play

The only way to stop a Slice from Playing (and exit back to RP sample or PlayFX) is to hold the White Slice button for just over 1 second. The Green P LED will go out upon button release.

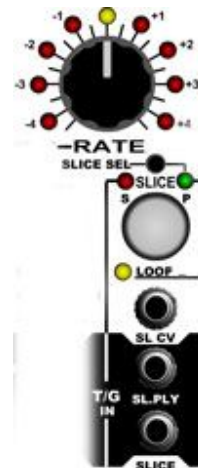
Erasing Slices

To erase all Slices, press and hold the White button for over 4 seconds. All of the LED circle will flash.

Slice Clock Trigger Output

If REC T/F/C trigger input is switched to CLK, slice loops will output a trigger pulse that can be used to sync other modules to the Reflex LiveLoop! The TRIG LED will flash to indicate a trigger output.

If in SGS (Slice Groove Sequencer) mode, a derived Clock will be output instead. See Sect. C. in this chapter.



A. Slicing Methods

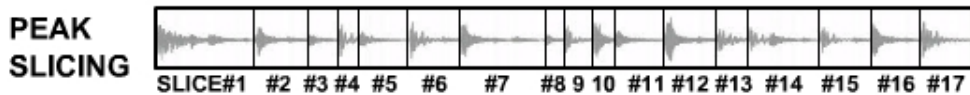
There are 4 ways that Slices are created, each yielding the same type of slices.

1) Manual Slicing

Manual slicing is manually tapping the Slice button to create a slice at a given point in the RP sample playing or recording. The Slice button always acts as a Slice button when not in SLICE SEL mode (Green P LED is off)
 As new Slices are created, the LED circle will briefly display the relative slice number from 1 to 8, then back to 1. Each cycle adds another 8 slices, but this only good to indicate the first 16 or so, or identify alignment with a sequence (if using the SLICE trigger, below)
 There is no time correction, so you must be nimble with the button! If you're not, then perhaps Peak Slicing is more in the works (below)

2) Peak Slicing

Peak Slicing is a really fun way of getting some slices banked quickly. You never know what to expect, especially if the sample isn't cut and dry percussion. Peak Slicing works/sounds best with "beaty" music, and can create super cool slices for sequencing and modifying to use in a composition.



The Peak Slicing "sensor" is on the output of both channels, which gives some gain control by using the Blend knob during a "live" record Peak Slicing session. This is generally not a concern as Peak Slicing has an AGC in place.

Because the algorithm requires a small amount of time to decide whether or not to create a Slice, and there's some delay in the circuitry of course, there's a "back slice" time that can be adjusted if needed in User Settings. The best way to test the Back Slice is to use some percussive sounds, Peak Slice them, then Select a Slice, Play it, and tap PlayFX (POS/SIZE mode) to hone in right at the start with a very low Size setting. If the sound disappears, then Back Slicing needs to be adjusted a bit forward. It's too far back. Default setting is 4, (38mS). This allows attacks from most instruments not to be chopped at the start.

*Turn on PEAK Slicing by selecting it with the MODE button. The Mode LED will flip back to R/P, ECHO, or LAY after a moment.

If RP Record/Play or PlayFX is already active, then Peak slicing will start as soon as the Peak LED is on. If "All Stopped", then tapping on the Record button will "Arm" for the next Audio Peak to begin recording. This can be useful for starting a recording while away from the panel, even if you don't use the Slices!

*Turn off /end Peak Slicing by just tapping the MODE button.

*Note: Please See Section IV. D. Record Modes for some more on Peak Slicing

3) Auto-Slicing



Auto Slicing is an unobtrusive Background Slicing function that creates slices at intervals determined by the present RP Mode. These Slices will not interfere with regular Slice creation as they are invalid the moment a "real" Slice is created by one of the other methods.

Switching into SLICE SEL and playing a Slice created by Auto-Slice (Slices not created by you) will instantly validate all Auto-Slices created since the Record button was first pressed in any Mode. At these point, you can add more Slices, or Delete all of the Slices to create your own. I find it good practice to do a Delete before creating Slices as I may have created some earlier and forgotten about them. Delete All Slices = hold Slice>4 seconds.

Auto Slices are created **-only if there's no valid slices or slices have been cleared, and a new record :*

Echo Mode: At every echo. These can be recalled up to 3 minutes later by Slice Select or trigger/CV

Layer Mode: On every Layer created except the one playing

R/P Mode: On every Record back to play action

4) Slice Trigger Input Slicing

A forth way to create a Slice is to use the SLICE trigger input. This is a preferred method when a certain size of Slice is desired, and will cut slices evenly (if the trigger is even) so they can be fully played by the same clock/trigger source without looping. * For Sequential Slices, do this during initial Record or playing in R/P mode.

Slice trigger would be capable of creating 400 tiny slices in 4 seconds (100Hz trigger) during initial record, for direct control of sample position from an LFO or other waveform generating module.

*Note: This input becomes a Slice Sequence Clock when in SGS mode. (Slice Groove Sequencer, section C.)

5) Recording over Sliced Sample ..accidental

Because of the Serendipitous nature of Modular music, it was decided to put no "overwrite" protection in the Reflex LiveLoop. It was tried and quickly bogged down the user with deletes, validations, and setting areas etc, then became very confusing. So, in a nutshell, it is possible to overwrite Slices created with new recordings.

This can be desirable if Sequencing a large number of Slices for a long period while continuing to Record as the Slices will change, get mixed into new Record, but the Sequence remains the same!

All Modes are capable of continuous Recording (except Layer won't work properly if > 1 minute 27 seconds) and R/P Mode has a feature that, when REC button is tapped after recording all day, will play the last 3 minutes of audio recorded (@48Ks/s, longer if lower Sample Rate). This can be then Sliced into manageable sizes.

*For Intentional Slice record-overs, see section E. Slice "Global Overdubbing"

B. Playing Slices

Manually Playing Slices can be accomplished by tapping SLICE SEL to toggle on the green P LED, then selecting 1 of 16 Slices with the Rate Knob.



The LED circle indicates Slice # 1-4, 5-8, then with amber/yellow LED on Slice # 9-12, 13-16 as the knob is turned. These 16 also act as a Slice # offset to the SL.CV input. Slice # offset is useful to shift a whole sequence of Slices up by 1 - 16 slices, without worrying about Voltages.

! NEW: Slices are now indicated in chunks of 16 (amber = +8) when green SLICE SEL LED is on.

Loop On/Off: If Loop is off, will play through following Slices instead of looping or stopping (1-Shot) at end of a Slice. Hold LOOP button to toggle Slice Loop on/off.

SL.CV input can be used to select Slices with the voltage/slice depending on the number of Slices. The Voltage range is 0-5V so if there are 100 slices, this would be 20 slices per volt, or with 60 slices, there'd be a match with the 1/V octave standard on a keyboard (positive side only) with 12 Slices per octave... but it's more fun just to make a bunch of Slices and play with them!

SL.PLY input will trigger a Slice to play, regardless of SLICE SEL setting or any mode.

! NEW: The White button must be held >1 second to exit unless Slice LOOP is off, which will cause a triggered Slice to Stop at it's loop point, then exit to RP sample playing. If RP play has been stopped, then exits to silence. This new feature allows for 1-shot Slice playing.

*Note: 1-Shot only works with a triggered Slice, not the button, which intuitively plays through when LOOP is off.

PlayFX will work inside of a Slice, but also will update to a new Slice selected!

This allows a single PlayFX effect to be applied to all Slices as they play in a non-destructive way. This only works if PlayFX is applied once any Slice is playing as a "Slice First" status. If a PlayFX (from an RP sample) is already active when a Slice is played, the Slice play will "run over" the PlayFX and no PlayFX will be applied to it.

Changing the Sample Rate of Slices

When a Slice is Playing, or many are being Sequenced, the base (global slice) sample rate can be changed, shifting them all up or down with the Rate knob.

If SLICE SEL is on (green P LED) then tap the SLICE SEL button to exit Slice Select (the Slice or Slice Sequence will still play) to return to Rate control.

A pair of LEDs will flicker 4 times to indicate which way to adjust the Rate control to match the present sample rate of the slices. If you move towards the flicker, nothing will change until you pass the present sample rate.

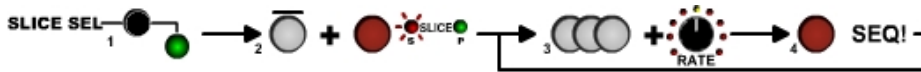
If you move away from the flicker, then the Rate will quickly slide up to the present Rate knob position.

This only changes the base Slice sample Rate, not the actual Slices individually. To do that skip down to sect.D Slice Modifications using PlayFX.

The Rate CV input will happily globally change the Slice Sample Rate at any time a Slice is playing!

C. Slice "Groove" (Automation) Sequencer (SGS)

A great stand-alone feature on the Reflex LiveLoop is the Slice Sequencer!
 The Slice Sequencer is what it sounds like, a built-in sequencer to sequence through Slices. Up to 200 steps can be programmed as easily as tapping the Slice button, and it's time-based, so can be extremely long if desired.
 On top of this, Slice Sequencer can be programmed by a real sequencer via the SL.CV and SL.PLY jacks, and play through the sequence while the "real" sequencer is changed to a new sequence for instantly recording once ready to switch sequences!



Getting into Slice Sequencer is easy:

- Assuming you have some Slices created, tap SLICE SEL to get into Slice Select mode (Green P LED)
 - *Tap the REC button while holding the White Slice button and you're in! (Don't hold too long! > 3secs = erase all)
 - *The red Slice R LED will illuminate indicating Slice Sequencer is armed and ready to record your taps.
 - *When ready, start tapping the White Slice button while turning the Rate knob to select different Slices.
 - *When done, tap the REC button to switch to Slice Sequence Play to play your SGS sequence.
- You will now be hearing the sequence you tapped in! Try a different one by tapping it in with the White button, then hit REC to end it.
 You may have noticed it's best to tap the REC at the end on the down beat for the start of the sequence, which keeps it in line, and can be seamless once you get good at it.

As mentioned above, Slice Sequencer can also be used with a real sequencer, or any trigger & CV combination. Patching into SL.CV and SL.PLY jacks will start the sequence recording when you tap the White button, and switch to play the sequence on tapping the REC button.

*To exit SGS, just hold the SLICE button > 1 second. This will also exit PlayFX and Slice Select Rate Knob mode. PlayFX can also be applied to the Sequence as it is playing, as well as Sample Rate changes and Rate CV input.

Slice Sequencer Clock Trigger Output

Please note that hand-made SGS is not synced to incoming clock because it has its own time base, but if REC T/F/C is switched to CLK, a derived clock is output as a trigger to control other Modules in your arsenal!
 This Clock is based on your ClockDiv setting /4 at a range of 60-120BPM. i.e. 16/4 = 4 clocks/beat.

SGS Clocked Sequencing Mode

New for V1.03A is the SGS's ability to record a clocked sequence (from a sequencer, or trigger/gate sources, LFO etc) with quantized switching from recording to playing the Slice Groove Sequence.

This requires 3 patches:

A CV signal: To select Slices in Sequence (offset by the Rate Knob in Slice Select mode)

A Trig/Gate: To Play the Slices being selected

A Clock: To step through the sequence. ** Do not patch this until already in SGS Mode (above) or will make slices!*

There is a quantization that is based on your ClockDiv setting (see page 41) usually /8 or /16.

If you tap SLICE to record a SGS sequence, then recording won't actually start until the count is on the Nth clock, making sync simple!

To align (if desired) to Step 1 on your sequencer, tap SLICE to begin a recording, then tap again just before Step 1 to reset.

Once SGS has been clocked, it will always require a clock (until reset/exited), but not the CV and T/G used to sequence the "notes".

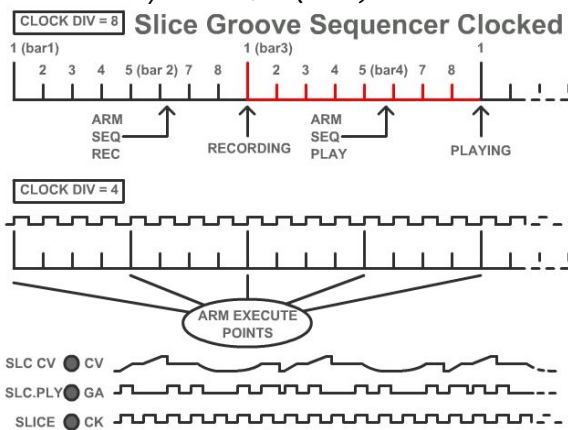
If SLICE clock is removed/stopped for longer than the 5 seconds, the SGS sequence will reset to Step 1, and wait, making it useful for a clock start, always being aligned with the rest of your gear.

Example: Enter SGS Mode by holding SLICE and tapping REC. -> patch in a CV to SL.CV -> patch in a T/G that will trigger the Slice "notes" -> patch in a clock source to make the steps of the SGS sequence.

Tap the SLICE button to start recording a SGS sequence, align to step 1 by tapping SLICE just before step 1.

Tap REC to play the SGS sequence and check where it switched to play. -> Tap SLICE to record a proper sequence, adjust Rate Knob to add offset to your CV input selecting Slices.

*Note that maximum recorded clocks = 192. See Addendums on page 50 - 51 for more on clocked SGS.



D. Slice Modifications using PlayFX

Slices already created by any method can be modified by using PlayFX. Start/End points, forward or reversed, and pitch (sample rate) can be changed per slice.

To modify a Slice follow these easy steps:

*Assuming you are in SLICE SEL mode and have a slice playing, use P.SEL to select ST LED (start/end knobs)

*Tap PlayFX to capture the Slice into PlayFX.

*Adjust the Start/End knobs to change your Slice

-Optionally switch out of SLICE SEL to change the future slice's sample rate

*To save the new Slice over the old, tap PlayFX, then immediately tap the REC button to "record" in new.

PlayFX will exit and the newly modified Slice will be playing!

If you try to modify the Slice again, it's original self will return for a new modification.

If the Slice LOOP is off, then a "giant" Slice will be captured. This is useful for lengthening a Slice.

-Note that this "undo" feature will not work if there are more than 200 slices, which will rarely be the case!

E. Slice OverDubbing / Global Overdubbing

An added feature to Slices is the ability to overdub into, or completely erase it in lieu of another clip of audio. Slice overDubbing actually records into the sample at the Slice point so is destructive to the original sample and any slices using it. For this reason it's best to overDub into slices that were created during an initial record, or that have been created sparsely during a running record like Echo Mode with Auto-Slice.

This feature can be used to "grungify" a Slice or mix into a Slice, or replace it all together.

*Slice overdubbing is easy: Set the Feedback control up so you don't lose the Slice too quickly.

*Play a Slice, then tap REC button to record into it, then tap REC again to exit recording.

Notice how similar it is to echo, albeit not as clean sounding? Try switching out of SLICE SEL so the Rate can be changed. Because the play and record rates are now different in the same space, some wild/bad FX can happen!

Note: Slice over dubbing will not work if the Slice Rate is > Max sample Rate (center). Slow it down first.

Global Overdubbing: (New!)

If there is a sequence (via trigger input to SL.PLY or SGS) of Slices playing, you can't very well use Slice Overdubbing right? That is why Global Overdubbing exists (as of V1.04a)

The range of the Slices, lowest to highest, is used to set the Record head's limits when the REC button is tapped. Record will continually update the Slices with new audio, or a mix which can get really busy, providing the same sequence but with all different sounding Slices.

This feature is more of a fun way to create some great background mix (especially if feeding a reverb) and shouldn't be taken too seriously! Just keep in mind PlayFX can be used on sequencing Slices too, which gives us some interesting possibilities.

F. Slice Remove

Sometimes there's a rogue/dead Slice (perhaps created by Peak Slicer) in your otherwise wonderful collection! Removing that Slice is simple:

Play the Slice as usual, then set both PlayFX knobs all the way to the left and tap PlayFX then tap REC* button. Gone! All of the Slices will move down one to fill the gap. *The REC button should be tapped within 1 second.

G. Slices & Memory Delete

As mentioned above in the Slice section, deleting all Slices can be accomplished by holding the White Slice button for about 4 seconds. The LED circle will light to confirm they are deleted.

Even though as of V1.04a, Slices are erased on any new Record (after stopped), generally it's good practice to do this before creating any Slices if you've been using the Reflex for a while as you may have created Slices, or validated an Auto-Slice. This will start a new Auto-Slicing when Record starts.

Old Samples

Once all Slices are deleted, if you try playing a Slice, the whole RP memory will play from the beginning. This can be useful for listening to old samples that are no longer accessible, or, using playFX to create new Slices from old memory! At the entry there is only one Slice, the whole memory.

*Make sure yellow Slice LOOP LED is on.

*Play the Slice, then select PlayFX P.SEL ST (Start/End) or POS (Position/Size) to use for editing

*Scan across the memory to find window you'd like for a Slice. Tap PlayFX to hear how it will sound

*Switch SLICE SEL out of Slice Select (green P LED off) so following White button taps will create Slices.

*Create a Slice by tapping the White Slice button.

At this point you can window around the memory for more Slice-able material. Once you exit PlayFX though, there's no going back. The "null" Slice that was originally played will have been written over so is only accessible by deleting all of the Slices again!

This isn't much of a feature, but sometimes it's interesting to listen to the memory stacked with all sorts of previous samples and recorded PlayFX etc.!

Memory Erase

On rare occasions, you may want to initialize and delete the entire sample memory to have a clean slate. For example, the new POS/SIZE PlayFX no longer "scrunches" into the loop end, it can play over the loop limit. If in echo this isn't an issue, but in R/P mode and even Layer Mode it's possible to run into "old" recordings, or just dead (unrecorded) space.

To erase the entire memory, press and hold the SLICE button and the REC button together. All of the LED circle will light as when erasing Slices, but for about 2 seconds.

Make sure there's no (or little) audio coming into the AC inputs at this time as a sample of the ADC is taken and duplicated through the whole memory, creating an offset voltage if there's anything other than 0 volts on the input. This method had to be used to ensure upward compatibility with the proposed Expander module (ReFlExp1), which has DC sampling for a 2 channel CV recorder built in.

PlayFX with Slice Play Triggering (new for V.1.03)

A very recent addition is the handling of PlayFX on a Slice that is being played via a trigger (SL.PLY) If the Slices are being played with a trigger (or in an SGS sequence) and PLAY button is tapped, then PlayFX will wait for the next trigger. This allows good synchronization with the incoming triggers.

A tap on the PlayFX button will "Arm" PlayFX for the next triggered Slice Play. That Slice will be played with the PlayFX applied to it at the SL.PLY trigger point.

This is great for reversing a single Slice, or truncating it to a shorter length just once, or continuously.

Assuming Slice LOOP = on:

Loop Slices (Non-1-Shot -created from PlayFX, Echo, or Layer in progress):

-If PlayFX LOOP is off, PlayFX will exit to present Slice and start playing it. This can be useful for creating "doubles" of a slice within the trigger time, or half reversing into a forward playing slice (nice effect!)

If the next trigger happens before PlayFX ends/exits, PlayFX will be applied to this Slice, and won't exit.

-If PlayFX LOOP is on, PlayFX will begin on Slice trigger, but then continue until either LOOP is turned off, or the PLAY button is held. This looping will change and start with each new Slice triggered, which is great for tiny loops that change with each Slice.

** If playing Peak Sliced Slices, it may be necessary to move the PlayFX Start or Position slightly up to hear the very beginning. This of course depends on your BackSlice setting and sample.

1-Shot Slices (created from Record or R/P Play)

-If PlayFX LOOP is off, PlayFX will exit when done,

but will get the present Slice and start playing it. As mentioned above, this can be a useful effect, especially if reversing and using a trigger on the PLAY input.

-If PlayFX LOOP is on, PlayFX will just stop when done, and exit to RP sample play, or silence if there is no RP sample playing. This acts the same way as just playing a 1-shot Slice, except with a PlayFX on it.

*G-Move will not exit this way and needs to be manually stopped, or Gated (PLAY T/F/G set to G) off.

PlayFX can be applied to a Slice about to play by the same trigger as the Slice (SL.PLY) or another trigger so only certain Slices are PlayFX'ed. This makes sequencing 1-shot Slices extremely flexible.

Because PlayFX with PlayFX LOOP off exits then plays the Slice after exiting, it will also play any Slice that is being selected, while playing the Same Slice that was last played with SLICE button or SL.PLY trigger.

Assuming Slice LOOP = off:

Everything above applies when the Slices are set to Play-through, meaning 1-Shot Slices don't stop at the end of the Slice, and Looping Slices don't loop at their end points.

Using PlayFX with Slice LOOP off captures the whole remaining Slice area to use in PlayFX. While this can be useful for Modifying a Slice to a larger size, or completely different area of the sample, it can be confusing to use when in PlayFX Start/End and the knobs are set so it plays in reverse. If set to the extremes, the reverse play will always start from the same spot, the highest Slice in memory. If set mid-way, then there will be variation depending on the position the Slice is in relative to the highest Slice.

In reverse, you'll find the Start/End knobs will be mostly CCW, at which point you can switch to Fine PlayFX to set the range. In a Slice Sequence, it's a nifty switch from Slice LOOP on to Slice LOOP off, but totally unpredictable! Adding a LFO to PlayFX Start input (or End) with PlayFX LOOP on can nicely cycle forward/reverse while still sequencing. As to whether it sounds good depends on your samples/slices.

VII. Other Modes/Features

A. EQ (Equalizer)

The Reflex LiveLoop has been equipped with a 3 band stereo EQ (actually 2 EQ's) that can be used to tailor feedback and output audio. It is in 1dB steps with +/-15dB on each side so is pretty touchy in the Feedback area! You'll find that you'll be mostly attenuating the 3 bands rather than turning them up.

Controls

The EQ control is basically an attenuator for the EQ CV, but is normalized to +5V when not patched. The 3 LEDs, LO, MID, and HI are the band indicators. Each band can be selected with the Black EQ button in the sequence LO-MID-HI-ALL-OFF/BLEND, and will be under CV control.

The OFF position controls the BLEND control as a takeover to CV control panning from the AC in audio to the Sampler out audio.

All of the EQ bands together, and Blend control can act as an envelope, and even though the resolution is 20mS, does a nice job!

Centering the EQ

For unmodified Feedback and sample play, it's important that the EQ be centered. Turn the knob toward zero until the Band LED(s) flicker off momentarily. At this point the EQ is centered. A 0V CV patched in will also center the EQ no matter where the knob is...except if the input is switched to uni-polar mode (below)

Unipolar input

The attenuator is designed to operate over +/- 15dB with +/-5V patched into the EQ CV input when at full, but if you want to use as an envelope, 0-5V giving response over the full -15dB to +15dB might be better.

By holding the EQ button for > 1 second, the bi-polar/uni-polar modes will toggle. Now, if not patched, the EQ knob acts as a unipolar knob on each half, and a CV input will give the full 30dB range.

The Blend control acts in a slightly different way in unipolar mode, see below.

Note that there is no visual indicator for this.

EQ vs. Feedback

The EQ can be subtly used to offset the feedback control, i.e. add 1 or 2 dB on all bands, but reduce the gain of the feedback. This will give you the ability to jump up the feedback quickly to far above 100% if desired.

*There are 4 MID band settings. See Sect. IX.A. "Settings" to permanently change the MID band frequency.

Blend CV Control

The Blend CV (if enabled, Option LED 3, default is on. See pg.40) is selected by All EQ LEDs off. This takes over the Blend knob, which becomes inactive until an EQ band is again selected. The EQ knob will act as the Blend knob when in bipolar mode with the same direction of turn.

In Bipolar mode

0 volts to +5 volts fades the raw (input) audio leaving the sampler audio, while 0 volts to -5 volts fades the sampler audio leaving the raw audio.

In Unipolar mode

With EQ knob on (+) side, 0 volts to +5 volts brings up the sampler audio with the raw audio remaining, with EQ knob on (-) side, 0 volts to +5 volts brings up the raw audio with the sampler audio remaining (less used).

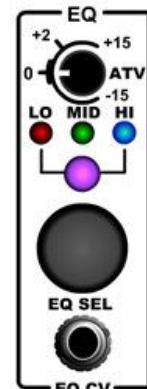
*The first unipolar setting will be the most used as it allows envelope controlled spurts of sampler audio to be mixed with through audio.

NEW! EQ "Pass Lock"

As of V.1.01G there is an option (User Settings Submenu LED 7, default=on) that will lock a band when focus is selected to another band. Normally (prior) the bands would hold the last knob/CV position, but would sometimes change unexpectedly if the knob is in a different position than it was before. This can be disastrous during a tight Echo with the feedback all the way up!

EQ Pass Lock won't allow a band's setting to change until it's previous value is met and passed by the new setting. For example, the LOW band is turned right down to get a crisp string of echos, but the EQ button was set to adjust the HI band up some. After 3 taps on the EQ button, selection is focused on LOW, but the knob is still above 0dB a ways. Before this option, any movement on that EQ knob or CV would bring the LOW band right up to where the knob is. For that reason you had to be quick!

Now, the EQ knob/CV must be lowered to capture the previous position, then can be gently adjusted to the new position. This seems ideal, but can be a bit confusing if you can't remember where the setting was. The RGB LED will show a colored / dimmed reference R=LOW, G=MID, B=HI. The lower the setting, the dimmer it will be.



B. Stutter

Stutter is not a new idea to me, I discovered it way back in the '80's after building my very first sampler. A rather large and power heavy TTL driven beast with a whopping 3 seconds of sampling time was going into a Yamaha CS-10 synth and I accidentally shorted an address pin with some wire. The sound that resulted was amazing in the day! I'd never heard anything quite like it, so implemented a bunch of toggle switches to further explore this.

Happily, this can be done in software in the Reflex, and was going to be implemented in the expansion module. Once the PlayFX "Fine" mode was changed to inside toggle control, I saw no reason not to use the now free "hold" on the P.SEL button.

-To turn on Stutter, simply hold the P.SEL button > 1 second, and the 2 red PlayFX LEDs will light.

-To adjust Stutter on either AC out channel, turn the ST knob (R) and the END knob (L). fully CCW is off.

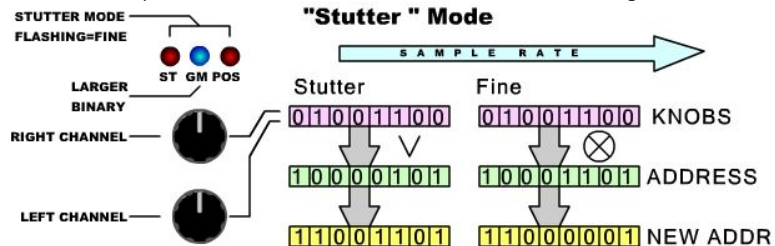
Stutter is a "try and listen" type of mode, but it may be of some benefit to understand what it is doing:

A binary number produced by the knobs is laid onto the sampler's pointer in memory. This will cause some locations to repeat, depending on what the binary weight is, large or small loops will occur.

Because the knobs can select many combinations of 1's & 0's

there may be big loops, with little loops beside them, or loops within loops.

As you turn the knobs you may have noticed the GM blue LED flashing. This indicates larger loops that have no small loops inside, which becomes a pure stutter on a slower scale. If the two knobs are set on "blues" but at different positions, you get a fancy stereo stutter, even from a mono input (normalized to left input)



Drone:

After a while you may notice multiplications of the same note. At full sample rate this will primarily be 100Hz, or F# on a musical scale. The reason for this is the tiny loops in some control positions will create their own waveform from your sample. Varying the Rate to the key of the piece you are working with is one way of dealing with this. Because the Rate CV is 1v/octave, it can also be moved around and Stutter can follow what the rest of your rack is doing. It opens up a lot of possibilities!

Fine Mode:

Stutter also has a "Fine" mode, which to be honest, sounds nothing like normal mode.

-Tap P.SEL to toggle fine mode. Settings in course mode will remain active, so if you don't want them, CCW knobs. In fine mode the pointer's lowest bits are being XOR'ed with your adjustment on the knobs. This creates tiny loops that will make aliasing, harmonics, and distortion/rumble. This mode is great for percussion, but has surprising twists with synth sounds and anything triangular. During Echo, slices can be created to save these sounds if desired, as they are still being recorded. (Remember to pause echo or stop before playing slices!)

CV Control:

As if Stutter wasn't already exciting enough! The knobs can be CV controlled with the knobs as an offset. If the Knob+CV > 5V, then it'll roll around to the start. When in Fine mode, the coarse stutter values remain, and when in coarse mode, the fine values remain. An LFO on Fine mode is fun. Be warned, this can be a chaotic time!

Running Off Sample:

At times, the Stutter may be larger than the echo (for echo times < half a second) so will stutter over blank memory space, or old samples, that the echo hasn't recorded over yet. I could have added a routine to stop this from happening, but it's something to explore for the bold!

Rule of thumb: If doing very tight echo's (Karplus) stick to Stutter Fine Mode, which is "fine" ;)

Keeping the coarse Stutter settings low (< 9 o'clock) can generally defeat this in reverb speed echos.

Tips:

If you are using two channels in a live (Echo) setting, it can be useful to leave one channel "original" with knob all the way CCW, and monkey with the other, then switch. This way there's always the original beat in "sync" so listeners won't be lost by knob tweaking antics!

Try syncing up an echo (by hand) and turn down the feedback to it's a pure delay. This allows full Stutter control at 1 "beat" (or more) behind. Trust me, it won't matter once stutter gets a hold of it!

C. RateLock

This recent addition to the Reflex allows you to quickly change from unlocked sample rate (default) to locked. Sometimes it's totally desirable to be able to shift the sample rate while echoing, recording, playing samples, but an accidental touch on the Rate knob at the wrong time can be disastrous!

- To toggle RateLock from the Settings (power-up) value or back, just hold the MODE button > 1 second.
- The LED circle will indicate by focusing towards center (locked) or away from center (unlocked)

Rate Locked Pro's:

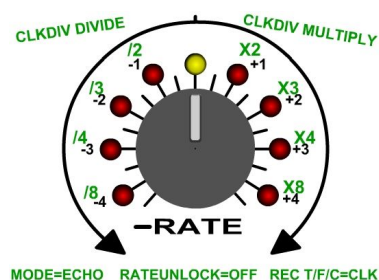
- When using Layer Mode without a Clock Sync, no worry of accidental Rate shifting
- When using Layer Mode with a Clock it will still stay in sync (Rate varies minorly to match clock)
- When using Echo Mode with a Clock, the Echo/Delay size tracks the clock without shifting the pitch (see below)
- R/P Mode's Loop Play Pitch shift clock tracking still runs normally

Rate Locked Con's:

- No 1V/Octave pitch shifting of samples
- No Rate/Pitch effects in any mode
- No G-Move pitch shifting
- Fixed maximum record time of 174.76 seconds, can't extend by lowering sample rate.

New RateLock Clock Echo feature

Like nature, I abhor a vacuum in panel functionality. When not in RateUnlock setting (rate is locked) the big Rate knob becomes useless other than when in Slice select, or making settings. There had to be a use for it!



That was how the RateLock Clock in Echo mode was born. It basically compresses or stretches the echo length to match the clock without changing the pitch.

- Select REC T/F/C to CLK and introduce a clock.
- The clock will be divided by your Clock setting (see Section VIII, pg.40)
- This ClockDiv will determine the initial length of your echo once started (Just tap REC button, the rest is automatic)
- The Rate knob can grow/shrink the echo by factors shown in diagram (Changes may not be immediate as it must stay in sync with the clock)

For example:

ClockDiv=8. Setting to /2 will echo on every 4 clocks, /4 on every 2 clocks, /8 on every clock. /3 will also echo on every 2 clocks as 3 doesn't go into 8 so is rounded off. /3 is best for ClockDiv settings of 6, 9, 12, 15 etc.

ClockDiv=16. Setting to X2 will set echo on every 32 clocks, X3 on every 48, X4 on every 64, or X8 on every 128! While 128 clocks seems extreme, it's handy to have if the clocks are fast 32nd notes.

CV Control

The Rate CV can be used to select the 9 divides and multiplies, which opens up a whole new realm of possibilities! The Rate knob acts as an offset, but there are no "stops" so will roll right around.

Tips:

- If you are echoing long delays, drones, or high feedbacks that will echo for a long time, a stable clock is best as each out of sync re-alignment will also be added into the mix and eventually chop the sample up.
- Switch to infinite echo means non-destructive clock modifications, but it's best to let infinite echo loop once first (as will still be recording a lead-in for the return) before changing clock.
- PlayFX can be used to "save" an echo by turning on it's LOOP, setting the knobs to their extremes (in ST/END or POS/SIZE) and starting it, then turn off LOOP to exit smoothly into the echo. Each time PLAY is tapped, that echo will be brought back fresh.
- The clock can run at over 100Hz for some experimental delays

D. Live Pitch Shift

This very new feature of the Reflex adds yet another "live" option to use the sampling engine. Using a pitch-shift is especially great with vocals (matching a key) or drums (changing the timbre). The Pitch-Shift mode also allows the variance of tempos without shifting the frequency i.e. sample rate. This can be used to add some "swing" to a beat, especially a snare if can be fed alone into the Reflex, by varying the Pitch-Shift delay parameter which gives it a "human" quality.

This addition simply uses the *G-Move* PlayFX mode in a different way:

- 1) Set the Rate to center, feedback all the way down, and select R/P or Echo mode
- 2) Use PSEL to select the *G-Move* PlayFX mode (blue LED)
- 3) Tap the REC button to start a record, then tap the PLAY button to start PlayFX
- 4) With audio feeding in, try adjusting the Rate control to pitch-shift the audio.

Knobs:

The bottom PlayFX knob will act as usual, setting the *G-Move* size, but the top knob will act very differently. It now controls a delay, from near zero to 1 second. The tighter the *G-Move*, the shorter the delay from "real time" will be.

Rate:

You may have noticed the Rate knob is acting differently since entering Pitch-Shift? This is because the range has been reduced to 1.25 octaves, giving better control over the useable range. The +/- 1 LEDs will indicate exactly 1 octave.

CV inputs:

- The bottom CV (END/SIZE) will control the grain size as usual, adding to the knob.
- The top CV jack (ST/GM/POS) becomes a +/- 5V offset for the top knob. This allows the delay to be moved either way from the present knob position, and is very useful for staggering delay sizes, thus adding a "swing" to the incoming audio, without shifting the sample rate at all.
- The Rate CV can shift over the 1.25 range but add on up to 5 octaves each way as usual.

Feedback on Pitch-Shifting:

Turning up the feedback will yield some bizarre/dirty arpeggio's going up/down that can totally become a sound of it's own!

*Remember, to make Slices of this, you'll need the feedback up, or you'll just record incoming audio!

Tech Stuff:

The reason the feedback sounds choppy after a few rounds is the zero-crossing in *G-Move*. Each time a grain loops, there's a 4mS "gap" in the sound. The feedback sends this audio and gap back into the sampler's input to have another gap added when that grain loops. It's unavoidable as it's either gaps or clicks (no zero-crossing). The length of a grain can't be continuously varied without artifacts, so there's no matching the wave form "edges". In a large DSP system (computer, ARM DSP) these bridges are averaged, or "faked" to add smoothness, leaving an unauthentic blur of sound if fed back upon itself. It's just the nature of audio.

Exiting Live Pitch-Shifting:

As this mode only works during an initial Record, continuing as a normal *G-Move* over the long sample recorded can be accomplished by holding the REC button to stop it, or tapping REC to play/echo.

This can allow some reversing over the last recorded sample with *G-Move*.

*The proper way to exit though is to hold the PLAY button or turn off the PlayFX LOOP LED

VIII. Operation

To fully enjoy your Reflex LiveLoop, here's some deeper explanations of how best to control and set things.

A. Knobs

None of the Reflex LiveLoop knobs are purely analog so can change with the function or mode that is enabled at the time. The PlayFX knobs have 6 different modes, but the Rate knob has 7! Fortunately, the Blend and feedback knobs are always Blend and Feedback.

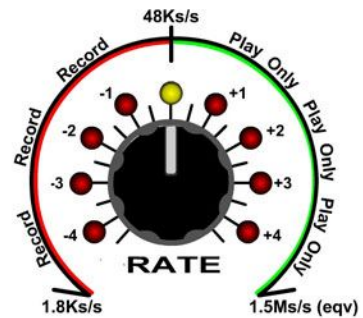
Rate Knob & Rate Attenuvertor

The Rate knob, by default, controls the Sample Rate on it's own. During Sample play the range is -4.9 octaves to +4.9 octaves, which is a massive range, almost 10 octaves. Play will track this truly on the low (left) side, and by smoothly skipping samples on the high (right) up to equiv. 1.5Ms/s.

When the Rate knob is centered, the Amber/Yellow LED and the two either side of it will light, indicating the knob is centered.

The range at and below this point can be used to set the Sample Rate for recording.

When adjusting the Rate knob, a new LED will illuminate as an octave point is crossed. This is fairly accurate and is reliable as an offset value for Rate CV in at 1V/oct over the range.



Rate Sensitivity

Because the Rate knob has such a wide range, it can be quite sensitive for pitch sensitive applications. That is why there is a User Setting to reduce the range to +/- 1.2 Octaves if preferred. This is a permanent setting, which means it will be remembered at next power up. This does not affect the Rate CV range at all (+/- 5 octaves) except you won't be able to offset it with the Rate knob as much.

Rate Return

As the Rate control is used for Setting other modes and functions (such as Slice selection, Clock division, other Rates) it has a "return to rate" override.

For example, let's say you were using the Rate knob to select a Slice, then exited Slice sel to set the global sample rate of slices playing. Instead of the Rate abruptly jumping to where the knob is now (unlikely in the right spot) there is a "pass or slide" condition. This is indicated by a pair of LED's in the LED circle flickering 4 times, which shows the direction the knob needs to move in order to pick up control.

If you move the Rate knob away from this direction, the Reflex assumes you want to set to a new sample rate far from the present rate and slides smoothly/quickly up to that position. This avoids any abrupt changes and sounds rather intentional!

A desired sample Rate that is between the original rate and the present knob position can be obtained by moving towards the "flicker" direction, but once the knob is over the proposed rate, just move slightly away from the flicker.

Blend Knob

The Blend knob is probably the simplest knob on the Reflex. It acts as a cross-fader between the incoming audio, and the sampler output audio. It can be used to mute a preparation also, if you have a headphone monitor/amp plugged into the FX feedback Send jack. (Headphones direct will pull down the feedback, but can be used) The EQ CV (when selected to all LED's off) can takeover control of the Blend knob.

Feedback Knob

The Feedback knob controls how much of the Sampler's output gets mixed back into the input. As it is a different entity than the actual AC outputs, it will work the same way regardless of Blend control's setting.

By default, the Feedback gain is factory set at just over 100% with the EQ flat and an Echo/delay time of 10mS. As Sample Rates change, the dynamics of Feedback will vary, i.e.

A really tight echo (Karplus range) will run away at the same setting and echo will happily fade into oblivion over time. This is because the tight echo audio will begin to pile up upon itself and create a much louder/stronger signal, that is then re-sampled and so-on.

If you really must, the Feedback limit can be changed. But warning: It's very touchy! See sect. IX.A. "Settings"

PlayFX knobs

The PlayFX knobs are covered well in the PlayFX section of this manual, but a couple of good practices will make your sampling experience run much smoother!

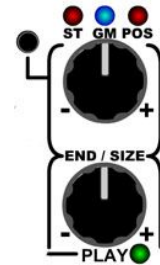
1) Always set the top PlayFX knob (ST/GM/POS) to the extreme left, so when started, a PlayFX sample will start from the point it was captured, offering a smooth transition. If standing by in G-Move mode (blue LED), right of center is best.

2) Always set the bottom (END/SIZE) PlayFX knob up some.

One reason for this is the bottom setting in all 3 PlayFX modes almost always results in silence or a buzz, as was intended, but a real performance killer.

Another reason is if you're about to edit a Slice and both knobs are at zero, then you hit record immediately after entering PlayFX, you will delete that slice.

It has happened to me believe it or not!



Stutter Mode:

The PlayFX knobs are used by Stutter mode. The Top knob controls Right Stutter, while the bottom, Left. This applies for Fine Stutter mode as well.

-When not in a PlayFX these knobs become immediately active, so set them both fully down for a smoother start.

-When inside a PlayFX and entering Stutter mode, the knobs don't become active until set fully down first.

The accompanying CV's will both control Stutter mode as the knobs do, but if the CV + knob is greater than the knob range, the resulting Stutter setting will "roll" around to a lower setting, instead of piling at one end.

Pitch-Shift Entry

The PlayFX knob ST/GM/POS changes when in Pitch-Shift mode (G-Move +REC only). Instead of controlling the tracking speed/direction G-Move grains through a sample, it becomes a delay control for near zero to 1 second.

The accompanying CV (ST/GM/POS) acts in a bipolar (+/- 5V) fashion, offsetting the knob's setting.

The END/SIZE CV input acts as usual in G-Move and G-Move Fine modes.

B. Clocking and Syncing

One of the most recent developments in the evolution of the Reflex LiveLoop is the Clock input/output. When using it as an input, an incoming clock will take over the sample Rate control in all 3 modes. The way clock affects the Rate in each of the modes is different.

Also, there is the option to Clock/sync a sample already created and playing, or sync/clock right from the beginning of Record. There is a built-in clock divider, with a ratio of 1:1 to 16:1, "1" being the full sample time, that can be set permanently and will be remembered on power-up.

! *Note that this section assumes rateUnlock=ON (Rate is not locked)*

**See Sect. VII.C for more on RateLock Clocking with Echo Mode.*

Arming Record for clock

When in clock mode, tapping the REC button will "Arm" record for the first clock, at which point it will begin. What happens on the next Clock cycle is somewhat different in every Mode.

Setting Clock Divider (ClockDiv)

The Clock divider factor is what dictates how long a sample can be vs. the number of clocks that pass before it loops. The faster the Clock rate, the faster the sample rate. In most cases, higher clock divisions are better, because the clock source is probably going to be a sequencer or other that is stepping through a sequence and doing multiple changes on each cycle of several clocks.

To set the Clock Divider, press and hold the REC T/F/C button for > 1 second. All of the LED circle will flash. As a safety, the present Clock is shown (1 - 8, Amber/Yellow on = + 8), and you need to dial past it to capture the LED and change it to the new setting. Tap the REC T/F/C button again to exit and save. By default, the REC T/F/C selection will now be CLK, but exit that by selecting TRIG for the next step.

Entering Clock Mode

Before entering clock mode, make sure the Sample Rate is set for what you plan to do. Here's a checklist:

*If in Echo Mode, are you going to want to speed up the clock while echoing? If so, set the Sample Rate down some.

*If in Layer Mode, set the Sample Rate to center (SW detent) as it won't vary much with Layer anyway.

*If in R/P Mode, again, if you plan to increase the clock rate, set the Sample Rate down some.

Once the Rate has been set, re-enter CLK mode by selecting with the REC T/F/C button.

[Echo Mode Clocking]

Echo Mode is the most Clock friendly, and responds quickly to a changing clock rate. When in Infinite Echo, fast changing clock rates will continually re-align the start of the echo on each Division, keeping in sync.

If Using Clock to do a Sync Start:

Tap REC to start record on the next Clock and let the Clock cycle take over setting the echo size.

If there is already an echo in progress, you can

a) Make sure the clock patch you are plugging in won't surpass the maximum sample Rate

b) Switch Echo to Infinite Echo first, which will instantly align echo to the first clock pulse

After the initial entry into Clocking, all actions on the record button won't take place until a clock cycle passes.

[R/P Mode Clocking]

When in R/P Mode, the Reflex will attempt to fit the whole sample playing into the Clock/Div time. If recording a punch-in or overdub, be careful not to append the end of the Loop or it will be chopped off.

If Using Clock to do a Sync Start:

Tap REC to start record on the next Clock and let the Clock cycle take over setting the R/P Loop

If there is already an R/P play in progress, the start of the R/P sample will align to the first clock pulse

[Layer Mode Clocking]

Layer Mode is fairly different than the other two modes in that it needs to remain in tune and stable yet keep alignment without noticeable shifts in the Rate. Layer assumes you are using an acoustic instrument or hand performing in some way, making good intonation necessary.

For this reason, the clock in Layer Mode shouldn't change much, and the clock count must match the initial Layer size or the Reflex will attempt to fit 2 Layers into one clock cycle, effectively doubling the speed.

For example, if the Clock Div is set to 16:1, and the clocks are on every 1/4 note of a 4/4, then the initial Layer can be 4 bars long. Once the first Layer has been recorded, the next Layer can bridge 2 loops and become 8 bars long if desired. All Layer operations should be handled under clock control, so arm/start record with a clock start.

Before entering Clock T/F/C in Layer mode, make sure Rate is centered, then plug in your clock signal.

Note: For Sample Rate stability in all modes, a stable Clock is an asset, but then maybe we don't want stability!

C. CV / Trigger Inputs

All CV inputs respond to maximum +5Volts, but will handle up to +/-10V.

CV inputs that are bi-polar are Rate CV and EQ CV, while the uni-polar CV inputs are Slice Select (SL CV), ST/GM/POS CV, and END/SIZE CV inputs.

While the CV inputs aren't frequency limited, they do have an upper timing limit of 200Hz on the processor side. This doesn't mean that a Rate modulation of 500Hz wouldn't be "seen", it's a guaranteed timing. Give it a try!

The Trigger/Gate inputs are filtered, but still capable of 100Hz reliably, but can respond up to 250Hz or as high as 400Hz if the trigger pulse width is < 100uS. (This is for PlayFX in Trigger mode. Slice Play trigger = max 100Hz) Slices can be created at 100Hz, so it'd take 4 seconds to completely fill the slice memory with tiny slices.

*Minimum trigger input voltage is .7 volts.

The PlayFX/Slice Loop CLK pulse output has an impedance of 1K and is 5V for about 2 mS.

D. Limits, Limitations, and Modular Serendipity

While the Reflex LiveLoop has been designed and engineered with care and the utmost of my abilities, there is still a lot that is left to chance! I like to call this serendipitous surprise!

The Reflex is not a polished and predictable beast, as most things in the modular world are not, but care and attention has gone into the way samples sound and interact when used in the various modes, both with predictable use and unpredictable mayhem.

Some of the limitations you may have noticed while reading this manual were left intentionally, others were, and still are beyond my control. That is what gives the Reflex a personality and certain "feel".

I'm going to be honest and list all of the Reflex's limitations here:

Limitation #1: Record handling

The way recording has no stops or boundaries may be annoying to some, the fact that a Slice can be over-written by a record gone rogue (left going), while others see it as a blessing.

Limitation #2: Slices limited to 400 instead of the original 500. To be honest, they were eating up too much memory that was used to create some of the more advanced features, like the Slice sequencer

Limitation #3: Slice Sequencer limited to 200 steps, and 200 slices, see above. If there are more than 200 slices and you start the Slice Sequencer, some of your slices (namely the ones above 200) will disappear, mostly.

Limitation #4: Inability to split the two channels into 2 separate samplers. The Reflex has this capability, but no easy way to toggle between the two sides on the panel, which would need to be fast. This feature is reserved for an expansion module planned for Fall 2016. (The same one as the SD Card module!)

Limitation #5: Power consumption has been hovering upwards of 200mA and without a 64mS recovery delay from a DRAM standby condition, there's not much I can do about that. 64mS is an eternity on a trigger!

Some of these and any other limitations that pop up over time will be solved in a timely fashion and posted as firmware updates. See Addendums at the end of this manual.

There is a "patches" page developing on the Reflex site at <http://www.freshnelly.com/reflex/methods.htm>

most of them dreamed up by yours truly thus far, but we'd like more added by you the user!

It's the beauty of modular, there's so many ways to trigger, patch, route, and invent new sounds, it'd be crazy to keep it under wraps.

So if you have discovered an amazing patch, don't hesitate to PM me on Muff Wiggler, or email me at fresh@freshnelly (A picture or two may be helpful too!) and I'll make sure it's on the Methods Page.

There's also a nice Patch Manual ever growing at <http://www.freshnelly.com/reflex/00-Reflex-Patch.pdf>

IX: Advanced Settings and Configuration

A. Settings Menu

There are some non-volatile (power down friendly) user settings that can be changed by you, but take care when inside the settings mode. If you mistakenly enter the Settings mode, dial (with the Rate knob) down to the first LED and tap SLICE SEL to exit without changing.

Entering the Settings menu

To enter into the Settings Menu, press and hold SLICE SEL for about 4 seconds, don't release when the LED circle flashes, wait another second then release. This is a "red herring" to prevent accidental entry.

Dial in the appropriate menu item to modify it's settings. Only the RED LED's are active selectors.

Red LED:	Menu Item	Indication upon entry	Selection (use rate knob) / Notes
LED # 1 (-4)	Exit Settings with no save	n/a	
LED # 2 (-3)	Set MIDrange Band	4 Lower LEDs Flash	Select LED#1 to 4 to set band to 1: 500Hz, 2: 1KHz, 3:1.5KHz, 4: 2.5KHz
LED # 3 (-2)	Set Rate Knob Width	2 bottom LEDs, or 2 top LEDs	Select the two top LEDs for narrow, or bottom LEDs for <u>normal (+/-5 octaves)</u>
LED # 4 (-1)	Set Peak BackSlice Time	Bar of LEDs from right side of circle	Adjust left for more Peak Slice advance, Right for less. <u>Default = LED #4</u>
LED # 5 (+1)	LED Brightness	All LED's will change in brightness	Adjust left to right for Brightness
LED # 6 (+2)	User Options SubMenu (see below)	Top 6 LED's in Circle	Select an Option LED 1-8 to modify and tap SLICE SEL again to enter it.
LED # 7 (+3)	Auto Calibrate Feed back (May need 2 or 3 tries)	Flashes, LEDs may chase around	Remove AC inputs & flatten EQ to center before entering this menu. Will take about 2 minutes, Amber center lights when done
LED # 8 (+4)	Manual Calibrate Feedback	Flashes, immediate jump to set levels	Before entering Settings Menu, Turn Rate to bottom and double click REC to start a fast echo. Turn Rate to Max. Center EQ. & turn down feedback some. Once HERE, use ST (top PlayFX knob) to select Left and Right Channels. Adjust Feedback to set how you would like top position (100%) of feedback knob to be.

*Defaults are underlined

Tap SLICE SEL to Save and Exit Settings Menu. If you are in SubMenu (LED 6) then select from table below

Options SubMenu (from LED 6)

Select (oct)	Option	Description
LED # 1 (-4)	Set Output Level	On=100% Modular Level appx 10Vp-p, Off=Line Level
LED # 2 (-3)	Zero-crossing and Mute smoothing	On=Normal, Off=Fast & tight (coarser sounding samples when looping tight, shorter G-Move ZC)
LED # 3 (-2)	Blend CV (On EQ Button All LEDs off)	On enables CV control of Blend (see EQ section)
LED # 4 (-1)	Triggered Slice Stop When LOOP off	ON enables this feature. Allows triggered Slices to 1-shot and return to RP sample or silence
LED # 5 (+1)	PlayFX Scrubbing	ON: Will scrub as Start or Position knob is adjusted. See PlayFX Modes and Addendum Below
LED # 6 (+2)	FootSwitch Type	ON: Normally open (default), OFF: Normally Closed
LED # 7 (+3)	EQ pass-active takeover	On: EQ bands must be adjusted past the previous settings to takeover. Off: instantly updates
LED # 8 (+4)	Sample Rate UnLock (Variable)	On: Default, Variable Sample Rates. Off: Locks Sample Rate to 48Ks/s, disables Rate CV input.

* Once an on/off state has been selected, don't forget to tap SLICE SEL to save it!

B. Expansion Port

You may have notice the large 30 pin box header mounted to the digital board? This is the future expansion port. While still in the decision stage, a planned expansion is for a flash memory expansion board, and in the future an SD Card I/O and MIDI I/O, along with CV recorder I/O and a Split Sampler switch, all on a slip of HP!

Most agree that permanent memory would be a great asset for live performing and convenience. That is why the Reflex "Flash-8" expansion board is coming soon. This board, at this time, will allow 8 Reflex memories to be saved and loaded, along with Slice data, and even an SGS sequence if one was playing at save time. MIDI control is added via a 3.5mm jack mounted on the tiny expansion board.

An SD Card addition to the Reflex LiveLoop would also be a logical next step in modular sampling capabilities. Pre-loading Slices with standard .wav/.aif files from a DAW, memory recalls along with slice data, and recalling Slice Groove Sequences are being researched, along with MIDI functionality for more in-depth control.

Check the Reflex Site in Support section for updates <http://www.freshnelly.com/reflex/reflex.htm>

C. Firmware Updates

Occasionally, there will be improvements to the Reflex, and these can be uploaded via USB through the Arduino IDE. See the Support section at <http://www.freshnelly.com/reflex/reflex.htm>
As of publishing this manual, V.103b is the newest firmware version for the Reflex LiveLoop

D. Addendums: (Next Page)

D. Addendums

As a quick guide, this addendum lists what's new after V.1.02A (July 17 2016) then V.1.03A (Aug 31 2016) then V.1.04A (Sept 21 2016) and the manual has (hopefully) been updated to match new features and/or behaviors.

* The newest version at this time is 1.04A.

Features and Updates include:

Stutter Mode

This is a fun stereo mode that was added to the Core recently, and is basically sample Address manipulation via two control knobs, Start (for Right channel) and End (for Left channel). There is also a "Fine" mode for amazing Grungification of samples playing, or live samples still being recorded (as in echo).

To enter Stutter Mode, just press and hold P.SEL for > 1 second. Both Red PlayFX LED's will come on indicating stutter mode. Adjusting the knobs will overlay a binary number, selected by you (1 of 256) onto the sample pointer. This will cause small loops in the flow of the sample, hence the logical name "Stutter".

Larger binary weights will be indicated by the blue GM LED, and it's best to hear the effect rather than explain! There is also a "Fine" mode, that is a bit different. Just tap the P.SEL button to toggle to Fine (The 2 LEDs flash) It logically Exclusive OR's the lower address creating very tiny loops in the flow, which creates aliasing and degradation in the sample, which is particularly great with percussion. This can be echo'ed as well. Stutter will work in any mode, during Slice play, even PlayFX (but the controls will be taken over by PlayFX) To exit Stutter, just hold P.SEL again for > 1 second. See Section VII. B. (pg.36) for more on stutter

Mode hold to toggle RateLock

The Mode button can be held to toggle into/out of RateLock, so preferred power-up setting only needs to be set once. See Sect. VII. C. on page 37

RateLock Clocking in Echo Mode

Now Clocking an Echo/Delay can be accomplished without shifting the sample rate around! While set to RateLock, the sample rate stays at 48Ks/s but the clock will sync be stretching or shortening the echo length. The Rate knob becomes a clock divide/multiply of your ClockDiv setting that updates in sync. See Sect. VII. C. on page 37

PlayFX during 1-shot

While PlayFX worked with 1-Shot (Slice LOOP off) Slice play before, it now will also 1-shot the present Slice when triggered by the same or a different source when PlayFX LOOP is off.

For manual triggering, while 1-shot slices are playing, it "arms" to PlayFX the next Slice that is triggered! This "arming" also works with triggered Slices with Slice LOOP on.

If PlayFX LOOP is left on, selecting GATE input will control the PlayFX as usual. See page 35 for more.

Footswitch Type Setting

The Footswitch inputs can be set to work with an inverted (normally closed) footswitch. See Settings section for how to change this setting. *When selected this way, selecting REC T/F/C or PlayFX T/F/G may trigger if no footswitch is plugged in as "open" becomes the on state. I am trying to resolve this issue.

EQ bipolar/unipolar modes indicated

The EQ button hold to switch from bipolar (default) to unipolar mode now indicates it's present state:

Bipolar is shown as the EQ band Red and Blue LEDs simultaneously

Unipolar is shown by just the Red EQ band LED.

The RGB LED follows suit. The knob should be turn through last position when modes changed as it will be in a different position on the EQ band scale.

Blend activated by hold EQ button when all bands on bug fixed.

--V.1.01G (June 27 2016) Features and Updates include:--

PlayFX scrubbing can now be turned off.

If in Pos/Size mode, the POS knob's position is only updated on a Loop. This can be slower/difficult to use with large samples, but allows smooth changes

Reducing the SIZE while adjusting allows scrubbing behavior.

If in Start/End Mode, it's a bit easy to navigate a sample when scrubbing is off, although larger samples are still slow to tune.

G-Move and CV input's are unaffected by PlayFX Scrubbing option

Slice Play LEDs indicate Slice #

Now when in SLICE SEL mode, the relative slice# is displayed as 1-8 and 9-16 with amber LED on, with >16 Slices rolling on every 16, i.e Slice 17 = LED 1

Moving the Rate knob for Slice# offset(+1 to +16) momentarily shows offset. This feature also works when in Slice Groove Sequencer while playing.

This idea was brought up just 2 days ago, and even though obvious now, I hadn't considered it at all. + who doesn't like der blinkinlights!

New/Improved Blend CV control:

Blend can now be controlled via CV! If the option is enabled (is by default) selecting EQ All LEDs Off will switch the EQ CV input over to Blend control.

On power-up, -5V will fully swing Blend to the AC input, while +5V will fully swing the Blend to Sample output, just as the Blend knob does.

To use with an Envelope that is only positive, hold the EQ button > 1 second (as with unipolar EQ band controls) and the CV 0-5V with EQ knob fully CW will envelope the Sampler output and mix the AC input as steady level. 0-5V with the EQ knob fully down (CCW) will envelope the AC input while sampler level remains the same!

The response time has been shortened to about 20ms which will still smoothen gate pulses if used on CV input.

EQ Band pass-active Takeover and Band indication:

If the option is enabled (is by default) each EQ band setting is remembered and won't become active until the EQ knob (or CV) moves over the previous setting. This can be useful for adjusting 2 bands without interfering with the third that is set way low or high when in "All 3 bands" selection.

It can also be useful if you have a lower level CV moving around that will "capture" the EQ band once at a certain level.

The Lock is set when switching to a new band, so upon returning to that band, the knob must move past old setting before "capturing" focus and actual adjustment occurs.

Also, there's better level indication during EQ band adjustments that assists in knowing where the band was previously set.

RGB disable on Dimmest LED setting:

If the LED's are dimmed to the bottom level, the RGB will no longer light on the Spectrum analyzer signals. This is to prevent "LED Blindness"!

The EQ adjustments will still illuminate though (sorry!)

Coarser ZC and muting/smoothing:

There is now an option to turn off fine loop soft muting to experience a lot of clicking and buzzing that is taking place behind the scenes! This isn't for everyone, but some do like the sharp sound that can be created.

G-Move becomes finer, as does PlayFX Fine Modes.

The ZC isn't completely removed but almost!

When crossing from forward to reverse (with option off) you will hear a brief buzz as the waveforms clash. This is normal and even desired. If you don't like that in particular, then leave this option on.

PlayFX Fine Modes now respond to CV ranges:

If in PlayFX and in a Fine mode (tap P.SEL once in PlayFX) the ST/END, POS/SIZE, and GM/SIZE CV's with control the Fine ranges Rather than ignore them.

ST/END: As the fine mode's range is defined by where the Start/End knobs were when entered, the CV range is inside of this range. This enables remotely scrubbing through a sample using your favorite LFO pattern!

POS/SIZE: The POS is still full range under CV control. SIZE is now the top range set by where ever the Size control was set upon entering Fine mode.

GM/SIZE: G-Move speed on GM is cut in half, so approximates "real time". SIZE range is 8X finer, so about 1/16 second max.

Level Equalization and Option:

The Input and Output levels have been balanced to a reasonable equality, in other words the Reflex is no longer loud as was before. The level that goes in will be matched by the level that comes out. This wasn't to reduce noise figure, but to prevent over driving other modules in the chain.

There is also a Line Level output setting for those so inclined to use the Reflex as an attenuator before recording to a consumer level sound card. * Note that this is no replacement a proper attenuator! But it'll do in a pinch.

Rate Unlock/Lock:

If you want to use the Reflex LiveLoop as a straight looper/sampler (in Layer Mode for eg..) then you may not want to have to worry about accidentally moving the Rate knob and recording/playing at a low rez sample rate! This option will completely freeze all sample rates to 48Ks/s (Like the 4ms DLD) and cannot be varied.

As a result, the Rate CV becomes non-operational. All non-rate functions on the Rate knob will still work (Slice Selection, clock divider etc)

Triggered Slice Stop When LOOP off:

In default setting (on), Slices played via SL.PLY trigger input while Slice LOOP is off will Stop once they reach their loop point. This mimics a

1-shot sample player and was brought in after several requests.

*Note that the Slice button will play through a Slice as usual and is unaffected.

The logic behind this is two modes of operation without changing the options settings. A triggered Slice will rarely ever be set to play through except during manual/peak Slices created during a very tight echo (<100mS), so any Slices created from a tight echo will play through rather than just quickly "click" when triggered! The echo must be <100mS (Karplus Strong FX range)

Slices played with LOOP on will loop as usual and are unaffected.

Improved PlayFX CV response:

As with all new products, there's bound to be bugs, and this one was a big one that may have gone unnoticed by most users. Negative voltages on

the PlayFX CV inputs were causing crashes and silences. The bug only came to light after I used a defective Envelope module on those inputs. The defect is the ADSR would release into a negative voltage after a second or so. I had used it before with the Reflex, but with fast notes so it never fell into the negative range. Fixed!

Also, the general response on the CV's has been improved and feels more solid and predictable.

--V.1.03A (Aug 30 2016) Features and Updates include:--

-some great improvements to Slice handling, better PlayFX response with Slices and 1-Shot Slice play, as well as Slice Modifier being able to "grow" a Slice if desired. Also, SGS (Slice Groove Sequencer) is now clock-able by simply inputting a clock signal (or any trigger, even non-uniform!) to SLICE input while a SGS is playing. All steps of the sequence will happen on clock pulses only, allowing pause/stop/speed changes.

In addition to the new SGS configuration, Sequences can now be recorded into SGS using the mentioned clock signal, another trigger or gate on SL.PLY, and a CV from your sequencer to SL CV input. The SGS record time is synced every 1-16 clocks, so can be set to be 8 to 196 steps long (if your clock divider is set to 8 for example)

Bugs have been fixed, the new mode "Stutter" has been added to be controllable inside PlayFX using "knob takeover" methods so settings aren't inadvertently changed when switching between Stutter & PlayFX controls. Finally, Stutter will now work inside of G-Move.

Slice Stop (1-Shot) play on all Sequentially created Slices

*This mode of operation supercedes previous "trigger only" 1-Shot Slice playing.



Sequential Slices: (1-Shot)

Any Slice that is created during a Record Only, or R/P Play, will be considered a Sequential Slice. Sequential Slices will always play as a 1-Shot when Slice LOOP is on. They will Play through when LOOP is off.

If the Record or R/P Play is ended/stopped (by holding REC button) the 1-Shots will stop to silence.

If the Record is switched to Play or Echo/Delay, then 1-Shot Slices will fall back to the playing RP Sample.

Looping Slices:

Any Slice created from an Echo/Infinite Echo, Layer Play/Layer, a PlayFX loop, or another Slice that is also a Looping Slice, will not 1-Shot, but instead will continually loop when the Slice LOOP is on. This can be useful with certain types of Slices that are created within a time domain (like echo) and will always reflect that time domain. This is the original way Slices worked before 1-Shot Slices came along!

*Slices created from Slices will inherit the type of Slice for the new "baby" Slices.

PlayFX (ST/END & POS/SIZE) on 1-Shot Slices

During play back of 1-Shot Slices (Slice LOOP on), if PlayFX is turned on, all following Slices will have the PlayFX applied to it, but still will only 1-Shot. If Slices are being played via external trigger, then PlayFX PLAY button will "arm" the FX for the next Slice to be triggered, which helps keep sync with incoming clocks.



This can be quite useful for just changing a single slice in a sequence, such as reversing, or shortening Slice play.

*If PlayFX LOOP is off, it must play out before ending/exiting PlayFX. If a new Slice plays it will re-start and stay active until either a knob is moved to shorten the PlayFX time, or it is manually exited/stopped.

*If PlayFX LOOP is on, PlayFX stays on until LOOP is turned off, or a PLAY Gate falls low. All Slices will be played with PlayFX applied, and will act as 1-Shot even as PlayFX remains on.

PlayFX on a Slice Sequence (or just hand played) can be used shorten or reverse slices, and used with a CV signal (from LFO, Env, Seq) on the End/Size input, these dynamics can be changed as a sequence progresses.

*While Slice LOOP is off, the Slices will no longer play as 1-Shots, and PlayFX will loop the Slice as if is a Loop Slice playing through. (See Slice Modifier below)

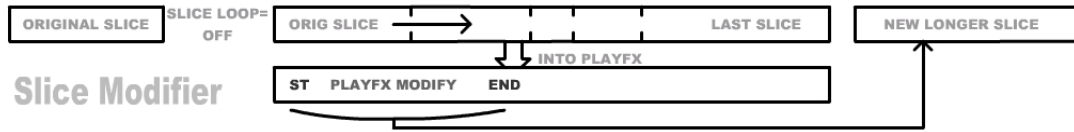
*Note: G-Move on 1-Shot Slices will continue and not exit with the 1-Shot, but will "arm" for the next Slice, and responds as usual to a Gate input.

Tight Echo Slicing:

The Reflex LiveLoop can still Slice tight echo's (<100ms) but will be treated as a 1-Shot Slices when played with Slice LOOP on. (Previously, this just created a buzz) This can do some cool stuff, especially if the Karplus Strong tones were varied, but for nice long tones, turning off Slice LOOP so it can play through is far better.

Slice Modifier:

Modifying a playing Slice with PlayFX, then saving/updating it, is the same as previous versions (Tap PLAY then REC in < 1 second) but now a Slice can be "grown" to be longer. Turning off Slice LOOP, then entering PlayFX will capture the entire Slice range after the present Slice.



This may include some areas of memory that were in the created Slice range, but not assigned a Slice number, so keep in mind if reversing a long Slice that the area could include non-slice areas. *The "last slice" is actually the highest slice, searched for during Slice creation.*

PlayFX can be used to find the new Slice area, then saved. Tap the Slice button to make sure the Slice is still selected, then tap PLAY then REC to save.

SGS (Slice Groove Sequencer):

The SGS has undergone some major changes, actually twice before the final system was in place. Hand tapping a sequence still operates as before, with the Rate Knob (Slice Select on) or SL.CV input selecting Slices, but there are two other ways to get a sequence into SGS:

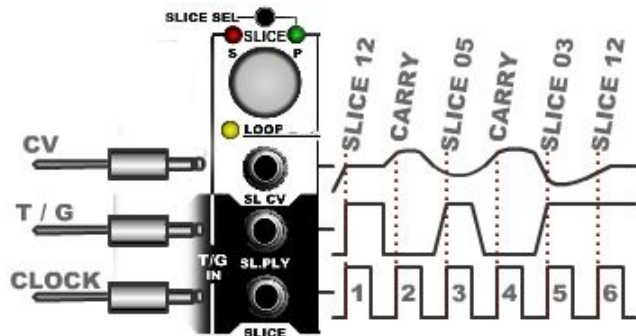
Timed Sequence Entry:

As before V1.03A, a sequence can be recorded into the SGS using a trigger/gate on the SL.PLY input, and a CV. Trying to match the end/step 1 can be difficult as timing on the SLICE (to start recording) and REC (to end recording/switch to play sequence) buttons is crucial. The next trig/gate after these buttons are pressed will activate recording or playback, in the same fashion as was entered.

Clocked SGS Sequence:

With Clocked Sequence recording and ClockDiv quantization, this record to play transition time can be predictable, and much easier to use.

Using a 3rd patch, a clock (sequencer clock) will keep the sequencer stepping while recording or playing back. This can be patched into the SLICE input once already in SGS mode. At the time of the clock pulse, the Gate is tested, and if there is also a logic high, then the CV selects the Slice and it is recorded into the sequence for that particular clock. Once switching to SGS Play, only the clock needs to remain as the other two are ignored. The clock can be sped up, slowed down, paused, or stopped. After 5 seconds, the sequence will reset to Step 1, ready for new clocks!

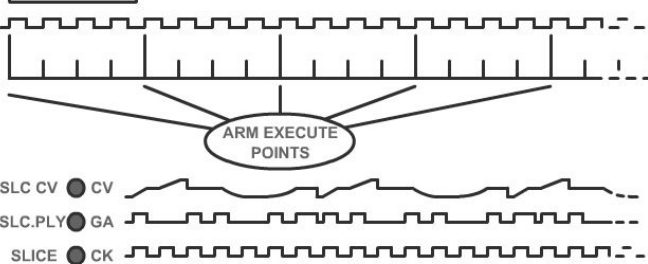


The key to ease of use of the Clocked SGS is your ClockDiv setting is used to quantize action periods, which means if you have ClockDiv set to 16, SGS record or play actions will only happen on every 16 clocks.

CLOCK DIV = 8 Slice Groove Sequencer Clocked



CLOCK DIV = 4



Plug in a CV and trig/gate to play some Slices.
 Enter SGS Mode (Hold SLICE & tap REC).
 Plug in a Clock source and tap SLICE to start a trial recording.
 To align to your sequencer, tap SLICE again just before Step 1 in your sequence. The clock is now aligned.
 Tap REC to hear what you've just recorded, which probably won't be great!
 Adjust the Rate knob to new offset and tap SLICE to start a new recording. Change the offset to see how it sounds.
 Notice the record & play action only begins after X clocks. It will remain aligned until you exit SGS (Hold SLICE for 1 second)

Now the trigger & gate can be removed and SGS will play on, ready to be modified by PlayFX and/or Stutter.
 *If the clock is removed, SGS will reset to first step in SGS sequence after 5 seconds, ready for a new clock.

To reset SGS back to hand-tapped entry, just hold the SLICE button for 1 second, then re-enter Slice Select and SGS mode.

*Note: A maximum of 192 clocks (24 8-clock bars) can be recorded at once, after that it'll roll and over-write. This may be useful if left recording to recall the last 24 1/8 step bars, or 12 1/16 step bars when switched over to SGS play (tap REC button)

Clock Playing "Hand-Tapped" SGS sequences:

Once a "clock" has been introduced to the SLICE input during SGS play, SGS will switch over to, and become dependant on a clock signal until exited out of SGS and Slice Play. (Holding Slice button > 1 second)

A hand tapped sequence can be played via clock input, but each note will play on each clock, with total disregard to the timing in the original hand tapped version.

This can be useful for getting in a quick sequence (if you count the "notes") and can be done slowly if desired. Also a single clock can be fed into the SL.PLY input so you just have to select the Slices, but this seldom turns out well!

* Triggered and CV SGS record/play will still work as before, but as before is not quantized to ClockDiv so good reflexes are required! It's far easier just to make a Clocked SGS Sequence

Why would I want to "Record" a Sequence in SGS?

Because the SGS can record a sequence of 4/8/12/16+ steps, and have an offset applied, it can become a worry-free rotating sequencer that repeats over long periods, while freeing up the same sequencer for other things. ANLFO can be used with a clock, split to act as a trigger and create proper length sequences without a sequencer.

REC CLK output during timed SGS playback:

Switching the REC T/F/C jack to CLK will switch to an output during Timed SGS Playback (Hand-tapped). A useful clock is derived from the rhythm to have tapped in, and is based on X/4 timing between 60 and 120 BPM. "X" is your ClockDiv setting 1-16. So if ClockDiv is set to 8, and the derived beat is 110BPM, then 220 BPM will be sent as an even clock. This clock uses the first tap of your sequence to align the first clock or "beat", which makes it great to drive a kick drum, or a sequencer.

If the SGS is being clocked or triggered, then the slices themselves will output triggers instead of a clock (as it's already present at the source right?) After the recorded trigger is removed, the trigger output will continue as long as a clock is present.

Because of these features, the Reflex LiveLoop can be used without any audio as just a tap-tempo (hand tapped), or trigger recorder that will follow any clock.

Stutter inside PlayFX:

To enter Stutter mode while running PlayFX, hold P.SEL as usual.

To avoid conflicts with the knobs, Stutter won't be applied until the knob(s) are fully over to the left, at which point stutter will become active for that knob.

Tapping P.SEL during Stutter will toggle it to fine/coarse Stutter as usual.

Exiting Stutter mode inside PlayFX will not STOP Stutter, rather just shifts knob's focus to PlayFX control.

*Exiting PlayFX will also exit Stutter. If Stutter is already running when entering PlayFX it will continue.

Stutter + PlayFX + G-Move Update:

Stutter Mode will now run inside of a G-Move PlayFX offering yet another way to twist a sample/Slice. It works the same way as for PlayFX S/E and P/S modes above, and can toggle fine/coarse for both stutter and G-Move.

Enter G-Move and adjust accordingly, then hold P.SEL to toggle into Stutter mode. The knobs won't become active for Stutter control until zeroed (CCW) as a safety feature. Holding P.SEL again will toggle out of Stutter, but Stutter will remain active as you adjust the G-Move settings again!

To stop stutter, either turn it's knobs fully CCW, or hold PLAY to exit G-Move, which will exit Stutter mode.

--V.1.04A (Sept 21 2016) Features and Updates include:--

PlayFX Live Pitch-Shifting

Finally the Reflex has Live Pitch-Shifting. Live means in real time so could be used with a mic or any audio with very small delays. This minimum delay is defined by the size of the "grain" as this feature uses the G-Move PlayFX mode. The GM knob can expand the delay to 1 second, and with a CV input to ST/GM/POS input, up to 2 seconds. Entering Pitch-Shift mode takes advantage of a never-used state:

- 1) Tap REC to start a new record only
- 2) Select GM mode and tap PLAY
- 3) Start tweaking! The Rate control has been narrowed during Pitch-Shift to make it easier to adjust, but also to limit the swing to +/- 1.25 octaves, beyond which is relatively useless in any case.

See Section VII.D. (pg.39) for more!

Global Slice Sequence Overdub

This is a feature for anyone that like playing a Slice sequence while leaving the Record running so the Slices change every 3 minutes! Now, you don't have to wait for 3 minutes as this special Recording uses the lowest/highest Slices in memory to acquire it's record range.

Record can be quickly started and stopped at will. Only one of the following states is required:

- An SGS (Slice Groove Sequencer) sequence is playing, or
- Slices are being sequenced via the SL.PLY trigger input (along with SL.CV I hope!)

Single-Slice overdub still works as usual (although it was *almost* removed and still pending) when not sequencing Slices.

See section VI.E. (pg.34) for more.

BugFixes:

Fixed: Layer 1 captured by PlayFX would be partially silent

Fixed: Holding MODE button to toggle RateUnlock would cause Peak Slices and jump to Echo mode.

Fixed: 1-Shot Slices playing as Looping Slices after a G-Move session in any RP mode. (GM flag)

ChangeLog:

Core update: Streamlined all read (play) operations. Prep for expansion interfaces.

U.I updates: PlayFX yellow LOOP LED flashes when in Standby

I hope these updates will vastly improve your Reflex LiveLoop experience. It has mine!

SDS*

-----Manual edition V1.04A-----