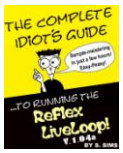



# The Complete Idiots Guide to Running the ReFleX LiveLoop V.2.00





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## I. Introduction: Patching In

**Preface:**

Welcome to the Complete Idiot's Guide to The Reflex LiveLoop!

Since the release of the Reflex Live Loop (RLL) in spring of 2016, there have been many advances in both the features (A.K.A. "Feature Creep") and complexity of the RLL, which has been concerning many potential users to perhaps turn to another sampler that is simpler, but lacks what the RLL has to offer.

The fear is unfounded, although getting through the user manual itself is a daunting task even I, the writer, will procrastinate editing following a new version release. One day I will re-write the manual to be simpler. . . or perhaps this will be the new manual!

This guide is meant to be fun and provides examples on every section, starting with the simpler functions and moving on to the more advanced ones.

**Patching In:**




Connecting the Audio I/O is pretty intuitive if you ignore the RP/FX labels (created for the proposed Expansion Module) and think of them as Stereo Left & Right Channels (R & L)

The Left Channel Input alone is normalized over to the Right Channel if there is nothing plugged into the Right Channel AC IN jack. This can be useful for mono (of course!) or "Stereo-izing" samples using Stutter Mode ( Section IX. )The Outputs are a variable Blend between the inputs (dry) and sampler output (wet).

The FB Send Output (Left Channel) is pure sampler output always, adjustable with the FEEDBACK knob. Speaking of Feedback, the FB Send and FB Return allow insertion of an FX, VCA, or filter module into the feedback loop. This can be very interesting to use with an Echo/Delay!

**The EQ:**

The Reflex LiveLoop has a built-in EQ that is applied to both the output, and the feedback route. This means that an echo can be made to decay into a tinny ring, or a sludge of bass, or a single band can be patched as a sort of VCA, adding accents to samples or echos! Blend can also be CV controlled.

**Audio Levels:**

Please note that the RLL is optimized to accept modular audio levels (10V p-p), not consumer line levels, for the best dynamic range/performance. Line level audio (1V p-p) can be sampled, but in order to hear the sample, the output also needs to be connected to a line level device, which will produce 10X the noise level. The Reflex LiveLoop is very low noise, but with enough amplification, some noise will be heard.

**Powering Up:**

When Power is applied to the Reflex LiveLoop, the LED's on the panel will dance around (this is known as a "Flash" in teck-talk) then settle in the default modes/settings:

| | |
|---|---|
| Mode LED's: | Echo Mode |
| PlayFX P.Sel LED's: | STart/End |
| REC T/F/C LED's: | TRIG |
| PLAY T/F/G LED's: | TRIG |
| pLoop & sLoop LED's: | On |
| EQ Band LED's : | Green On (Center Band) |
| Spectrum RGB LED: | May be flickering if there's audio |

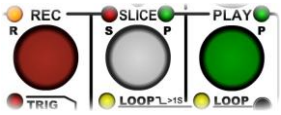
So, go ahead and do a basic audio patch in (preferably in stereo if you can!) and we can move on to the next section.

## II. The Panel

The Panel looks busy and complicated, but just think of how much HP you are saving! That was the intention of the design to be very compact, yet offer features of a much larger module.
As far as complexity is concerned, just remember it's the big buttons and the big knobs that do most of the work. The smaller buttons are for setting things, and while there are lots of things to set, only holding them in for a bit will get you into trouble, so be nimble!

### A. Big Buttons

The 3 big buttons are for big things:




*The **Red** (REC) is to toggle or step through recording a sample, playing that sample, or echoing/layering that sample (depending on which mode you're in). It is the RP sample control.
RP stands for RecordPlay, but could have been RPEL; RecordPlayEchoLayer, but that was a confusing looking acronym, so RP is it. An RP Sample is the base sample laid down when you record, and the sample that PlayFX, Slice, and Stutter uses to do their thing.

*The **White** button (SLICE) is for making or playing Slices. If you haven't tapped the SLICE SEL button to make the slice green LED come on, then tapping this button will create a new Slice every time.

*The **Green** button (PLAY) will cause the RLL to enter PlayFX mode. PlayFX will "capture" the playing RP Sample or Slice, manipulate that sample, and have it's way with it using it's knobs (above the button) and mode. It's not a permanent change however, as when PlayFX is exited, the original RP sample is still there, happily playing/echoing as if nothing ever happened!

*The **Black** button (EQ) is to select EQ bands to adjust (+/-15dB), or select Blend control

Stop it!!
All 3 colored buttons share a common property. If any one of these is held for longer than 1 second, it's function will stop/exit. (The EQ button is different. See sect. VIII. B. 3.)
So if the REC button is held, the RP Sample will stop playing/recording/layering/echoing into silence. If the SLICE button is held longer than 1 second, the entire Slice play mode will stop/exit, and if the PLAY button is held, then any PlayFX in action will exit.
If the two latter buttons cause an exit, but a RP sample is still being recorded, played, echoed, or Layered, then the RLL returns to that, again as if nothing ever happened.

Return to RP sample Echoing:
This is one of the great features of the RLL! If there is an echo in progress, and a PlayFX or Slice is started, then stopped/exited, that sound will be in the echo along with whatever audio is feeding into the AC IN jacks. >>

To be clear, PlayFX will capture an echo from the exact point at which the echo was at, so sounds can be immediately modified, even while still recording. A sudden fast loop (DJ effect), buzz, or even reverse can be inserted into an echo. Read on young Padawan learner!

### B. Small Buttons

The small buttons, while not evil, can cause havoc if pressed randomly. Each one has a distinct and unique function, so it's important to understand them a bit.
Top to bottom here's what they do:

| Button | When Tapped | When Held > 1 second, or[>4 seconds] |
|---|---|---|
| **MODE** | Selects the RP Sample Mode. If Peak is selected, this turns on Peak Slicing option, and last Mode LED will return after a time | Toggles RateLock as indicated by LED's zipping towards or away from the center of the LED circle. |
| **PSEL** | Selects the 3 PlayFX Modes: Start/End, G-Move, or Position/Size. If already in PlayFX, this button toggles the PlayFX Fine mode. If already in Stutter Mode, this button toggles Stutter Fine mode. | Toggles Stutter Mode on/off Stutter is indicated by the 2 red LEDs ST and POS. The 2 knobs above PLAY button now are to control Stutter effect. Must also be held to turn off Stutter mode. Tapping PSEL will toggle Stutter Fine mode. |
| **SLICE SEL** | Toggles the Rate Knob to become a Slice Select Knob (Slice 1-16) Slice Select in indicated by the SLICE P LED coming on. | [> 4 seconds: Enter Settings mode 1 second after the LED Circle lights] |
| **REC T/F/C** | Selects the function of input jack T/F/C: TRIG: A T/G pulse will acts as REC button FSW: To control REC with a footswitch CLK: Clock input/output for Echo/Layer | Enter Clock Divider setting. Select a ClockDiv of 1:1 to 16:1 as indicated by the LED circle. Yellow Off = 1-8, Yellow On = 9-16 Tap REC T/F/C again to save & exit |
| **LOOP** | Toggles PlayFX Loop / exit | Toggles Slice Loop/1-Shot or Play-through |
| **PLY T/F/G** | Selects the function of input jack T/F/G TRIG: Triggers a PlayFX as with button FSW: To control PLAY with a footswitch GATE: Starts/exits PlayFX with Gate | Enters MIDI CC edit mode if the Flash-8 Expansion board has been installed. Please see the Flash-8 user guide for more. |
| **MODE** + **PSEL** | Pressed together enters the new Mode: "Broken Echo" Mode. See section IX.F. Tapping MODE will exit this mode | Same if both are held |

Notice some of the table is in dark blue? These are functions that happen when the buttons have been held instead of just tapped. Avoid holding the buttons until further into this guide, or you'll be re-powering up!

**LED's:**

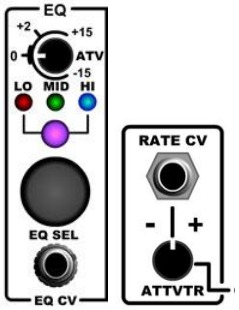
There are a lot of LED's all over the Reflex LiveLoop's panel, and most have an obvious function, but I bet you didn't know that:

- The REC button LED goes Red during Record, Green During Play, and Orange during Echo or Layer Record, and during R/P overdubs? *(See Chapter III. "Getting a Sample In")*
- The large RGB LED is actually being driven by a 7 band spectrum analyzer and can indicate EQ band levels as they are adjusted (Red=Bass, Green=Midrange, Blue=Highs) ?
- The LED Circle will flash to indicate status, like the Loop point of a Layer, Recovery of knob take-over in PlayFX, or the direction of the last sample Rate adjustment if the Rate knob was used for another function?
- The LED Circle will indicate Slices being made, or played, in sets of 16 by using the amber center LED to indicate the upper 8? *(See Chapter V. "Slicing")*
- The entire panel can be Dimmed as a permanent setting? *(See Chapter IX. D. "Settings")*

…well now you do!

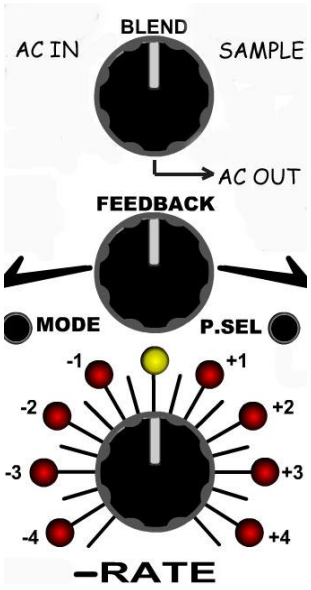
## C. Knobs

There are 7 knobs on the Reflex LiveLoop, which is a lot for such a small panel, but happily 2 of these are tiny knobs.




These are attenuvertors, and, while they are no less used, are small to indicate they are attached to a jack, which is nearby.
The EQ CV attenuvertor is set to 5 volts when nothing is plugged in, so the knob has immediate affect on the selected band, while
The Rate CV attenuvertor is set to 0 volts, so moving the knob only has affect on the sample rate when a voltage is patched in.
Both attenuvertors are +/- 5 volts range and add/subtract to their individual functions. The big Rate knob acts as a +/- offset from 0 volts, or the CV acts as an offset if you want to think of it that way!

The 3 center knobs consist of:

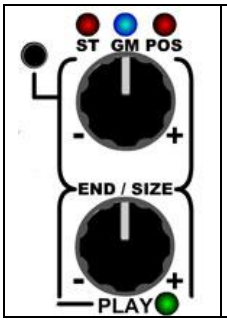



**The Blend Knob:**
This knob acts as a cross-fader between incoming audio, and sampler audio playing. If you have recorded a sample, you'll generally want to slide away from the AC IN so there's not a clutter of sound. On the othe hand, when Layering or echoing, you likely will want the original sound + the sampler sound, so set to center. Blend is CV controllable.

**The Feedback knob:**
This knob controls how much of the sampler's output goes back into it's input. This *must* be used during an echo or else there'd only be 1 echo. In Layer mode, as it relies on the previous sample to add to a new Layer, feedback should be nearly all the way up.

**The Rate Knob:**
This knob controls the sample rate of recording (up to center) and playback (full range) In SLICE SEL mode, this knob becomes a Slice # selector and offset for the Slice CV input, while in Clock Division setup the Rate knob selects divide by 1-16, and finally in Settings mode, this knob selects menus for setup and user settings if changes are desired.
That makes the Rate knob the busiest knob by far, a sort of "boss" on the panel if you wish! That's why it is so big. OK not really! The Rate knob is large because setting the sample rate can be touchy over a +/- 5 octave range.
*This width can be reduced to 1.25 Octaves in settings if you'll never use this range, or the Rate knob can easily be locked to 48KHz as mentioned in the Small Buttons section above.

**PlayFX Knobs:**
The last 2 knobs are the PlayFX knobs. These become active when PlayFX is active.



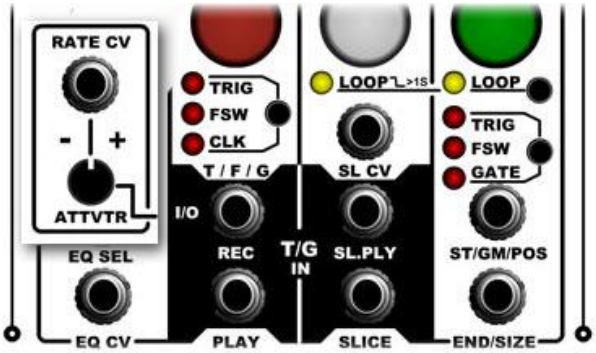

The top knob, ST/GM/POS, acts according to the present PlayFX mode, as does the bottom knob, END/SIZE.
For example, if PlayFX mode is at it's default mode of STart/END, then the top knob controls the start of the PlayFX sample, while the bottom knob controls the end. These knobs act as positive (+) offsets to their companion CV inputs on the panel area below them.
If Stutter Mode is active, then these knobs control Stutter on the Right (top) and Left (bottom) AC output channels and also offset the CV's!

## D. Jacks

There are several control jacks as already mentioned. Some are Trigger/Gate/Clock/Footswitch inputs, while others are CV inputs both unipolar and bipolar.

**CV's:**

The jacks inside of black areas are traditionally logic typed signals, while jacks on a light background are more CV voltage/analog inputs.




The RATE CV input (inset), as mentioned above, will shift the sample rate from end to end over a +/- 5 volt input range.

The EQ CV will set +/- 15dB to the selected frequency band over the +/- 5 volt range.

The EQ CV can be toggled to unipolar (0 - 5 volts) by holding the EQ button > 1 second, which is useful if using as a "band VCA" from an envelope generator that only has positive voltages.

The ST/GM/POS CV input is *added* to the same named knob to control PlayFX and Stutter's right channel.

The END/SIZE CV input is *added* to the same named knob to control PlayFX and Stutter's left channel. These CV's are positive (unipolar 0 - 5V range) only.

**Trigger/Gate/Clock/Footswitch Inputs/Output:**

These jacks are somewhat more involved (as logic usually is) and each requires explaining. The best way to explain all of this is to use a table. The Jacks are listed across the first row, and what signals will do with each possible jack setting follows in the column below.

These 4 jacks are the "James Bond's Car" of the Reflex, but to begin with, you only need to do some regular driving with them! The table below is for the RP Mode Echo.

| Echo Mode | | | | |
|---|---|---|---|---|
| Setting \| Jack>> | REC T/F/C | PLAY T/F/G | SLICE | SL.PLY |
| Set to TRIG (Low to High edge) | 1-Starts Record, 2-Switches to Echo 3-Sw's to Inf. Echo +-Sw's back to Echo | Starts PlayFX by "capturing" an echo length from NOW. Re-Starts PlayFX | Create a Slice with the Echo Length (or from PlayFX loop if PlayFX is active) | Play a Slice Selected by SLICE SEL (Rate knob) + SL.CV input |
| Set to FSW ( Normally open or Normally Closed - see Settings) | 1-Starts Record, 2-Switches to Echo 3-Sw's to Inf. Echo +-Sw's back to Echo Hold>1 sec Stops All | Starts PlayFX by "capturing" an echo length from NOW. Re-Starts PlayFX Holding >1 sec stops/exits PlayFX | N/A | N/A |
| Set to GATE (Active High) | N/A | Toggles PlayFX on (gate=high) and off (gate=low) | N/A | N/A |
| Set to CLK (in) | Sets REC button as "Arm" for next Clock initially, then REC button arms for subsequent ClockDiv cycles. | N/A | N/A | N/A |
| Set to CLK (out) | Outputs Pulse on PlayFX/Slice Loop or during SGS play, a Derived Clock out | N/A | N/A | N/A |

Now before you get all upset, may I mention that all of these functions are pretty similar, and the ones that aren't are notably different, like the Clock input/output, which has automatic input/output sensing by the way which will be covered in detail later.

In Each RP Mode, Echo, Layer, R/P, the Record T/F/C jack set to TRIG or FSW follows the Record button for the steps of controlling that particular mode, whereas the PlayFX and Slice jacks act pretty much the same…well in their function anyway.

One special case is:
During Slice Groove Sequencer Clocked Record - the SLICE input jack becomes a Clock input to step the SGS through the sequence, and during resulting SGS sequence playback also a clock input to step SGS through the playing sequence.

That's it! The rest of the time, the SLICE, SL.PLY, and PLAY jacks are at your service.

**FootSwitch (FSW) inputs:**
The Reflex has an added circuit selectable for both REC and PlayFX input control. The main intention of the FSW input was to use with RP mode Layer as a looper, while playing an instrument that requires both hands, such as a guitar or sax.
So, in affect, a "hands free" control of REC and PLAY button functions.
The way the FSW controls each function is the same as how the corresponding buttons will, with even "hold to stop" functional. PlayFX could be used with a second footswitch for more FX control.
The FSW circuit involves a pull-up of voltage to detect both normally open (default), or normally closed footswitches (such as a sustain pedal).
Footswitch polarity can be changed to your type of footswitch in "Settings" (section X .D.)

If you only have a piezo - style foot pedal, it will work with an input set to TRIG as those inputs are pretty sensitive, but the "hold to stop" function won't work of course!

The Record T/F/C jack when in TRIG and as just mentioned, FSW setting, generally follows what the REC button does in the 3 modes, and sometimes has powers the REC button does not have.
i.e. Starting a regular Record while Slices are playing. (The button will overdub a Slice)

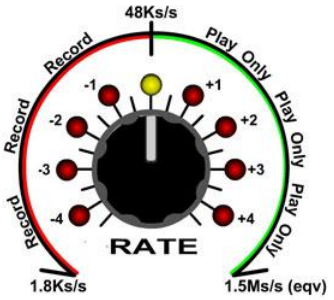
This will all be made clearer in upcoming sections, but first . . .

## III. Getting A Sample In

One of the simplest things to do with the Reflex LiveLoop is to get a RP sample into it and start playing/echoing immediately. But before jumping right in, there's a couple of settings to check!

### A. Sample Rate For Speed Freaks

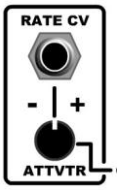
Because the Reflex has such a wide range of sampling speeds, it's important to check that big knob and make sure it's where you want it to be.
It's setting depends vastly on what you're planning on doing next, but for the most part you probably want the maximum sample rate for recording.




The Rate knob has a couple of safeties when diving into a record:
1-If the Rate knob is above max. recording sample rate, it centers.
2-If the knob is centered, the center 3 LED's in the circle will light.
It's a good idea to get the knob centered before-hand as there's a small software detent that won't drift if lightly bumped, although I've been guilty of swinging to the extreme right being in a hurry, only to accidentally bump it during playback and have a sample zing up to unimaginable speeds!

The Rate Knob has a "recovery" function that, if coming from another mode that required it be moved elsewhere, once it becomes a sample rate control again, nothing will change until:
a) the knob is moved toward the last position and passes the last position, or
b) the knob is intentionally moved away from the last position, which will cause the sample rate to smoothly slide up to it.
If the sample rate isn't where the knob is, 2 LED's on the extreme ends of the circle will flicker 4 times to indicate the condition. The same as someone waving "hey come over here"!

**Rate CV:**
The Rate control can be an offset to an incoming CV voltage in either direction.




If the Rate attenuvertor is turned all the way up, the CV has full range control as a positive 1V/octave controller for samples being played.
If the Rate attenuvertor is turned all the way down, then it's still 1V/octave, but reversed, like playing a keyboard upside down. 0 volts will be the only note that is the same either way.

**Longer Sample Times:**
In some cases you may want a slower sample rate to extend recording time beyond 3 minutes, or just to get that retro-sampling sound, but a very good reason to go straight to the bottom is to set a super-tight echo for Karplus Strong overtones and FX.
This will be covered later on!

Now we're done with all of the theory for a while, time to have a go at sampling ( like you haven't already had a go ! )

## B. Sampler Modes and the RECORD Button

There are 3 distinct RP Sampler modes, and they all act quite differently:
Echo: To add a delay or echo to incoming audio, or create a simple free-running loop
Layer: To Loop and add sound in layers in a controlled synchronized fashion
R/P: Record a sample, Play it back, overdub, punch-in, and append. Create 1-Shot Slices.

This section will give examples for all 3 modes to get you started right away!

### 1. Echo (Delay) Mode

The easiest to use and most familiar mode in the Reflex LiveLoop is the Echo mode. Using only the REC button, a record can be started, then an echo (delay) which sets the time of the delay, then even infinite echo which just loops the last echo over and over until echo is re-started.

1) Select Echo by tapping MODE button if not already set to ECH
2) Set the Sample Rate (big Rate knob) to center so the 3 LED's light.
3) Set the Feedback up nearly to the top, and make sure Blend is in the center so you'll hear incoming audio as well as the echo. Blend has no affect on feedback.
4) When ready, Tap the REC button to start recording, the REC LED is now red.
5) Tap the REC button again to set the delay time and begin echoing. If you had audio coming in, then it will now be echoing, if not, then what are you doing?? Get some audio!! The REC LED should now be orange
6) Now try Infinite echo by tapping the REC button yet again. If the Feedback is up nearly 100%, then the transition will be seamless and the echo is perpetual.
7) Try Slowing down the Sample Rate, then speeding it up, or adding a Rate CV
8) Try varying Feedback Levels

If the MODE is changed, the echo will be cancelled, but the standard way to stop is by holding the REC button for about 1 second.

Super-tight Echo for Karplus Strong mixing:
1) Turn the Rate to the bottom
2) Double-Tap the REC button (from a stopped state) which will create a short echo
3) Increase the sample Rate to normal (centered) and notice the "ring". This ring will phase in and out with the original audio coming in creating some nifty FX, and some interesting Slices (once you know how to Slice!)
4) Try varying the Rate with a CV from and LFO, ENV, or sequencer

> *Tip: If the Rate attenuvertor is all the way up, the CV input can be true 1V/octave so the Karplus tones will also play as notes. Remember to allow sufficient Rate overhead though (by turning down the Rate somewhat) or all that voltage will squash into the maximum sample rate! ++ Switching to Inf.Echo "catches a wave" for higher Rates.

Super-Long Echos/Delays:
Making a long echo, 10 - 30+ seconds, can be a lot of fun and allows pristine quality sound to be added to over a long period of time, and no fiddling with controls. The most difficult part of making a decent cycle of sound is to get a tempo to start, so the next time it comes around, you're ready to add to it appropriately. A bit of practice goes a long way!
Clocking an Echo can also solve this issue, which will be covered in an upcoming section.

## 2. Layer (Looper) Mode

Pretty much all guitar players under the age of 50 know about Loopers and how wonderfully fun they can be. The Reflex LiveLoop has a Looper built in called Layer mode.
If you are unfamiliar with this concept, I'll explain.

Layer mode is similar to a long Echo/delay in that slowly more sound can be added to the cycle each time it comes around, but with Layer mode, the recording part can be turned on and off. This means that a new Layer is only added when you want it to be.
Because of this, a record can "bridge" over a shorter Layer to create a proportionately longer Layer, by 2X or 3X, or 4X, so the new cycle only repeats over the new length of time.

Another great feature to Layer is the ability to "peel" Layers off, returning to the previously playing Layer. Once down to a single Layer, the REC button or footswitch can be held to fade out, or held then released to stop play immediately.

Here's an example to set you up with Layer mode:

1) Adjust your sample Rate to center (max)
2) Use MODE button to select LAY
3) Set the Feedback up nearly to the top, and make sure Blend is in the center
4) If using a Footswitch, select REC T/F/C to FSW LED and plug in your footswitch
5) Start playing some music (by hand!) with whatever instrument is within arms reach
6) on the down-beat (at where you want the Loop) tap REC or the footswitch to start recording the first Layer. The sound must flow into this point, not start at it.
7) Once you have played to the part of your song that would be where it would repeat, tap REC/footswitch again to set the base length of the Layer Loop. *LED's Flash!* Keep playing along and prepare for the next addition to the Layer, then once ready:
8) Tap twice <u>on or before</u> the next down-beat or Loop point. The Reflex doesn't care if the second tap is late as it has anticipated you may want to create a new Layer!
9) Tap once at anytime after 1 second from the last time you tapped to switch back to playing the new Layer. *Circle LED's Flash at Loop points you may have noticed.*
10) Repeat step 8 to continue adding Layers.
11) Now tap 3 times to "peel" off a Layer. *It's important these 3 taps don't occur at a Loop point or the first 2 taps may be seen as a request to record another Layer.

Once you have had enough, or run out of Layers to peel off, hold the REC button to stop or the footswitch to stop/fade play.

So what just happened? You have been giving command codes to Record, Play, record some more, then peel off layers. In a nutshell, the 3 commands are:

| | |
|---|---|
| First Tap: | Record first Layer |
| 1 Tap: | Play new Layer ( and set Loop time if this is the first Layer Play) |
| 2 Taps: | Record new Layer until either 1 tap (play) or 2 taps (another record) |
| 3 Taps: | Peel back 1 Layer |
| Hold: | Fade and Stop (footswitch) or Stop (REC button) |

That's Layer in a nutshell!

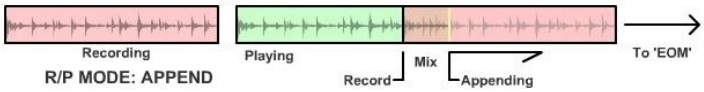
*Tip: The second tap after an initial Layer Record doesn't need to switch to play, but can be a double-Tap which will still set the Layer Size, but start a new record while playing the Layer just recorded!

Try "growing" a Layer by allowing it to record past a Loop point, or several Loop points, but be careful, 3 minutes of recording time disappears quickly, and you won't be able to Peel!

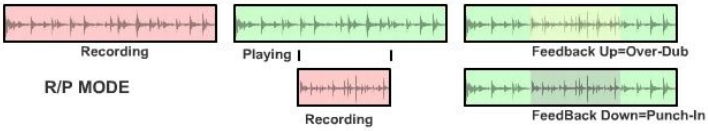
### 3. R/P (Record/Play) Mode

Before 1-Shot Slices, the R/P mode was the least used mode of all, like the old station wagon out back. But since it's facelift and it's unique ability to make 1-Shot Slices from a sample playing R/P mode is back on top!

R/P mode can be a/the simplest way to get a sample into the Reflex, and is only 2 button clicks away. . . but in the shadows, complexity lurks. When an R/P sample is playing, more audio can be over-dubbed or punched-in to the existing sample at will, and the sample can be lengthened by simply forgetting to stop the Record. Record can be left on for days and the last 3 minutes can be recalled at any time! Absolute evil!




So what can be done? I can only make suggestions to make this R/P'ing a more pleasant experience.
Firstly, if you plan to overdub (i.e. mix original sample with new incoming audio) it's best to leave the Feedback at maximum as this is how the sample will get back into the input. Secondly, Make sure the incoming sound isn't already happening when you hit REC to overdub or it'll pop in with a nasty (or nice, depending on who you are) click. Same with ending the overdub. If the feedback is all the way down, then your record will "punch-in".




Here's how to R/P by example:

1) Adjust your sample Rate to center (max) or left if you want a lower sample rate
2) Use MODE button to select R/P mode
3) Set the Feedback up nearly to the top, and make sure Blend is near center
4) Tap REC (or footswitch if still connected) to begin recording an R/P sample, the REC LED will illuminate Red.
5) Once finished, tap REC to hear the sample. The REC LED will become green. If you timed the Loop it'll sound better at the Loop point, but it's up to you ( as this sample may just be to capture some legendary 1-Shot Slices! )
6) Now the R/P sample is playing, try inserting a stab, drum, scream, what-have-you, by tapping REC at the place you want it inserted, make the sound, then tap again to return to Play only. While overdubbing, the REC LED will be orange.
7) Try extending the sample length, but don't tap too close to the end or the Reflex will assume you want to record from the beginning and Loop.
8) Notice that once you are past the end of the Loop, the REC LED turns from orange to Red? This indicates there is no longer Play happening.
9) To Stop R/P Play, press and hold the REC button for about 1 second.

As you can see, R/P sampling is pretty easy, especially if it's just to create a looping sample. Once in Play only, the sample can be sped up, slowed down, and modulated with the Rate CV. A trigger input on REC T/F/C can intermittently insert other audio until there's a whole collage of sounds.

Now we've covered sampling in the three RP modes, you're ready to move on up to bigger and better things!

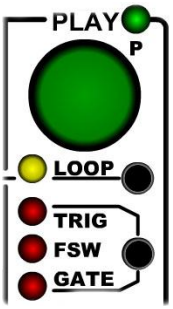
### C. Sample's In, What's Next?

Once a sample has been captured, there's options as to what to do with that sample now in memory. It can be captured by PlayFX to loop, reverse, modulate, granulize, and window, or it can be Sliced up to more manageable chunks to be sequenced via CV, modified further by PlayFX modes, over-dubbed, reversed, and even recorded and Sliced again.
The following 2 sections are the nexus of the Reflex LiveLoop!

## IV. PlayFX Capture

Now that the basic concept of getting a sample has been covered, a new concept of PlayFX can be introduced. PlayFX "captures" a sample, or section of a sample and allows windowing over the sample in a controlled fashion via the PlayFX knobs (over the green button) and their associated CV inputs. When the two CV inputs are used, the corresponding knobs act as a positive offset, or, in affect, add to the CV's range of 0-5 volts.

### A. PLAY Button




I think the first impression the uninitiated Reflexer may have of the green PLAY button is to hit REC to record a sample, then hit PLAY to play it, which probably works most of the time, but the fun stops once the newbie tries to do something else, like stop PlayFX, or stop Recording. Confusion and frustration would set in at that point I'd imagine. If you have read to this point, then you already know better!
PlayFX is exclusively entered by the green PLAY button, or the PLAY T/F/G input jack (under the REC T/F/C jack).

Tapping the PLAY button, or triggering/gating PlayFX, will capture a sample for itself depending on the RP mode the sample is in:

Layer mode: Captures an entire Layer that is playing, start to end.
Echo mode: Captures the present Echo is echoing, or the infinite Echo if inf. echoing.
R/P mode: Captures the entire R/P sample when playing, or form the start of present overdub/punch-in recording to present point in the recording.

**PlayFX from Initial Record:**
In any of the three modes, if a PlayFX is entered during an initial recording (REC LED is still red) then PlayFX will capture from the start of the recording to the present point in the recording. This can be really fun if PlayFX is in reverse, plus it all gets recorded as a bonus!
Also if this is done when in PlayFX mode G-Move, a live audio stream can be instantly granualized, an ace effect!

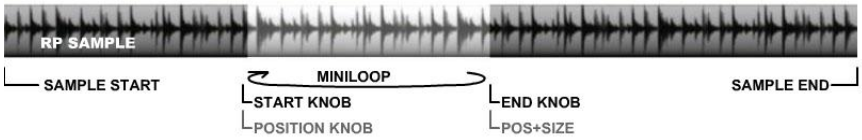
To Exit PlayFX back to RP sample there are two ways:

1) Hold the PLAY button (or press the footswitch if connected) about 1 second PlayFX can be entered and exited by the same hold on the PLAY button, which is a great way to temporarily apply FX loops/granulizing that will end upon release.
2) Turn off yellow LOOP LED in PlayFX section. PlayFX, while not in G-Move mode, will eventually reach the loop point, and if LOOP is off, has nowhere to go but out. At this point PlayFX is in "standby". Recurring taps on the PLAY button will bring back the same sample area over and over as it never officially stopped. This can be very useful during a live echo for repeatedly inserting the same sound. An old echo, captured earlier by PlayFX, can be recalled and re-started. I have used this unintentional feature myself many times.

As with the RP sample modes, there are also three PlayFX modes, which proves beyond a doubt the indeed good things do come in threes!

## B. Start/End PlayFX

Start/End PlayFX is one of the two "windowing" style sample accesses. As it's name suggests, one knob sets the STart of the PlayFX loop, while the other sets the END.
The closer these two are together, the faster the "mini-loop" becomes.
Any subsequent press on the PLAY button, or trigger/gate on the PLAY T/F/G input will set the "play head" to where the STart knob is pointing to in the captured sample range.




The above diagram describes the PlayFX windowing capture for both Start/End and Position/Size types of PlayFX.

**Fine Mode:**

There is also a fine mode that can be toggled (while PlayFX has the ball) by simply tapping the PSEL button. The ST LED will flash indicating fine mode. Before entering fine mode, ensure the STart and END knobs are well positioned as this will be roughly the limits for the knobs when in fine mode.

CV inputs to the ST/GM/POS and END/SIZE will control fine mode when it is active, or normal mode of PlayFX when fine is not active. This allows for some really "fine" work!

On to an example to try out. Echo mode is fun to PlayFX directly from, so make a short Echo and allow it to quickly fade by reducing the feedback level to half. The audio input should be continuously coming in, but turn the Blend over toward the sample side (right) so only the echoed audio is heard.

1) Make sure the yellow PlayFX LOOP LED is on.
2) Set the PlayFX mode to ST using PSEL button
3) Turn Start knob fully left, and End knob fully right
4) Tap PLAY to capture a PlayFX, which should sound identical to the echo except now it remains in a loop. This is because PlayFX uses the echo size as it's limits when in Echo mode, and the limits are presently set for maximum Start/End window size.
5) Play with the 2 knobs to become familiar with their dynamics with the sample
6) Turn off PlayFX LOOP so the loop falls out and back into the running Echo.
7) Tap PLAY again a few times. Notice the same captured Echo Loop is still there?
8) Turn on PlayFX LOOP to reset PlayFX for a new capture
9) This time adjust the two knobs closer while holding the PLAY button
10) Upon releasing PLAY, PlayFX will exit immediately as holding is a stop command.

Using CV's on the two PlayFX jacks can result in some surprising loops and FX, don't be shy!

### C. Position/Size PlayFX

Position/Size PlayFX is the other "windowing" type of looper and is prefered by some users over the Start/End type as it allows the same sized loop over the range of the captured sample. In some cases, such as during Echo mode, the loop will pass the end of the capture!

Here's a short example to try with POS/SIZE PlayFX:

1) Make sure the yellow PlayFX LOOP LED is on.
2) Set the PlayFX mode to POS using PSEL button
3) Turn Start knob fully left, and End knob fully right
4) Tap PLAY to capture a PlayFX, which should sound identical to the echo
5) Adjust the SIZE knob (lower) downward and notice the loop is getting tighter.
6) Now adjust the POS knob (top) to scrub through the sample.

You may have noticed the "scrub" is tighter than your SIZE is. This is because the scrub -aide is active. It is useful for finding a spot in a sample, and does sound interesting, but some prefer to hear just the Loop changing. Scrub can be disabled in Settings (sect. IX. D.) Don't worry, the CV input doesn't scrub this way! It updates on a PlayFX Loop only.

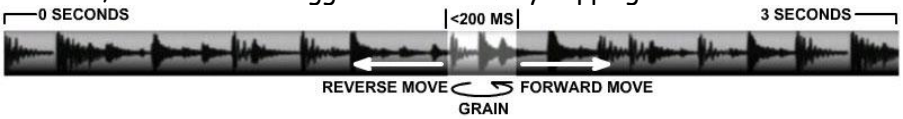
### D. Loop or Exit PlayFX

The two "windowing" types of PlayFX can exit if the PlayFX LOOP is turned off. Instead of looping, it just exits at the Loop point. When LOOP is off, a new capture won't be made from the present sample playing, rather it just plays the same sample captured when LOOP was on. This is because PlayFX doesn't actually exit and reset, but goes into standby mode.

At first glance, this seems a bit loony, but this allows a repeating sample to be inserted momentarily into the RP sample stream, which, again is especially enticing when Echoing. Try using the previous Example B. Start/End PlayFX during an active Echo to test PlayFX LOOP off.

### E. G-Move Granular PlayFX

Last, but not least, is the 3rd PlayFX mode G-Move. This mode is different in that it "moves" though a captured sample range rather than direct-controlled windowing through it. G-Move also has a special algorithm to null clicks and pops (or at least keep it to a minimum) during these tight "grains" of sound. Grains can be reduced to a couple of milliseconds in G-Move's Fine mode, which can be toggle into/out of by tapping PSEL while active as usual.




The GM (top) knob will allow G-Move to step through a sample forward or reverse up to 2X the normal rate and pause when centered. When paused, the blue LED for G-Move will go out, indicating it is centered.
The ends (fully CW or CCW) are exactly 2x the normal play speed if sample was recorded at Rate center. There are also 1x speed indications (LED circle flashes) at 2 and 10 o'clock.

G-Move can also be used for pitch shifting while maintaining the sample's Play speed. Setting the GM knob at about 2 O'Clock will run at approximately the regular sample speed. To Pitch-Shift, just change the Sample Rate control up of down some. Adjusting the SIZE for a smoothing "sweet-spot" is a common practice when using G-Move this way!

Now to try G-Move.

For this example, use R/P mode (MODE select R/P) and create a somewhat longer sample, preferably with drums or vocals as they sound very cool in G-Move. Note that deep Kick drums tend to be a bit "clicky" in G-Move when the grains are small because their waveform is so long. Perhaps, if you are using a percussion, end the loop with the start beat?
Once you have a good, well OK reasonable, sample playing in R/P mode, continue with the following G-Move Example:

1) Select G-Move mode with PSEL button. (Blue center LED will indicate)
2) Adjust the GM knob (top) to about 2 O'Clock, and the SIZE (bottom) to half way.
3) Tap PLAY button to capture the R/P sample and start G-Move
4) Hopefully it sounds pretty similar, but try turning the GM knob further up
   Notice the speed of your sample has changed, but not the pitch? This is one of the differences between G-Move and the other two PlayFX modes.
5) Now adjust the SIZE (bottom) knob down to reduce the grain size.
6) Adjust the GM knob left of center and notice how G-Move plays in reverse.
7) Try the Fine Mode by Tapping PSEL to toggle it. Blue LED will flash occasionally.
8) Try changing the G-Move sample Rate (big Rate knob) while moving through the sample. Notice how the sample's speed doesn't change with the pitch?
   Adjust the SIZE knob to find a new sweet spot for this Rate.

**CV'ing G-Move:**

Because G-Move "moves" through the sample at the speed/direction dictated by the GM knob + CV, the CV can't be anything that changes quickly (more than 5 times/second) or the movement become stuck trying to go places. This would be much as shifting your car into reverse, then forward, then low gear, then reverse again. You'd go nowhere and probably burn out your transmission! A slower CV can work wonders, and even a Sequencer CV can produce some clandestine results, but all in good slow time.

The SIZE CV input on the other hand is always ready, willing, and able. It can change very quickly but prefers sudden transitions rather than slides (see Tip box below)

**G-Move Stereo NEW!**

If you only have a mono signal to feed the Reflex, this feature will spice things up a bit. By feeding your audio into RP side (right) to make a sample, then turning off PlayFX LOOP, a G-Move will toggle from both channels. The LOOP must be off before starting G-Move PlayFX. See X.D.3. (page 49)

**Triggering/Gating G-Move:**

All PlayFX modes can be triggered to start/re-start or gated (only active on gate's high state). G-Move is a little different though as the start point is always the same unlike Start/End and Position/Size modes that will start where-ever the top knob is.

For this reason, G-Move always starts from the point it was entered (PLAY button or trig/gate) so can constantly change if using a Gate on PLAY jack.
To do this from the PLAY button, just press and hold the button at the proper time and when you release the button (if held longer than 1 second) G-Move will exit and reset.
Example: -use previous example, then:
1) Set PlayFX T/F/G to GATE using the lower button under the PLAY button.
2) Introduce a slow Gate signal (not trigger pulse) to the PLAY input jack

You should hear pieces of the playing RP sample being carried into G-Move for the duration of the Gate signals high period. If not, then you may be using too short of a pulse!
If this was from a running Echo, can you imagine? Bold enough to try? Do it!

*Tip: G-Move can be used as a wave table synth when in fine mode:
Tap PSEL (while in G-Move) to switch to Fine Mode, then find an area of the sample that sounds good by moving slightly from center (paused). Adjust the SIZE knob almost all the way down, then plug a Sequencer into the SIZE jack. *It's not 1V/Oct, but sounds great!!

## F. PlayFX From Different Modes

Now that you know that PlayFX can capture from an RP loop currently playing, echoing, or even just recording, the question of what areas it captures in the 3 different modes? Here's a simple list of modes even though PlayFX capture is pretty logical:

| | | |
|---|---|---|
| Layer Mode | During First Record | Captures from Record Start to present Record position |
| | During Play & Record | Captures from present playing Layer Start/Loop points. G-Move starts playing at present play position |
| Echo Mode | During First Record | Captures from Record Start to present Record position, except when in G-Move PlayFX mode (see sect. G.below) |
| | During Echoing | Captures from 1 previous echo to present position, *thus PlayFX max loop size = 1 echo size. (Great for reversing an echo!)* |
| | During Infinite Echo | Captures from 1 previous echo to present position in infinite echo |
| R/P Mode | During First Record | Captures from Record Start to present Record position, except when in G-Move PlayFX mode (see sect. G. below) |
| | During Play & Record | Captures entire recorded Sample for loop size. G-Move starts playing from present position |

A PlayFX can also be captured from a Slice, and continually capture different Slices as they are played. See section 6 to know all about that! Furthermore, new Slices can be created from another Slice (baby Slices), or a PlayFX from a Slice, obeying all the rules.

## G. PlayFX Live Pitch-Shifting

This very new feature of the Reflex adds yet another "live" option to use the sampling engine. 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.

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? 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 yeild 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.

**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 REC to stop it, or tapping it 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.

## H. Recording a PlayFX

Originally the RLL had a nice "Record Protect" feature that would protect an area of sample memory that has been Sliced, or is being used by PlayFX from being erased by a new Record. It seemed to be a good idea, but quickly made things complicated. When is the protected area no longer valid? What if a Slice area spans most of the memory? What if there's a running echo from which Slices are being made, should it continually shrink?

As a result of all of this, the memory protect feature was scrubbed before release.

It is entirely possible to lay down that great PlayFX cycle you have been tweaking around, but some precautions must be taken, and laws obeyed.

Firstly, make sure the Feedback control is turned UP TO MAX, as this is how the PlayFX audio will get back into the sampler. Without this, you will lose level, or get silence.

Here's some PlayFX Record case files:

Echo mode:

If you acquired your PlayFX sample from a running echo, then you are already recording and may be able to access old echoes from Slice Select (No you didn't miss it, next section!)

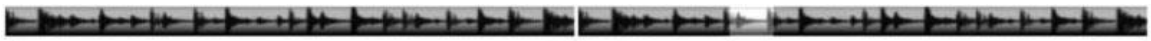
If you had been echoing for a minute or two since starting Echo, then stopping it (hold REC button to stop) and starting a new record probably won't record over the sample that PlayFX has been using; which means you can record this in any mode (Echo or R/P preferred)

R/P mode:

The only easy way to record a PlayFX that was captured in R/P mode is to make sure the PlayFX is using a later part of the sample, then that you don't record it too long so as to over-write it.

Layer mode:

Recording a PlayFX in Layer mode is a fixed way to create a new Layer from PlayFX, but will always be same length as a Layer. Once record is started, it won't stop until the Layer is complete. Layer mode isn't really the place to be doing this sort of thing, but can be done.




In the above diagram, the PlayFX loop area may be the large lighter bar, and the proposed new record end/loop point at the narrow bar. This will result in a good record of your PlayFX work.

Over time, I have learned to "guesstimate" memory areas i.e. if I want to do a 10 second or so recording of a planned PlayFX, then I'll run out 20 seconds of echo before entering PlayFX, then stop the Echo. Once ready I'll start recording again, do the PlayFX tweaking, double-click REC to switch to infinite Echo, then once exiting PlayFX there it is!

There's another way to capture PlayFX settings without recording at all, using Slicing inside a PlayFX. Slices are created of that moment in the PlayFX. This will be static moments of the PlayFX loop, but perhaps this is what you're looking for! See next section V.

One final note on recording. Sometimes it may be preferable to allow recording overwrite the PlayFX sample. Sometimes the results can be astounding, but other times it can be a WTF moment, so to each their own!

## V. Slices (the best thing since …bread)

The feature that the Reflex LiveLoop has that sets it far apart from most other modular samplers is the Slicing capability. What is Slicing you ask?

Slicing is the ability to cut up a sample into smaller, more manageable pieces. The way this is done is simple. Each time you press the SLICE button during the record/play of a sample, a marker is created. Each marker has the point in memory it was created at, the proposed "LoopTo" point, where the slice will loop to, and the end, or loop point.




When played back, Slices can be accessed in any order or speed. They can be sequenced, PlayFX'ed, modified, reversed, shortened, lengthened, and deleted. They can be 1-Shot, like a sampling keyboard, play through, or loop, depending on how and where they were created.

Up to 400 Slices can be made from a sample, a running Echo, an infinite Echo, a PlayFX loop, or even another Slice! Slices can be played by a sequencer using CV and trigger/gate inputs, and offset up to 16 Slices from the panel, so a sequence is always exciting.

Slices can be created using the SLICE button, the SLICE trigger, Peak Audio (great for drums), and even upon auto-slice validation always running in the background on each Echo during Echo Mode, each Layer addition in Layer mode, or each click on the REC button during R/P mode.

With the new Slice Groove Sequencer (SGS) Slices being played can be recorded as a micro-timed sequence, then played back without missing a beat. Slices can also be recorded as a Stepped Sequence (up to 192 clocks) and played back using the same clock source, or another, at virtually any speed.

If I haven't sold you on Slices yet, then consider recording a whole set of drums from a computer / sound file using the Peak Slicer option, then playing them back with triggers and CV from a sequencer, ready to globally modify with all 3 PlayFX modes!
Lucky for you, all of this is already included in the Reflex, so enjoy!

## A. The Two Slice Types

First and foremost, it's important to understand the two types of Slices, how they will play, and how to make them.

The two types of Slices are called "1-Shot" and "Looping".
Looping Slices will play over and over when started, whereas 1-Shot slices will only play once then stop. If there is no RP sample playing in the background, then 1-Shot Slices will stop to silence. If there is an RP sample playing, then the RP sample will be heard after the 1-Shot Slice is finished.




### 1. 1-Shot Slices

1-Shot Slices can only be created from:

a) An initial Record in progress, (REC LED is red) A.K.A. "live slicing"
b) An R/P mode Play. This is a useful way to create 1-Shot Slices as there's no hurry!
c) A PlayFX loop with the PlayFX LOOP LED (yellow) off. [V1.03b+]

These Slices have been also referred to as "Sequential" or "Series" Slices, as during record, the Slices being created all follow one another in chronological order, mostly. The R/P Play 1-Shot Slice creation is a more recent addition. These Slices might not be sequential of course.

There . . .is . . another. . Skywalker.. I mean another 1-Shot Slice method:
In the Echo section there was a brief mention of making a Karplus Strong effect with Echo set really tight you may remember. During any Echo that is less than 1/10th of a second long, Slices created will be considered 1-Shot Slices.
Because this tight Echo's can form their own "notes" (Rate CV as 1V/Octave) these Slices can be played as notes, which are pretty agreeable as 1-Shots, rather than loops.

If you really want to play a 1-Shot Slice as a loop, there is a way using Slice LOOP off and PlayFX, covered later on in the next section VI.

### 2. Looping Slices

The second type of Slices is Looping Slices, which during earlier versions of the Reflex was the only type of Slice. How it has been listed 2nd is a mystery, but we'll go with it!
Looping Slices are created during everything else not listed above:

| | |
|---|---|
| Echo mode Echoing: | Created from the present echo point, ending one echo size later |
| Echo mode Inf. Echo: | Created from the present play point, but loops at Inf. Echo loop point and Slice will loop to the start point of the Infinite Echo. |
| Layer mode: | Created from present point in the Layer Play, but loops at Layer's end, and loops to Layer's start point. |
| R/P mode: | Looping Slices aren't made in R/P mode, only 1-Shots! |
| PlayFX w/LOOP on: | Created from PlayFX STart, POSition, or G-Move position. The end is set from END, POS+SIZE, and G-Move Size (Tiny Slices!) |
| Other Looping Slices: | Slice "babies" will have new start points, but will inherit their parent's end Looping point. |

## B. Slicing And Dicing a Sample by:

### 1. SLICE Button

To Slice, or not to Slice? That is the question I ask as a sample zips along. Manual Slicing can give you the best control of all of the methods, and is really easy to use if Slicing a PlayFX that is looping where timing is not important because the PlayFX start point is used.

If you have are all thumbs though, manual Slicing might be a problem. With some practice, setting a Slice on a beat can be pretty intuitive after a while. There is no latency at all (like with many systems) but you'll learn to "lead" on some sounds, like a soft kick, so the Slice starts appropriately and includes that tiny lead-up.




Here's the example to try your "hand" at manual slicing:

1) Hold the Slice button for over 3 seconds to *erase any Slices*. The LED circle will fully illuminate indicating erasure. This is a good habit to get into as it could be possible that an Auto-Slice was played accidentally, which makes them valid! Mode changes and new Recordings will not clear the Slice memory by design so any new Slices will just be appended.
2) Start an Echo (yes we'll start with Looping Slices) and get some audio input
3) During the Echo, tap the SLICE button at key points you would like Slices at. The Red LED "R" over the Slice button will flash with each Slice created. Also, the LED circle will briefly show the Slice number in 8's (1-8, 9-16, etc)
4) Once finished, hold REC to Stop the Echo, and turn Blend over to the right.

*At this point you can skip up to section C. 1. to learn about playing Slices, or just do:

5) Tap the SLICE SEL button (above the white SLICE button) to toggle into Slice Select mode. The green LED over the SLICE button will light.
6) Use the Rate knob to select Slices 1-16 (amber off = 1 to 8, amber on = 9 to 16)
7) Tap SLICE to play the selected Slice! Select another and tap SLICE. If you only made 3 or 4 Slices, the selector will roll and the LED will flash to indicate the actual Slice number. i.e. if you only have 4, then 5 will flash to LED 1.
8) Once you are all "Sliced out", exit Slice Select by holding the SLICE button. This will also exit SLICE SEL and the green P LED will go out.

Now you have exited the Slice Select mode for the Rate knob, and stopped Slice play, this doesn't mean the Slices are gone. If you were to tap SLICE SEL again, then tap the SLICE button, the Slices will again Play.

**Slice destruction, or is it?**

If you were to leave an echo recording, for example, eventually the record head would come around and record over you precious sample data. The Slices would play the same indexes, but with the new recording, which likely wouldn't line up. But if the recording was a certain sound, vocals, or other non-rhythmic audio, it might work. There's the serendipity factor of Slices!

*The new function (V.1.04) of the record button during Slice Play (1-shot or not) is to directly overdub or write over that particular slice. (See section VII. C.) If a Slice Groove Sequence is playing, the REC button will continually record only the Slice areas so can constantly change! (See section VII.D.)*

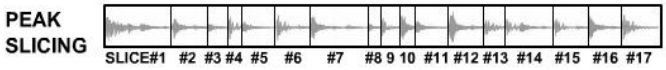
### 2. Slice Trigger Input

The Slice trigger input works the same way as the SLICE button, except that it is valid even when SLICE SEL is active, except that you'd be making baby Slices from the Slices playing!

Creating Slices from a trigger input is very useful if the source sample is being recorded from a sequencer or other module that has a clock/trig/gate output. The trigger input can also be used to create a series of very short Slices from audio input, or a sample playing, and is sensitive enough to be used with a piezo transducer drum pad directly.

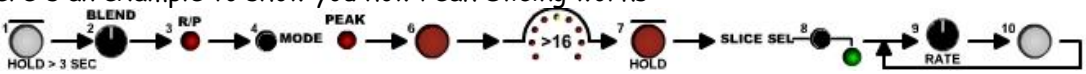
For a more "nimble" manual Slicing experience, any trigger from a keyboard or touch switch module can be used to create or play Slices ( SL.PLY input).

### 3. Peak Audio




As if a modular sampler that has sample Slicing isn't rare enough, one that has Peak Slicing is non-existent, until now! Peak Slicing is singly the pinnacle of the Slicing/Slice Playing experience hands down, and you don't have to lift a finger! (couldn't help the pun..)

Here's an example to show you how Peak Slicing works:




1) Hold SLICE > 3 seconds to delete all Slices
2) Set Blend to center. This is important as the audio must be "heard" by Peak Slicer.
3) Switch to R/P mode using the MODE button
4) Use MODE button to select PEAK. After a second or so, will jump back to R/P mode.
5) Start playing in some audio
6) Tap Record to record the audio and create some Peak Slices, indicated in LED Circle.
7) Once there's over 16 Slices, hold REC > 1 second to stop Recording and Peak.

*(*) These will be 1-Shot Slices so could be quite short, depending on the audio you used!*

8) Tap the SLICE SEL button (above the white SLICE button) to toggle into Slice Select mode. The green LED over the SLICE button will light.
9) Use the Rate knob to select Slices 1-16 (amber off = 1 to 8, amber on = 9 to 16)
10) Tap SLICE to play the selected Slices as in previous example.
-Hold SLICE button to exit when finished.

** Short 1-Shots can be set to Play through by turning off the Slice LOOP. This is the yellow LED in the Slice section. To toggle it on/off, hold the PlayFX LOOP button for 1 second.*

You may have noticed (if the audio had percussion or fast synth stabs) how nicely each Slice aligns with the start of the sounds. Even with talking tracks, or drones, there can be some very good results. It's a quick and easy way to load dozens, or hundreds of Slices.

If there is any misalignment of Peak Slice starts, this can be corrected by adjusting the BackSlice setting in the Settings menu (Section IX. D. "For Your Eyes Only (Settings)") but generally the setting's default is fine.

Peak Slice Auto-Record Start:

An obvious feature to add to the Peak Slicer is a way to arm the record to start on the first sound. This saves wasting a whole bunch of memory and puts Slice # 1 up front. Even if not using the Slices, this is a great way to start a recording!

1) Use MODE button to select PEAK. Will jump back to your sampler mode.
2) Tap REC button. The REC LED will begin to flash, indicating that it's "armed".
3) Start your audio input (great for recording a drum riff) and Record begins!

### 4. Auto-Slicing

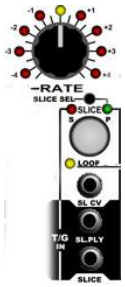
The forth and final (for now!) way of creating Slices is always running in the background when there are no "real" Slices. Auto-Slicing gives the option of going back through some Echo's, recalling a Layer, or playing overdubbed sections of R/P mode, after all has been stopped, or while it's still playing.




Auto-Slicing is most useful when in Echo mode though as Slices can be recalled that are the Echo length always, thus can be played in sync, and are very interesting to sequence. Example:

1) Hold SLICE button to erase all Slices. There must be a clean slate always.
2) Use MODE to switch to Echo mode, and tap REC, then REC again to make an Echo.
3) Add sounds to echo around, as it progresses, then tap REC for Infinite Echo. Don't stop!
4) Use steps 8) to 10) in previous example. **Playing Slices will "validate" Auto-Slices, otherwise they will be over-written by a new Record, or "real" Slices created by you.*

## C. Playing Slices:




As you may have already figured out, there is more than one way, or combination of ways, to play a Slice. There are also different ways a Slice will play, if that makes sense…

The image to the left shows all of the panel area involved in creating and playing Slices.

### 1. The SLICE Button (SLICE SEL) & The Rate Knob

The most immediate way to play a Slice has already been covered in previous examples, but for posterity's sake I will reiterate it here with some additional notes on SLICE SEL.

Understanding the SLICE SEL button's function is very important for a broader use of Slices. Tapping the SLICE SEL button will toggle between:

**Green P LED on:**
SLICE button Plays Slices. *No sample Rate control from knob (Rate CV input still works fine)*
>Rate Knob becomes a 1-16 Slice Selector and 1-16 Slice CV offset is a CV is patched into SL.CV

**Green P LED off:**
SLICE button creates Slices.
>Rate Knob is back to controlling Sample Rates as follows:
No Slice Playing: Sample Rate of a playing RP sample or running Echo
Slice Playing: Base Sample Rate of all slices playing. *Green P LED will Flicker*

This may seem to be a really goofy setup, but hear me out and it'll make more sense:

a) Because the Rate knob doubles as a Slice selector, it can no longer be controlling sample rates. SLICE SEL allows toggling between Slice select control and sample Rate control, so if you wanted to change the sample rate of a Slice playing, or a whole sequence, it's a simple matter of toggling between the two.

b) Because there's only one button to create *and* play Slices, it's logical to make it dual purpose depending on the status of SLICE SEL. This allows new Slices to be created from a Slice already playing.

*Note that SL.PLY and SLICE inputs are independent of each other so will function normally no matter the SLICE SEL setting, on or off.

**SLICE SEL Alternate Functions:**

As if all of that isn't enough to absorb, there's one more thing about the SLICE SEL button you should know (and not discover by accident) is it's alternate function.

If the button is held for longer than 4 seconds, you will enter the Settings Menu!
Unintentionally entering the Settings Menu is not a good thing, and can really mess things up. All of the LED's will light at 3 seconds, at which point you should feel inclined to let it go, but if you hold on for another second, you are there.
Should this ever happen, remember to use the Rate knob to select the first LED in the circle, then tap SLICE SEL again, or just power down. This will get you out without permanently changing anything.

### 2. SL.PLY & SLICE Trigger/Gate Inputs

Now on to the simpler parts of Slices! Sorry about the last section but it had to said.
The two trigger/gate inputs to do with Slices allow external control, which is where the real fun begins, and perform the following functions:

SLICE: Creates a Slice on the low-high transition of a gate or trigger.

SL.PLY: Plays a Slice selected by Slice Select + SL.CV Input on the low to high transition. This can be a gate or trigger, no difference as the high to low transition is ignored, but in the interest of standardization in modular, ar ar, consider it a note gate input.

It's important to note that once a SL.PLY trigger happens, the Reflex is in Slice Play mode, and RP play can only regain focus by holding the Slice button to exit it.
Slice Play mode is indicated by the green Slice P LED flickering quickly.

### 3. SL.CV Input

The SL.CV input can be used to select Slices by voltage. They are zapped into obeying your command so to speak, which gives one a dark pleasure to behold!
"So how many volts do I need to access this Slice or that one?" You probably have asked.

Slices are evenly distributed over a 0-5 volt unipolar range. So if you have only 5 slices, then 0V to .99V would be Slice#1, 1V to 1.99V would be Slice#2 and so on. If there are 50 Slices, then the selection would become 0.1 volts/Slice.
There is some merit to knowing this as you may have a keyboard that uses the .0833 V/note better known as the 1V/Oct format. This means you would need 60 Slices to make use of the upper range, which is probably half that on the keyboard.

Putting exactly 60 Slices into the memory may be difficult, but not impossible! Best not think about that too hard, and just enjoy the fact that you can access up to 400 Slices this way. Most of the time you'll be using between 16 and 32 Slices, or at least I do.

**SLICE SEL (Rate Knob) Offset:**

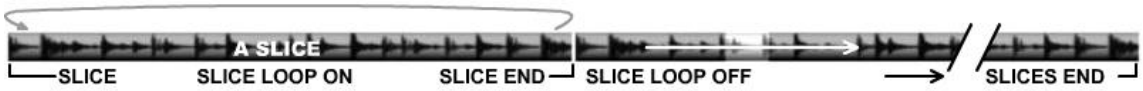
One of the more amazing ways to sequence Slices involves using the Slice Selector to offset incoming Sequenced CV Slices. The 1-16 Slice selection is added (as Slice # not voltages) to the CV.

This means a whole Sequence can be shifted up 1-16 Slices, which will completely change the sequence, but in a way that it sounds intentional (almost always!) Slices requested that are greater than the number of Slices available will roll back around, so no dead spots.

For example, if you have 5 Slices in, the Rate Knob will roll every 5, i.e. LED 5 = Slice #5, but LED 6 = Slice #1. Having 5 Slices means that the SL.CV is 1 volt/Slice. So if you have a CV of > 4 volts, and the Rate knob is at LED 1, then the Slice will be #5. Turning to LED 2 will roll back to Slice #1.
The number of Slices divides the volts per Slice; 10 Slices=0.5V/Slice, 50 Slices=0.1V/Slice, etc.

## D. To Loop, or Not to Loop (Slice Play-Through)

The Slice LOOP control in both Slice types (Looping or 1-Shot) does basically the same thing, allow Play-through. Play-through can bridge into the next Slice allowing a flow of the sample with 1-Shot Slices rather than stopping, and with Looping Slices rather than looping.




Generally there are no issues with this except when Slices span a large area of memory and using PlayFX from Slices while reversed, which will be explained in the next section VI.

Looking at this from another angle would be:

Slice LOOP off: Slice End is ignored, so will play to the last Slice, then loop.
Slice LOOP on: Slice End causes a loop inside the Slice or a stop (1-shot)

## E. Deleting All Slices (The Full Loaf)

Slices must be better than sliced bread as the Reflex can un-slice or delete slices!
To start a new bunch of Slices, and not append existing Slices, all Slices must be deleted. This is now automatic (>V.1.04a) when a new Record starts, but perhaps you start a bad Peak Slice session, or decide these Slices aren't for you, but don't want to have to initiate a new Record / delay? Or perhaps you want to re-Slice over the whole memory by making one giant Slice? (see below) …You get the idea.

To delete all Slices, press and hold the white SLICE button for 3 seconds. The LED circle will fully light to signal erasure.

If, at this point, you try to Play a Slice, the entire memory can play (Slice LOOP can be on or off as no end limits), as there is now zero Slices. This can be an advantage if you accidentally stopped an RP Play and want to regain Slices from it. This Slice can be re-Sliced, but will always play through after the Slice has played. PlayFX can be used to change the Slices back to "normal" Slices, which you'll learn about in the Advanced section, if you dare!

*Note that this does not erase the original Sample if still playing. So, as mentioned above, if you made a mistake Slicing an R/P sample playing, you can erase them, and re-slice it.
How's that for a magic trick!

## VI. PlayFX On Slices

At this point, you have learned about the two types of Slices, how to create Slices, and how to Play Slices using the SLICE button and SL.PLY triggering. But this is just playing back Slices, which can be fun, but not as fun as applying PlayFX to those Slices as they play!

### A. PlayFX On Slices While Using SLICE Button

If a Slice is already playing and the PLAY button is tapped, PlayFX will capture that Slice and use it's parameters to set the PlayFX limits. While using the SLICE button to play Slices, PlayFX will act much like it does when capturing an RP sample. But the state of the yellow Slice LOOP LED changes what PlayFX will capture:

S_LOOP on: PlayFX limits are set to the Slice's start point and loop point
S_LOOP off: (Play-Thru) PlayFX start is set to the Slice start, but PlayFX end limit will be the highest Slice in memory.

The Type of Slice , a 1-Shot or Looping Slice, also has a bearing on how PlayFX will Play the captured Slice:

Looping Slice: (created from an Echo, Layer, PlayFX or another Looping Slice)
Will continuously Loop at points defined by ST/END, POS/SIZE, GM/SIZE. If Slice LOOP is turned off, PlayFX will also loop continuously over the full "play-through" range.

1-Shot Slice: (created from any initial Record, R/P mode Play, PlayFX w/LOOP off, another 1-Shot Slice)
Will only play as 1-Shot, unless Slice LOOP LED is off and PlayFX LOOP is on, in which case PlayFX will loop continuously over the full "play-through" range.

PlayFX LOOP off (Not in G-Move mode):
When PlayFX LOOP LED (yellow) is turned off, PlayFX will "fall out" at the Loop point, and return to the currently selected Slice and start playing it. ( Looping Slices only )
This can allow the return Slice # to be changed during PlayFX, and once the PlayFX LOOP is turned off, triggering that Slice to play.

Because PlayFX was not stopped by holding PLAY button, but rather snuck out, it's in a secret Standby mode indicated by the flashing Yellow LED. When in standby, the same loop will play each time the PLAY button is pressed instead of capturing a new one.
This PlayFX behavior is the same in any mode, works from the PLAY trigger or Footswitch input, and can be useful for inserting a certain sound from time to time.

Holding the PLAY button to exit PlayFX back to a Slice playing works the same way, except that PlayFX is not in standby (Yellow LOOP LED not flashing) and ready for a new "capture".

*If PlayFX is in G-Move mode, it keeps moving: So it will just quickly duck out when PlayFX LOOP is turned off!

| - PlayFX on a Slice - | Slice LOOP LED on | Slice LOOP LED off |
|---|---|---|
| PlayFX LOOP LED on | Looping Slice: Loops the Slice<br>1-Shot Slice: PlayFX exits at loop point (Except in G-Move mode) and stops as does a 1-Shot to silence *or RP sample play* | Starts at the Slice, then plays through entire Slices area as one big loop to be windowed over. Continuously loops. |
| PlayFX LOOP LED off | Looping Slice: Exits at the PlayFX loop point back to selected Slice playing<br>1-Shot Slice: Exits at the PlayFX loop point and stops, *or returns to RP sample if one is playing still*. ( PlayFX Standby ) | Starts at the Slice, then plays through entire Slices area until reaches a PlayFX loop point, then exits to Slice already playing-through.<br>( PlayFX Standby) |

## B. PlayFX On Slices While Using SL.PLY Trigger Input

Using a trigger input to play Slices acts pretty much the same way as the SLICE button, but makes pressing PLAY to start PlayFX act slightly different. Don't worry, it's only a slight difference!




**PlayFX "Arm":**

When Slice are being played using a trigger input to SL.PLY, a tap on the PLAY button will Arm PlayFX to start on the next trigger. Turning PlayFX LOOP LED off will exit into standby as usual, returning to the selected Slice. Holding the PLAY button will exit PlayFX.

With PlayFX LOOP LED on, 1-Shot Slices will still play as 1-Shot PlayFX as usual, and apply the PlayFX loop settings. This is great for shortening Slices, or reversing them for a while.

If you have some Slices in, and a slow trigger source at the ready, you can try this out:

1) Turn on PlayFX LOOP LED, and Slice LOOP LED if not on (hold same button for 1 second)
2) Plug your trigger source into SL.PLY, and for variety, plug a CV into the SL.CV input.
3) Set PlayFX to ST/END and adjust the Start knob all the way up, and the End down.
4) Now tap the PLAY button to arm PlayFX, and the next trigger will play Slice in reverse.
5) If the Slices are 1-Shot, you will only hear the PlayFX once (unless in G-Move)
6) Hold the PLAY button to exit PlayFX, or turn off PlayFX LOOP to standby.

*Turning PlayFX LOOP back on after exiting will set to capture new Slices again!

You may have noticed that when PlayFX is on and it's LOOP LED is on, each Slice triggered has the PlayFX applied to it. This can be great for changing Looping type of Slices into tiny loops.

1-Shot Slices, as mentioned, will just jump out very fast. If an LFO is patched to the "end" part of the ST/END PlayFX cycle (top if reversed or bottom if not) the Slice lengths can be made to slowly vary, adding some variation to a Slice sequence.

**PlayFX Gate while Sequencing:**

A nice little use of the PlayFX Gate input (PLAY T/F/G set to GATE) is to send a gate pulse (remember the Gate pulse length states how long the PlayFX will play) on some of the clocks. Adjusting the PlayFX top knob will start playing at a different point in the present Slice! Gating a G-Move causes a short "hold" on the Slice, a nice effect.

Well that's it for the basic features of the Reflex LiveLoop. If you're feeling confident (and maybe a bit brave!) and would like to explore the more advanced features, read on! Covered in the second part of this guide is exciting / golden hidden features like the Slice Groove Sequencer, Stutter mode, a more in-depth look at triggers, gates, and CV's, and the Clock sync feature

If you have continued to here, congratulations! You have entered the Advanced features half of this guide. Here you will discover those "hidden" features and functions that need a button to be held to enter into.

## VII. Slicing Deeper

As I've mentioned before, Slicing is one of the more powerful features of the Reflex LiveLoop. It allows large samples to be broken down into smaller and manageable bites. . . like eating a sandwich rather than a whole, unsliced, loaf.

These Slices can also be customized into a shorter (or longer) size, shifted in pitch, or even reversed. They can have PlayFX applied to them globally as we've already covered, be overdubbed, erased, sequenced, or even play a Sequence!

### A. It's The Slice Groove Sequencer Baby! (SGS Mode)

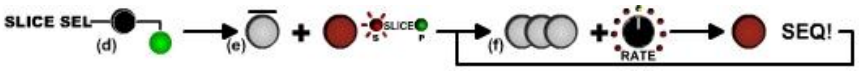
As an augmentation to sequencing Slices, the Reflex has a hidden function called SGS mode, AKA "Slice Groove Sequencer". This seems like an odd thing to name a sequencer, but soon you'll see why!

#### 1. Getting Into The Groove

There's only one way to enter the SGS, and that is simple once some slices have been made.

a) Hold SLICE to erase any previous Slices
b) Select R/P mode, wait, then turn on PEAK and record in a "beat-ful" sample to Peak Slice.
c) Once you have over 16 Slices just hold REC button more than 1 second to stop R/P play.
d) Toggle into SLICE SEL (P LED now on) and tap SLICE and rotate Rate knob to hear Slices.
e) To enter SGS mode, press and hold SLICE button then tap REC button.

Be careful not to hold SLICE too long or it'll erase all of your slices!! Just make sure the Slice button is down before tapping the REC button, which can be a very quick motion.
R LED will come on too, indicating SGS is ready to record some tapping!




#### 2. Toe-Tapping Hand-Made Groove Recording/Playing

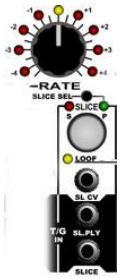
f) Now you are is SGS mode. Try tapping a beat into the SLICE button, then play it back by tapping the REC button, which I know seems backwards. I'll explain in a pinch!
g) Now tap a new beat into SGS using SLICE, but turn the Rate control to select different Slices you have made. Tap REC to loop the sequence as before.

That's it! Not so hard after all. And tapping a beat using Slices can sound in-sync and be really addictive once you become familiar with the set of Slices.

These were sequential 1-Shot Slices you may have noticed, which are always created during an initial record of a sample if you were paying attention in the first half of this guide. I know you were!
Had these sample been created in Echo mode, and the echo was made to be the size of the tempo of the audio input etc., then one tends to tap and SGS sequence that fits that tempo, which is pretty groovy man! … hence the name, Slice Groove Sequencer!

By now, you're probably tired of hearing the sequence you have made, so:
To exit SGS, hold Slice for > 1 second. If both SLICE LED's (R and P) are off, then you have exited SGS and Slice Play mode. If either LED is still on, then hold SLICE again to exit, to golden silence.

### 3. SL.PLY and SL.CV Input Recording




If all that tapping and turning tires you out and makes your fingers sore (it's happened to me!) then relax and let your rack/setup do the work for you! Either or both of the hand controlled elements in creating a SGS can be removed by using the SL.CV CV input, and the SL.PLY trigger input.

Do you have a sequencer (or other) that can put out a repetition of CV voltages and a trigger/gate? If not, don't despair, this will work with any pulse or LFO or anything at all.

a) Get into SGS mode as shown in the previous example d) & e), - SLICE SEL, SLICE + →REC
b) Try plugging your trigger/gate source into SL.PLY jack and select Slices with the Rate knob
c) When you are ready, tap the SLICE button to start recording a sequence using trigger.
d) Tap REC to play the Sequence back. Not much fun really! so . . .
e) Plug a CV into the SL.CV jack and tap SLICE to start recording a new Sequence.
f) Try adjusting the rate control from time to time to see how the sequence changes
g) Tap REC to have a listen to your CV and trigger generated Sequence. Better?

Please note that the SGS Sequence can record up to 192 notes, but using a trigger, memory can fill up pretty quickly, and will roll and start recording over your sequence if passed. This can be useful if you are searching for a really great sequence as the playback will be the last 192 notes, but:
Did you notice that it's really hard to "join" the end of a sequence when using a trigger to create it? The Reflex won't start the sequence loop until another trigger is received, which helps, but if it's a fast sequence, then your chances are small of getting alignment!

Leave the Reflex in SGS mode and I'll show you how to create a perfect SGS sequence recording!

### 4. Clocked Sequencer Recording

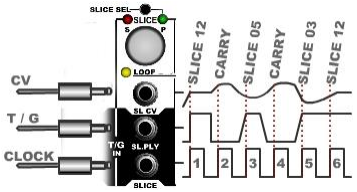
As promised, I will show you a way to record a sequence that is in perfect sync, and stays that way in this final SGS mode. This involves another signal that will clock the sequencer, and should be the Step Clock output from a sequencer, or, if you have no sequencer in your arsenal, just use the trigger source from the last example, which will need to feed 2 jacks so will need to be split. From now on, I will refer to this input as the "Clock" input.

Assuming you are still in SGS Mode and still have a sequence playing, unplug the SL.CV and SL.PLY patches, and plug the Clock patch into the SLICE input.
Notice how the sequence has changed? Every "note" of the sequence is now playing by using the Clock input to step through the sequence. I know it probably sounds disorderly as it was created as a timed sequence. The timed SGS is based on timing the way it was triggered or tapped during recording.
Now the individual Slices are being played on each pulse of the trigger so all notes are played at an equal time that is defined by this new clock input. Got it? Good!
Here's the proper way to put in a sequence, but we must prepare by checking/setting your ClockDiv setting. ClockDiv, short for Clock Divider, is used for several functions in the Reflex, and will be covered soon, I promise!

a) Exit SG mode and SLICE Mode by holding SLICE button about 1 second. Do it again in case.
b) Hold the REC T/F/C selector button > 1 second (just below the REC button) to set ClockDiv.
c) Use the Rate knob to dial to /8, (the 8th LED, +4, with the amber LED not on.)
d) Once LED 8 is selected, tap the REC T/F/C to save the setting.
e) Tap the REC T/F/C again to set it back to TRIG as will be in RP sample clock mode. Not OK!

Why did I just set ClockDiv?
This is because the Slice Groove Sequencer will now be in Clocked Step mode. This mean that not only will it wait for a clock before recording in the selected Slice to the sequence, but it can be aligned to loop only on every nth Clock, "n" in this case has been set to 8.
OK, OK! This is confusing I know, but it'll all come clear in this next example.

**SGS sequence recording with a Clock:**




a) Get back into Slice mode (tap SLICE SEL) and SGS mode (SLICE + →REC)
b) Patch in your CV to SL.CV, your trigger/gate into the SL.PLY input, and your Clock into the SLICE input as shown in diagram.
c) Tap SLICE to begin recording a sequence
d) Turn the Rate knob for some variation etc.
e) Tap the REC button to end the sequence and hear it.

At this point you may have noticed the sequence didn't loop right away (unless you luckily hit the REC button at the perfect time, which almost *never* happens!). This is because SGS has been counting Clocks going into the SLICE input, and will only end a sequence on every 8th count.

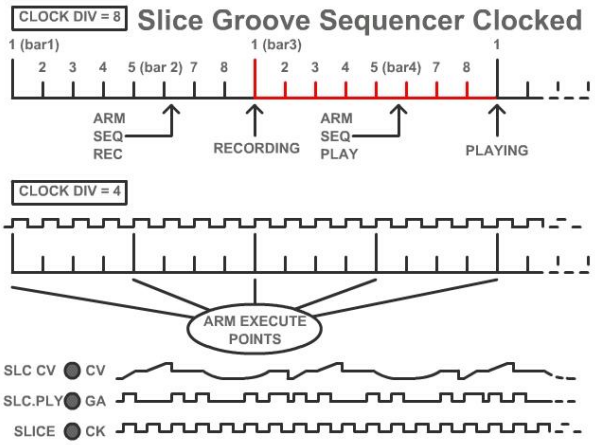
Now you are most likely yelling "but it's still not aligned with step 1 on my sequencer!" This is because the SGS doesn't have a clue where to start, so just started at the time you first plugged in the Clock. To calibrate and sync SGS to you sequencer is simple:

a) Tap the SLICE button to switch SGS back into recording.
b) Just before the your sequencer steps to Step 1, tap SLICE again.
c) Tap the REC button to see if things are up to expectations, if not try again!

In many cases alignment doesn't matter, but if it totally does, and you can stop your sequencer from stepping for 5 seconds, (wait for the LED Circle to flash) SGS will automatically align to step 1, ready for the "big start", which will undoubtedly dwarf all previous sequences!

Once the clock is aligned, it stays that way: Record in an SGS sequence for a few "bars" of 8 steps, then switch to play SGS (REC button).
Try speeding the clock up and slowing it down. You can even unplug the CV and trigger/gate to use elsewhere.
If the Clock is removed, then this SGS sequence is always at the ready for that first clock to step through.

Remember, SGS can only record 192 steps (24 bars of 8 clocks in this case) but wow, what you can do with 192 steps! Blues anyone?




Before I close this section on the Clocked SGS sequencer, I must mention a few thoughts:

-If you start an SGS sequence record that's not working out, start playing the sequence (REC button) then switch to the new sequence record (SLICE button). If you just tap the SLICE button to start a new record, and it's already recording, this will be "seen" as a re-alignment to the next clock pulse.

-Sample Rates: Slices getting sequenced into SGS during record are triggered externally, so you may toggle the Rate knob out of Slice Select mode (tap SLICE SEL, green P LED flickers) and into Rate control of the Slices, and globally adjust their rate which adds to the fun!

-As with "regular" Slice play, Slices playing in a SGS sequence can have PlayFX applied as with all Slices. Patch an LFO into one of the PlayFX CV inputs (ST/GM/POS or SIZE/END) and see what happens!

-Once a pulse has be received at the SLICE jack while in SGS, timed SGS mode is suspended until SGS and SLICE mode are exited/stopped; Back to finger-tappin' again!
**NEW! A timed sequence that has been clocked can be re-started by cycling REC T/F/C: T->F->C->back to TRIG.

## 5. SGS Clock/Trigger Outputs To Keep The Beat

You thought we were finished with SGS mode didn't you! There is one more feature that you will find useful. Switching REC T/F/C down to CLK during a Slice Groove Sequence will output it's own clock, or trigger, to drive other elements of your system.

*If SGS sequenced is timed (non-clocked) the output from the REC jack will be a derived clock, which is indicated by the TRIG LED flashing to the beat, which is great for clocking a sequencer or delay.

*If SGS sequenced is Clocked (plugged into SLICE input) then the CLK output from the REC jack will be triggers set by clocks that were accompanied by a Slice play trigger gate. So the Gate output the sequencer possibly used is duplicated upon playback, so could effectively act as another sequencer for percussion, or to trigger an envelope, less the CV of course!

The Clock output is the most interesting by far as it can be used as a tap tempo from a complex tap sequence, or a "clock copier" that continues a clock fairly accurately.

Here's an example of a hand-tapped sequence creating a clock output. (Assuming Slices exist!)

1) Enter Slice Play (SLICE SEL), Enter SGS mode (SLICE+→ REC) and Tap a sequence (SLICE)
2) Tap REC to loop the sequence/stop recording it.
3) Select REC T/F/C to CLK to see the tempo/beat. Patch to a percussion to check it out!

Clock Derivation:

This won't be a math lesson so don't worry about that. The way a Clock output is derived from a rhythmic bunch of taps (no just singles like a tap-tempo) is rather interesting.

It's based on a time domain, and timing limits. These limits are between 60 BPM and 120BPM, and always assumes 4/4 timing.

So if you were to tap an SGS sequence by simply tapping once every second, the interpreter would derive that the tempo is 60 BPM. If you tapped a bit slower, say once every 1.33 seconds, (like any of us could do that with any precision!) the tempo should be 45BPM, but because there is a lower limit, the actual BPM would end up being twice that at 90BPM.

"So why does it sound like 180 BPM is being output?!"

That's because it really is 180 pulses per minute. The ClockDiv setting, now at /8 which was set in the last section (4) if you have been following the examples, has a direct affect on the number of clocks this derived beat will have.

The formula: Cd/4 explains this. 8/4 = 2 clocks per "beat"

Had the ClockDiv been set to 4, then the actual BPM would emerge. Some ClockDiv settings are more useful (in pink!) than others. The following table explains:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cd = 1 | 1 clk/4beats | Cd = 5 | 5 clks/4 beats | Cd = 9 | 9 clks/4 beats | Cd = 13 | 13 clks/4beats |
| Cd = 2 | 1 clk/2beats | Cd = 6 | 3 clks/2 beats | Cd = 10 | 5 clks/2 beats | Cd = 14 | 14 clks/4beats |
| Cd = 3 | 1 clk/1.5beats | Cd = 7 | 7 clks/4 beats | Cd = 11 | 11 clk/4 beats | Cd = 15 | 15 clks/4beats |
| Cd = 4 | 1 clk/ beat | Cd = 8 | 2 clks/ beat | Cd = 12 | 3 clks/ beat | Cd = 16 | 4 clks/ beat |

. . .but that depends if you're a waltzer or not (1,2,3,1,2,3). For those, you'd set ClockDiv to 3, 6, 12.

Because of this auto-clock generator, the Reflex can be used as a handy tap tempo clock. The longer the time between taps (SGS record and play), the more accurate the tempo will be. You can simply enter Slice mode, then SGS mode, turn down the Blend so sample can't be heard, then tap away!

## 6. Exiting SGS Mode

It's already been mentioned above, but I'll re-iterate:

The best practice to exit SGS mode, which also exits Slice mode and any PlayFX playing, is to hold the Slice button for 1 second, then hold it again for 1 second. This is because sometimes SGS may be at a sequence loop point or other step that it won't fully "see" you holding the button, but Slice mode always does. You can tell if it hasn't exited properly as one of the Slice LEDs ( R or P ) will remain on.

* Don't hold that SLICE button too long or you'll erase the slices, unless that's what you want.

## B. Modifying/Removing Slices With PlayFX

If you liked the way a Slice sounded when a PlayFX started looping it around, this can be used to modify the Slice "permanently". Sometimes a Slice may be a bit too long and need a trim (like my hair does right now!) or perhaps there's just one part of a Slice that you want, the rest can go.

**Modify Looping Slices:**

You can use PlayFX STart/END or POS/SIZE modes to edit a Slice. You can "window" over the area, which will be continuously looping, find the sound you want to save back to the Slice in place of the original, tap PLAY button then REC button immediately after and "Bob's your uncle" the new sounding Slice will be playing!

To "preview" how the Slice will start when played/triggered, tap the PLAY button a few times. Here's a short example to try. This assumes you have some looping Slices (made from an Echo or PlayFX) already in memory.

1) Switch to Slice Play (SLICE SEL button) if not already there and play the offending Slice.
2) Turn on both PlayFX LOOP and Slice LOOP (hold button) for this example
3) Use PSEL button to select the PlayFX mode ST, start/end.
4) Tap PLAY to do a PlayFX capture and window over the Slice in PlayFX.
5) Once the loop seems to be in a better way, tap PLAY to test how it will sound as a Slice
6) To Save back to the Slice, tap Play then tap REC immediately after (you have 1 second!)

The new Slice will be playing and looping and doing it's thing!

If you return to PlayFX, the original Slice will be recalled so it acts as a kind of "undo". This is a good feature to have, but remember the ability to PlayFX on Slices that are playing? The original will always be recalled upon entering PlayFX, which is an unfortunate side-affect of Slice modification. . .or is it?

There of course is a diabolical solution. Hold SLICE button to exit Slices, then re-enter (SLICE SEL) and tap SLICE button to play your Slice. Start PlayFX, and voila, it's still the new Slice! This happens because exiting Slices clears any created "undo" references, and any entry into PlayFX is considered a new entry.

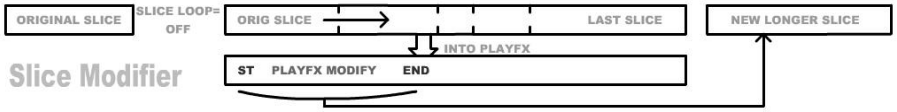
**Modify 1-Shot Slices:**

One-Shot Slices (created during an initial record, from R/P Play, or from a PlayFX with it's LOOP turned off) are a bit trickier to modify, just because they are fast and always trying to stop. Create some 1-Shot Slices (hand-tapped during an initial record for practice!), then follow the above example except make sure to tap Play often, while tuning the PlayFX knobs.

Once finished, test the Slice by playing it.

**Lengthening Slices:**

Slices can be made to be longer, even though they always have the same limits in PlayFX when played. Turning off the Slice LOOP (Hold LOOP button) will allow Slices to "play through" as mentioned long ago in the newbie half of this guide. As soon as this is done with a PlayFX active (or before entering) PlayFX will be able to window over the whole Slice range following, up to the highest Slice ever made.




If there is a lot of sample memory over that range, be prepared to use the Fine mode in PlayFX (tap PSEL to toggle into/out of Fine) as the controls will be sensitive. Tap PLAY then tap REC to save.

**Copying Slices:**

There is also the option to Copy Slices to run over less desirable Slices, or whatever. This can be done by simply selecting a different Slice before tapping PLAY → REC to save.

**Removing Slices:**

Sometimes there is a "dud Slice in there you wish to be gone. It can be deleted! Just play the nastly Slice, then enter PlayFX with both knobs fully down. Tap PLAY → REC as if to save, but you have tricked the Slice into digital doom!

## C. Overdubbing Slices With The RECORD Button

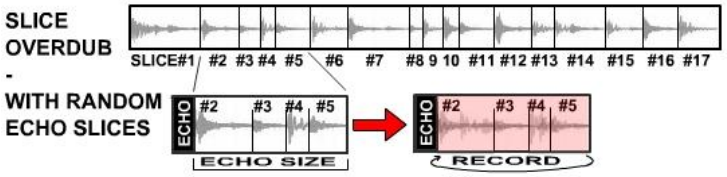
This final feature with Slicing lets you overdub a Slice, mixing the original Slice with new audio, or completely replacing it with new audio, depending on the Feedback level. This feature can be rather dodgy and can produce "clicky" results , so don't be too serious with it!

To overdub a Slice:
1) Play the Slice, then tap the REC button.
2) Tap REC again to end overdubbing.
The way Slice overdubbing works is different for the two types of Slices, Looping and 1-Shot.

**Overdubbing Looping Slices:**
Upon tapping the REC button, record starts immediately and loops inside the Slice range. This will cause an echo effect if the feedback is turned up and new audio is being fed in. Turning down Feedback and having no audio input will fade the Slice down on each loop, or if an EQ band is turned up some, you can bring it up to the point of distortion. Clean to dirty distortion if you so wish!

**Overdubbing 1-Shot Slices:**
When a 1-Shot Slice is played, it stops or returns to an RP Sample playing, so if the REC button is tapped after that, the Slice is silently recorded with new audio, nothing, or the RP playing if the Feedback is turned up. Because the record is looping, only audio from the last loop will remain. Needless to say, 1-Shot Slices aren't ideal for overdubbing!

**Overdubbing from Echo mode (Looping) Slices:**
If Slices are made during Echo mode, and are not Auto-Sliced, there is a good chance that more than one Slice resides inside of an echo period. For playing these Slices there is no problem as they just loop after an Echo period, thus making all Slices the same size.




But when a Slice is overdubbed, the record will loop at the Echo period after the Slice, which would also overdub following Slices. (See diagram)

There is a way to fix this, but be weary of overdubbing Echo Slices that are close together, especially if Peak Sliced. If an Echo-made Slice is modified using PlayFX, then saved, (see last section "Modifying…") this will correct the problem of running into the next Slice. Of course the loop will now be shorter.

**Fun with Overdubbing!**
It can be pretty interesting to quickly dub into a Looping Slice, keeping the original by having Feedback turn up. One of my favorites is to record an instrumental/percussion passage in Echo mode roughly sync'ed in size with the piece and with the Feedback turned down so it doesn't echo, and Peak Slice it. Then connect up a pre-amp with a microphone and overdub vocal approximations of the sound. i.e:
A bell could be a whistle or "biiiing", or a snare could be "trfff", while a hi-hat might be "tick"…
After you have modified a bunch (up to 16 from the panel) go to Slice # 1 and turn off the Slice LOOP so it will play through the entire recording, complete with those "vocal" modifications. Hilarious!

**Overdubbing Limitations:**
-Reversed Slices cannot be over-dubbed. It was tried and had terrible results not fit for man or beast, so has been blocked. Record just won't start on a reversed Slice.
-Slices are permanently changed. Unlike Slice Modify, there is no going back once a Slice has been overdubbed.

## D. Global Slice Sequence Overdub

A new "just for fun" innovation that has been added as of V1.04a is the ability to Record into playing Slices (either by SGS or a sequencer trigger) in a global sense. Previously this could be done by leaving Record run while the Slices were playing, and after 3 minutes the previous Slice samples would be overwritten with new / mixed audio.

No longer is a 3 minute wait required! The first (lowest) and last (highest) Slices instruct the limits on recording. If you only have 10 Slices, and they were all created in sequence or from a PlayFX of the same sample loop, then they will update in this time. The timing can be aligned carefully by creating X number of slices from a clock, then using that information to estimate the update time, but as this is really more of a "serendipity" feature, just let it go!
Here's how:

1) Create a bunch of Slices using you favorite method and type, but within 10-30 seconds.
2) Tap SLICE SEL and play the Slices to check how they sound
3) Hold the SLICE button and tap REC to enter SGS, *or hook up a sequencer to SL.PLY and SL.CV.*
4) Tap in a sequence then play it, *or sequence them* so they are actively changing
5) Tap the REC button. If there was still a record active, this will stop the record. You'll have to tap it again to start recording into the Slice set.
   If the RP sample is just playing/stopped, then record will begin and you Slices will start to change!
6) If there's a great sounding sequence, quickly stop that record by tapping REC.

When the Slice Set record is stopped, any RP play or Echo will be stopped as if you held the record button. This is to prevent confusion and simplifies operation. The REC will go dark.
So in a nutshell, if in SGS mode during play slices, or Sequencing Slices, then tapping the REC button will start recording a new Slice Set.

**Feedback effect:**
If the feedback was left up, some of the "old" Slices will be re-recorded back in along with incoming new audio. This is not on a per Slice basis, but a mix of whatever Slice happened to be playing at the time the "record head" passed a certain Slice. This can result in some bizarre echoes, on some Slices, and one Slice's sound being included in many Slices.

Changing the sample Rate of the playing slices via Rate CV or exiting SLICE SEL to change it via the knob can also cause some pitching effects, and a lot of clutter (if that's your thing) to the point of becoming a changing soundscape in of itself if the Feedback is high enough.

This audio can be great if fed into a deep reverb for background ambience of the foreground music you are playing.

Next CV/T/F/G/C inputs will be covered in more detail, so you can come back here and try some things even *I* haven't thought of!

## VIII. External Control Inputs

All of the I/O jacks were lightly covered in the first half of this Guide, but this section will provide a more in-depth understanding of how they interact and can be used.

### A. Pulling The Trigger On Inputs (T/F/G/C selection)

Each of the two selectable bi-state inputs, REC and PLAY have their own set of input types, and are quite different, while the non-selectable bi-state inputs, SL.PLY and SLICE are always edge-triggered. The term "bi-state" refers to the input being recognized as either low (< .6 volts) or high (> .6 volts), not to be confused with "bi-polar" which is what I'm accused of being from time to time!

#### 1. Triggers & Gates

The 4 bi-state inputs have a black background on the panel for easy identification (and standards). Here's a summary of each of these inputs in their default or fixed state as a trigger.

**REC Trigger:**
A low-high transition will always trigger a REC operation. When in:
Layer mode: 1) Starts a Layer record, 2) sets layer size, switches to play 3+) ignored.
*This is good to set a Layer to a tempo, but see *3.Clock* for a better option.
Echo mode: 1) Starts a record, 2) sets Echo size and starts Echoing, 3) switches to infinite Echo, 4) continues echoing, 5+) toggles between infinite Echo / Echo
*Alternating Inf.Echo/Echo will not change echo speed. See *3.Clock* below
R/P mode: 1) Starts an R/P record, 2) Play recorded sample, 3+)toggles between Play and Record
*If the trigger is always the same, R/P will act as a stepped Echo, if not the same, some very interesting overlays can be created with a gradually growing R/P loop!
PlayFX all modes: Follows the steps of selected RP mode above, but will record present PlayFX audio as a mix with incoming audio if Feedback is turned up.

**PLAY trigger:**
A low-high transition will always trigger a PlayFX. When yellow PlayFX LOOP LED is:
On: Captures a PlayFX loop from:
- Initial Record: From the start of memory to the present Record position except when PlayFX is in G-Move mode, where G-Move starts at the present record position. *This is great for "Live Freezing" audio input!*
- Echoing: The last echo up to the time of entering PlayFX. If PlayFX is in ST or POS modes, and knobs are at extremes, the PlayFX entry may not be noticed.
- Infinite Echo: From one echo back to present point in Infinite Echo.
- Layer Playing: From the present play position in previous Layer to present Play position.
- Layer Rec'ing: Same as above. New recording in progress will be ignored except in G-Move.
- R/P Play/Rec: From start of R/P to present loop point of R/P.
- PlayFX playing: Re-starts the present PlayFX loop from point defined by top PlayFX knob.
- Slice playing: From start of Slice to end of Slice if Slice LOOP LED is on. From start of Slice to end of highest Slice if Slice LOOP LED is off.

Off: Plays last captured PlayFX and exits to RP play or Slice play (if was captured from a Slice)

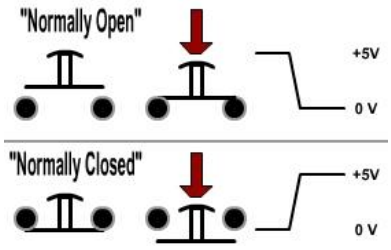
**SLICE trigger:**
A low-high transition will create a new Slice from presently recording or playing sample / PlayFX except when in SGS (Slice Groove Sequencer) mode where SLICE input becomes a SGS Step Clock.

**SL.PLY trigger:**
A low-high transition will always play a Slice selected by SLICE SEL (Rate knob) + SL.CV except when in SGS (Slice Groove Sequencer) mode during Playing a Sequence, when this input is ignored.

So there's all of the bi-state inputs as triggers, but we're not finished yet! The REC and PLAY inputs can be set to respond to other than straight trigger inputs. This is covered next.

## 2. Foot Switch Inputs

A unique input setting for both the REC and PLAY inputs is FSW, or footswitch, also called S-Trig, which I believe means "switch trigger". When FSW is selected, the input has it's own voltage pull-up so any switch can be used as a trigger. This saves adding a Trig→S.Trig converter to your already crowded rack!




**Footswitch Type:**

Footswitches come in two flavors: Normally open contacts (control button), and normally closed (most sustain pedals).

Depending on which type your footswitch is, it may be required to change the setting from the default "normally open" setting. See sect. IX. D. Settings Menus to permanently change the setting.

**Footswitch Actions:**

As a rule of thumb (or finger in this case!) the footswitch will act the same way as the buttons in all modes. The only exception is with the REC input: During Slice Play, the REC button becomes a Slice overdub record/stop control, whereas the footswitch will still be a regular Record function.

* Holding the footswitch > 1 second always stops/exits Rec/Play/Echo/PlayFX.

**When in Layer mode, holding the footswitch will first begin a fade-out after 1 second, then stop. If you don't want this fade then hold for 1 second and release immediately.

**Footswitch uses:**

The footswitch mode was added primarily for the Layer mode, to free up ones hands if playing a guitar, keyboards, violin, what-have-you. Because it can work in tandem with the REC and PLAY buttons it can be useful for an extra *control spot* if you have a large rack(s) or stage to traverse.

By holding the PLAY footswitch, a PlayFX can be applied until released, great for G-Moving a live recording! Also the same PlayFX sample can be re-triggered each time the footswitch is tapped. If PlayFX LOOP LED is off, then it will exit by itself. Great for inserting the same sound over and over.

During a Live performance, in echo mode, the footswitch can be used to start a Record, then tapped again to set the Echo size after a bar or two, then you can build on the Echo or switch to Infinite Echo.

On the other hand, even though your hands are free (sorry!), you can use Echo to echo the end of a song by *tapping* the REC footswitch on the last note, and then *holding* the footswitch at the echo point until the Echo has died out then release to stop/exit.

## 3. Clock / Sync Input

"Strap yourself in kid, we're about to make the jump to light speed!" best describes the following Section. Being able to sync a module to match the song in progress is probably one of the most important things in the new digital modular world. It was important in the early days, but those were more "dronie" times.

I haven't put sub-sections in the main index for Clocking as it may scare a few people away! Besides, it's not really very complicated and is intuitive once you have done it a few times.

The first Example will simply show you how to sync an Echo/delay to an incoming Clock trigger by varying the sample Rate up (a bit) or down (a lot!), and the Clock Divider's primary function: this! Setting the Clock Divider:

a) Hold the REC T/F/C selector button > 1 second (just below the REC button) to set ClockDiv.
b) Use the Rate knob to dial to /16, (the 8th LED, +4, with the amber LED on.) fully up.
c) Once LED 8 is selected, tap the REC T/F/C to save the setting.

You can use other ClockDiv's of course, but set it to /16 as it's nice and slow to start. Oh, and turn up the feedback control to near the top. Now you're ready to do your first Clocked Echo!

**Clocked Echo: Variable Sample Rate**

1) Switch to Echo mode using the MODE button.
2) Select REC T/F/C to CLK (should already be there) then plug your favorite Clock source into REC. input. Serve up some audio to the Reflex AC ins, something preferably controlled by this same clock.
3) When ready to begin the Echo, tap the REC button. It will begin recording on the next clock pulse.
4) After 16 clocks the Echo will start by itself!
   At this point you probably want to speed up the clock to see how fast it'll go. Don't! This type of clocking will shift the sample rate, and as we're already at the maximum Rate, there's only a small bit of wiggle room going up! There is a lot of room going down though.
5) Try tapping the REC button to enter Infinite Echo.
   Notice the green REC LED flashing? It has waited until the 16th clock before switching. Now you have full range clock→Rate capability. If you try to start Echoing again and the sample Rate is above maximum for recording, nothing will happen. Turn the clock back down again.

This method of Rate-Shifted Clocking can be used with the other 2 modes:

Layer: Clocking in Layer mode assumes the clock is very steady, and is primarily to maintain sync with the master clocking device using averages and counts. Please use a fairly stable clock in Layer.
**NEW! When Clocking in Layer, the PLAY input set to FSW will control Layer Steps via footswitch.

R/P: Clocking in R/P mode works the same as Echo mode, but only for the initial REC→Play, any further taps on the REC button will try to insert immediately and conflict with the clock.

**Clock/Loop/Trigger Output Feature:**

As a side note, when REC T/F/C is set to CLK and a PlayFX is looping, a trigger will be output each time that PlayFX loops. This output only happens if no input clock is detected; an "auto-feature".
This works with Slices also, so can primarily be used to trigger envelopes for a VCA or filter, or what ever you can imagine!

**Clocking an existing Sample:**

In R/P and Echo modes (not Layer mode) it is possible to begin to Clock an existing sample playing. The only criteria is the loop will be fit inside your ClockDiv clock cycle. Here's how:

1) Tap REC to Record in a drum loop or short 4 or 8 beat loop in R/P mode so the loop point aligns well.
2) Set REC T/F/C to CLK once sample is playing/looping
3) Patch in your clock signal. *Tip: Try to match the clocks/ClockDiv to the sample length first*

Immediately there will be a jump in the sample Rate as the clock time sync's into the loop time. If this change is really big, perhaps check you ClockDiv setting. Really long samples (20+ seconds) will require max ClockDiv (/16) and a slower clock. Of course, in situations like this I tend to just use the sequencer's "Step 1" trigger as a clock, so the playing loop always aligns to the first Step of the sequencer (eventually). Pretty smart eh?

Next is a different/better way to Clock an Echo, *without shifting the sample rate*, which most people prefer I'm sure, but then it depends on what your goal is.

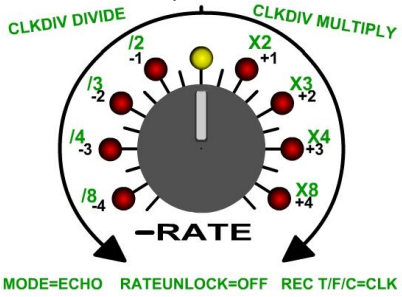
**Clocked Echo: Locked Sample Rate**

The second and preferred way to Clock an Echo/delay is to turn off "Rate Unlock" which hasn't been quite covered yet. This could also be thought of as just turning on "RateLock", and is what it sounds like, a mode that locks the sample rate. The sample Rate is fixed at maximum.

Simply hold the MODE button until you see LED's in the LED Circle zip inward. The sample Rate is now locked at 48Ks/s. Holding MODE again will cause the LED's to zip outward, unlocking Rate.

When the sample Rate is locked, a Clocked Echo will act very differently, as it can no longer maintain sync with the clock input by moving the sample rate.
The Reflex instead trims the Echo size to fit the clock, and does a good job of it too!

**Echo Clock Multiplier/Divider:**




In Echo mode, with the Rate locked, the Rate knob becomes a clock time divider and multiplier as shown. This takes you ClockDiv setting (1-16) and applies the divide or multiply to the Echo size on-the-fly!

I.E. If your ClockDiv is set high, say to /16, then turning Rate down to /8 will make the Echo 16/8 = 2 clocks long. There won't be a lot of math if you stick to standard ClockDiv's, like 2,4,8,12,16, but odd numbers can produce zany results!
The "/3" is for 3/x clock times (you are rare if you use these!) and can again produce an interesting echo / clock combination.

Example:
So it's time to give this a try! First, hold the MODE button to see LED's zipping inward to the amber, which will Lock the sample Rate. Then make sure you're in Echo mode, and have your ClockDiv to 16 if not already there (Hold REC T/F/C then crank the Rate knob fully over to select /16). Finally, make sure REC T/F/C is set to CLK.

1) Patch your favorite Clock source into REC jack. Notice the REC LED flashing to the clock.
2) Set the Rate knob to center (LED's won't change yet)
3) Tap record to start recording, then echoing. (RED LED will change to orange after 16 clocks)
4) Assuming you have some audio feeding in, lower the feedback some so things stay uncluttered.
5) Adjust the Rate knob to (-1) = /2. Notice how the Echo time just halved?
6) Adjust the Rate knob to (+1) = *2. Notice how the Echo time just doubled?

You can take it from there! The changes to the Echo times are pretty seamless, and are completely synced to the clock. The longer Echo times won't change to shorter times right away as that change always happens on a "loop marker".
An interesting thing to try is to get a 1:1 (Rate centered) loop going, then switch out to X2 (+1) to add some other sounds to the now "double length" Echo. If going from a fast echo (/8) make sure that it echo's enough times that it can "fill" the longer echo time. Just play around and you'll see!

**Rate CV:** Yes, your wish is my command! The Rate CV input can control the Echo Clock Multiply/Divide fully!

**Varying Clock Speeds:**

It's important that you use a stable clock that doesn't vary much when an Echo/delay has a very long decay, as all of those tiny corrections/adjustments will add up and make the echo sound "lumpy".
- Sorry, but that's the best way I can find to describe the way it sounds!
This doesn't mean you can't vary the Clock speed, as you most certainly can. Just keep in mind these variations should not be constantly changing or your nice echo will be chewed up in correction lumps.
Again, experimentation is the best teacher, and clocked Echo's are always entertaining! Infinite Echo works fine with clock changes, and isn't destructive.
*Note: If the Rate is Locked, clocking in R/P mode or Layer won't work [@V1.03b+]

* TIP: The Rate will unlock on the next power-up, but can be changed to power-up as locked in Settings(IX. D)
*TIP2: Starting a PlayFX will capture the Echo Size and play it if the PlayFX LOOP LED is on. By turning off the LOOP LED, it will happily exit, but retain the captured Echo. So if you change the clock speed or the Clock Multiplier/Divider a tap/taps on PlayFX will re-insert the sound into a new Echo size.
If PlayFX LOOP LED is turned on while PlayFX is playing it will continue looping, but turning it on when not playing a PlayFX will set it to capture a new Echo/sample.

## B. Smooth CV'ing (CV Inputs)

The CV inputs for Rate, EQ band(s), PlayFX ST/GM/POS, PlayFX END/SIZE, and SL.CV will be covered here. You have already used these I have no doubt, and they were explained in the first section, but a bit more understanding is never a bad thing!

### 1. PlayFX CV Inputs (Don't Touch Those Dials!)

The PlayFX CV's allow "knob-like" control of the 3 PlayFX modes, and also Stutter (to be covered in the next chapter) modes.




As you already know, the top PlayFX CV input offsets from the top knob, and the bottom CV offsets from the bottom knob. This means that if you want full range CV control, you need to have the knobs turned all the way down. In some cases, the CV adds to the knob to get beyond the knob settings:

POS:

-CV Will take the play head up to one whole knob width beyond the knob's maximum.

G-Move SIZE:

-CV Will up to double the grain Size above the max knob limit.

All of the other modes/inputs will just "top out" at their maximum if Knob + CV is > end.

**PlayFX Fine modes:**

If PlayFX is playing and switched to "Fine" mode (Tap PSEL to toggle) then the CV's will control the Fine mode as do the knobs. This can allow control of the PlayFX sample in smaller ways, and add some new possibilities (such as G-Move SIZE playing grain "notes"!)

As mentioned before, the PlayFX CV's are unipolar 0 V to 5V range.

The scan rate for PlayFX CV inputs is very fast, but most changes only occur at the Loop point, with the exception of G-Move which is instant. The reason for this that the sample would continually be updating with CV change and scrub through the sample always. If you want this effect, it can easily be done in PlayFX POS/SIZE mode (with the SIZE turned down) so would be annoying *and* redundant!

While on the subject of "scrubbing" through a sample, the Scrub effect has been purposely added to the top PlayFX knob to assist in finding a spot in the sample. If you don't like this, it can be changed in Settings, section IX. D.

### 2. Rate CV Input (Getting Up To Speed)

The Rate CV input is fairly self-explanatory, and acts the way the Rate knob does, but with one extra bonus. The 5th octave can be reached by adding the CV input to the Rate knob offset on the positive side. The reason the Rate knob doesn't quite make it to the 5th octave is, well only 4 LED's! It also has to do with math, the Reflex core, knob resolution… don't ask and I won't tell.
This is also true for going downward, although it's much harder to hear the difference.

The Rate CV has an attenuvertor, which means the CV's affect on the Rate knob's position can be very small, or very large, and even inverted (hence the name). No matter where the Rate knob is positioned, the CV can linearly add to or subtract from it except when:
1) Recording/Echoing and the Rate is already at center, it can't go any higher during record
2) The Rate knob + Rate CV totals > 5 octaves (32x normal) or < -5 octaves (normal /32)

**1 volt/octave:**

When the attenuvertor is fully clockwise, the CV reaches standard 1V/Octave affect on the sample rate. This means that if you had recorded the musical note "C-3", then setting the CV input to +1 volt will change the sample to "C-4", one octave up. If the Rate knob was turned down until the (-1) LED illuminated, then the note would be back at "C-3".

This gives us the option to use any sample to play "notes" at 1 volt/ octave, which is a great feature! Couple this with a PlayFX trigger and you have a universal "sample synth" not to be taken lightly.

## 3. EQ Band/Blend CV Input (Dancing dB's)

The EQ CV input is a fairly unique feature in modular samplers I believe, and adds even more to the compactness of the Reflex in the way of "essential" features. OK, you're probably thinking "but I have an EQ off-rack and plenty of filters already, why do I need another one?

This EQ is not only tailoring the output audio during playback, but is inserted into the feedback channels. This means certain bands can be selectively attenuated during a Play+Record or Echo with an exponential effect on each pass, which is pretty handy.

The EQ CV can +/- 15 dB with +5 volts to -5 volts, giving variable control over what Echo's, for example, and what doesn't (as much!), but must be used with caution as this can add 15dB to the final output, or in more understandable terms 21 volts peak to peak!

Here's an example to test CV'ing a band on the EQ during Echo.
1) Start an Echo, about 2 seconds long, but turn down the Feedback to about half way.
2) Select EQ MID band (green LED). **The MID center freq. can be changed in Settings (sect. IX. D.)*
3) Patch in an LFO (+/-) to the EQ jack, and adjust the EQ attenuvertor to 12 o'clock (almost full)
4) While echoing, slowly turn up the Feedback, but not too high!
If your LFO is over 1 cycle/second you'll hear the effects right away. Notice the RGB LED? It's relative brightness is tracking the LFO input.

This is a fairly extreme example, but also obvious for example purposes. Normally there's be less than 26 dB of swing! If used with the HI band, this can add a pleasing flutter to otherwise boring delays.

**Bipolar and Unipolar EQ CV:**

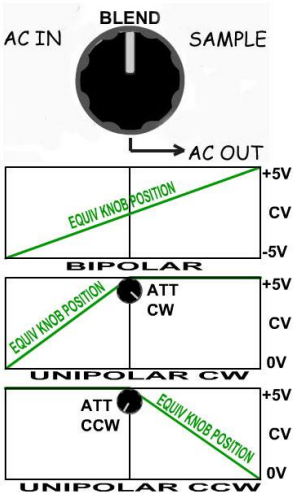
The EQ CV can be set to cover the entire range (-15 to +15dB) from a CV that only ranges 0V to 5V. This is useful when using the EQ CV with an envelope (as few fall below 0 volts) to shape samples, an excellent way to "spruce up" PlayFX or Slices.

Hold the EQ button for > 1 second to toggle to unipolar CV mode. Hold again to toggle back to bipolar. As there is no obvious indicator of this mode change, it can be checked by turnin down the attenuvertor with nothing patched in: If the level drops, it's in bipolar. If it rises then it's unipolar.

*Note, when using a CV on an EQ band, please remove the plug or set the attenuvertor to 0 dB before changing bands. This is because the last band's position will be remembered at where-ever it happened to be when the band was changed, possibly yielding some nasty results!

**Blend Takeover CV Control:**

As an additional function of the EQ CV input, the Blend knob can be taken over via CV. This is in effect when all 3 band selector LEDs are OFF, and only when there's a CV patched in.




The Bipolar and unipolar setting also has an affect on the Blend takeover as follows:

Bipolar (default) Attenuvertor fully CW. When the CV is at:

+5V: will fully swing the Blend to Sample output (Blend knob CW equiv.)

-5V: will fully swing Blend to the AC input (Blend knob CCW equiv.)

Unipolar ( 0-5V): When the EQ attenuvertor knob is:

fully CW: CV 0-5V will envelope the Sampler output and mix the AC input as steady constant level

fully CCW: CV 0-5V will envelope the AC input and leave the Sampler output at a constant level

The unipolar mode with Blend makes sense as generally it's required that either the input, or sampler audio needs to be under envelope control. In my experience it's mostly the sampler, which allows loops / delays to be inserted into the audio coming in for a short time, then nulled without affecting the incoming audio.

### 4. Slice CV (SL.CV)

If you don't know what this is please go to chapter V. C. 3. and read that section on Slice CV Input, or you'll be lost here! Slice CV has but one function; to select a Slice based on the evenly distributed number of them vs. the CV voltage range of 0 - 5 volts.

Primarily you will find that SL.CV is best used with a CV from a sequencer of some sort, where there's repetition or a cycle of CV levels. It's important to understand that the Slice # that is pointed to by the CV + SLICE SEL knob offset is captured at the point of the SL.PLY rising edge + 1 millisecond, or when the SLICE button is tapped in SLICE SEL mode.
This means that if you sequencer has portamento, or slide, the results may not be as expected, and seem random in nature, i.e. sometimes a different Slice plays in the cycle. This feature should be turned off, that is unless this is what you want.

Slice selection via CV is generally pretty stable once a sequence is running, but if your voltage is too near the threshold of another Slice, then it may change the Slice #. This doesn't happen very often as the Reflex interpolates a small voltage space between Slices as "just play the last Slice."

Slice Division:
Unless you are specifically trying to predictably create and play Slices in a rigid and planned way, the exact numbers of volts vs. Slice number is probably not going to be a big concern, especially with a large number of Slices, but with lower numbers, it's possible to predict what is going to play.

| | |
|---|---|
| 5 Slices: | One Slice / volt. Raise the voltage some to be certain. |
| 10 Slices: | One Slice / half volt, again raise the voltage a hair. |
| 30 Slices: | 1V/Oct X 2 (Positive Side). If you have a module that can X2, then use a keyboard! |
| 60 Slices | 1V/Octave (Positive Side). If you have a CV octave shifter, then full keyboard range! |
| 50 Slices: | Same as above but some Slice "notes" will be duplicated |
| 70 Slices: | Same as above, but some Slice "notes" will be skipped |
| 400 Slices: | With a keyboard/sequencer there will predictably be some Slice variation |

As we can see, CV selecting Slices can be as simple or complicated as we want it to be. With lower numbers they can be completely controlled, but with high numbers it becomes serendipity.

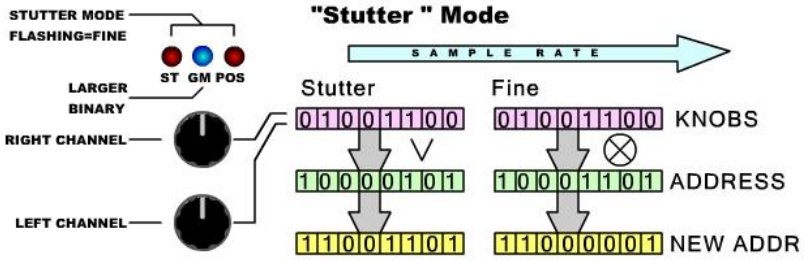
Slices created at a very fast rate (up to 100/second) can be used to "address" a sample in small pieces, but this can also be done by windowing/scrubbing over a sample in PlayFX. If this was done in R/P Play mode or during record though, tiny pieces will play as 1-shots, introducing a completely different/ controllable sonic technique.
* If you like unpredictability, try playing Slices via Feedback send audio output split patched into SL.PLY and SL.CV! You'll have to tap SLICE button to "prime" it, but as long as your slices are loud enough, it'll keep going. Try different SLICE SEL knob offsets. Fun hey?

## IX. Top Secret Features

If you don't have V1.03+ clearance, then you must skip this chapter and move on to the next, as most of this won't work. Just kidding! Still it may be a good idea to check for firmware updates from time to time, as the Reflex is constantly being refined. (See chapter XII)

### A. St-St-Stutter Mode

This is your reward for "hanging in there" long enough to reach this point in the Guide! Stutter is one of the newest modes in the Reflex LiveLoop, and adds a channel independent sample glitch / aliasing / stutter capability that has to be heard to be believed! If you have been using only one output channel on the Reflex up to now, it's time to start using both, at least to a mix, as one of the Stutter bonuses is separate left/right channel control. These controls are, you guessed it, the PlayFX knobs.




Ignore the right half of the diagram above for now, and we'll jump right into an example as it's best explained after you've heard it. Get a RP sample playing in any mode, (if in Echo mode, switch to Infinite Echo for this example) and let's Stutter!

1) Turn both PlayFX knobs down. (This is not required to enter Stutter)
2) Hold the PSEL button for > 1 second to toggle into Stutter mode. *2 PlayFX LEDs light.*
3) Adjust the top knob up some. Notice the change in sample in the right channel?
4) Adjust the top knob more until the blue GM LED lights. This is a "whole" stutter.
5) Adjust both knobs up some so the Stutter is different between them.
6) Turn both knobs back down and tap PSEL to enter Stutter "Fine" mode. *2 LEDs flash*
7) Adjust each knob up slowly. Notice the aliasing and harmonics?
8) Tap PSEL to switch out of Fine mode (your setting won't change) and adjust for Stutter
9) If you want to exit Stutter mode, just hold the PSEL button again.

At this point you may be asking questions like "What is this?" or "What about PlayFX if it's knobs are used for Stutter?" or perhaps you just think it's cool and don't care how it works, in which case you can skip the next paragraph!

**Stutter Theory:**

Stutter mode is very simple if you understand binary code, not so simple if you don't, but just hang in there. Referring to the diagram above, you can see the first 3 box of 1's and 0's. This is a section address pointer code that accumulates in binary to move through memory. Each "1" adds it's binary weight (1,2,4,8, etc) to get the final address that the sample is presently at. "0's" add nothing to the total.

The Stutter control knob's value in binary is overlaid ( or'ed) onto the present address binary, resulting in a different pointer address. i.e. if the address was 0100 0100 and Stutter laid 1101 1011 onto it, then 1101 1111 would result. So instead of address 68, the new address would be 223.

Because some of the address bits will stay as 1's, the sample tends to repeat some areas, and skip others which give the Stutter effect. When the Blue GM LED is lit, this signals that the lower part of Stutter's address is all zeroes (0000 in our explanation) so the stutter sound has less artifacts and sounds more "loopy".

Fine Stutter mode is similar, but work on smaller addresses and uses an "XOR" which boggles the mind so don't think about it! The important thing is that it creates harmonics and aliasing of the sample, breaking it down into tiny variable chunks of sound that looks quite interesting on an oscilloscope, and more importantly, sounds great!

**Stutter CV's:**

The PlayFX CV inputs will apply to Stutter Right/Left when active. This also goes for Fine mode as well. This can be a bit tricky if Stutter is running inside of a PlayFX loop, which is covered next.

**Stutter inside PlayFX:**

Stutter can operate inside a PlayFX, as PlayFX can be entered when in Stutter mode, to add to it's versatility. Once in PlayFX, Stutter can be started the same way, by holding the PSEL button. But holding the PSEL button to exit/stop Stutter will only return focus to PlayFX, and Stutter will continue. This is so a PlayFX can be changed while Stutter is still going, which I must say, is a lot of fun!

Here's an example of using Stutter inside PlayFX you can try:

1) Have an RP sample or Slice playing that PlayFX can capture from.
2) Select PlayFX STart/End, then Tap PLAY to enter PlayFX
3) Hold PSEL to enter Stutter mode. *The two red PlayFX LEDs will light as snake eyes.*
4) Adjust either PlayFX knob all the way down to make it active for Stutter, then adjust.
5) Tap PSEL to toggle into Stutter Fine mode and adjust the other knob to "de-rez" it. *The "snake eyes" will start to flash to indicate Fine Stutter mode is in focus.*
6) Hold PSEL button to exit Stutter focus, and return to PlayFX. Stutter will continue.
7) Adjust knobs for PlayFX. LED circle will flash once the knob has passed it's previous position. The last position remains locked until the new knob position matches.
8) To exit PlayFX and Stutter, hold the PLAY button as usual.

The only way to end Stutter inside PlayFX without exiting PlayFX is by adjusting both Stutter knobs to zero and both Stutter Fine knobs to zero. There is logic to this behavior. If PlayFX + Stutter being used during a Slice sequence, you can exit all effects at once!

If Stutter is already running when PlayFX is started, it will continue, but will be cancelled when PlayFX is exited or exits on it's own. If PlayFX is active on a 1-shot Slice sequence with Stutter running, it won't exit with the 1-Shot though, which is a good thing.

*** G-Move:** Stutter now also can run inside of a G-Move PlayFX! The fine Stutter controls are best for G-Move.

**Stutter Fine Follies:**

Stutter's fine mode can be used "live" to modify audio without playing samples and such. Simply select Echo mode and turn the sample Rate all the way down, then double-tap the REC button to start a very short delay. Turn the Rate back up to center (or higher) and turn down the Feedback so you don't get a Karplus Strong effect.

Now, start a Stutter (hold PSEL) and switch to Stutter Fine mode (tap PSEL). Adjust the two PlayFX knobs to taste while feeding audio into the AC in's. Sounds to try:

-A bass line (sine wave) is always great to mess up with Stutter Fine. Adds metallic sound.
-Percussion of any kind. Kick sounds are ringed up, snares and toms are metallized, cymbals are . . .well give it a try!
-Higher pitched synths create fine aliases when the controls are low. Bells are squared into 8-bit-dom.

**CV'ing Stutter modes:**

As you may have noticed while playing with the knobs in either mode of Stutter, a very small movement of the knob can completely change the sound. This is because digital binary ramps then drops suddenly as increased. Keep this in mind when CV'ing the two sides. I have found that constantly changing CV's in Stutter mode can be chaotic and annoying, whereas Sequenced CV's, that change rapidly then sit for a moment are far better sounding.

When unplugging a patch into one of the PlayFX CV's, Stutter may remain at the last CV position. Moving the corresponding knob will return it to the knob position.

**Sample Rate and Stutter:**

After using Stutter (not in Fine mode) for a while you may have already realized that many Stutter positions result in a great "buzz" that is always on the same note but in different octaves. The reason behind this mathematically is complex, but changing the Rate knob will shift this frequency around.

If the Rate knob can control it, then the Rate CV can control it at 1 volt/octave. Need I suggest more?

***One more note on Stutter:**

In the above "Fine Follies" example it is a very short time between the audio input and the recorded sample coming back out again. This isn't too small for a Fine Stutter, but regular Stutter's address manipulation may take the sample ahead of the "recording head" so expect to hear chunks of old/previous recordings from 3 minutes ago. This may be desired, but just thought I'd mention it in case this occurs!

Coming up:

At this point I can say there's no more features to remember! Was that enough? As I mentioned in the Stutter video "This might be last feature added to the Reflex 'cause I don't think there's any buttons left to hold!"

Next is important information about Settings, setting the Clock Divider and how that works, and using the Reflex Liveloop (do's and don'ts) along with a short Extreme (No Fear) users guide.

### B. Rate Lock-Up (48KHz Sample Rate Prison)

Have the ability to swing a sample Rate from 1500 samples per second up to 1.536 million samples per second is a great thing to have (That's one reason the Rate knob is the biggest, "Hey look at me!") but sometimes you may want to use the Reflex as a Looper during a performance, or as a delay for a drone.

This is why there is an easy way to lock up the sample rate at the maximum record rate.
Simply hold the MODE button until you see LED's in the LED Circle zip inward. The sample Rate is now locked at 48Ks/s. Holding MODE again will cause the LED's to zip outward, unlocking Rate.

*While Clocked Echo behavior follows the Rate-Locked format, Clocked R/P and Layer modes do not. They will work, but then the sample rate when not clocked will be locked at the very bottom, until either toggling Rate unlocked to gain control of the Rate, or a power cycle.
Avoid attempting to Clock in these modes while the Rate is locked (This issue will be resolved)

### C. Clock Divider Setting (How Many Will It take?)

In several previous examples we have changed the ClockDiv setting without much of an explanation of what ClockDiv really is. This short section will enlighten all!

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 and the lower the /x number, the faster the sample loops or Echoes. In most cases, higher clock divisions (8 or 16) 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, first exit Slice mode (hold SLICE button 1 second) if active so the LED circle isn't jumping around.
1) Press and hold the REC T/F/C button for > 1 second. All of the LED circle will flash.
*The present ClockDiv is shown as LED circle 1 - 8 and if the Amber LED is on 9 - 16.*
You need to dial past this value to capture the LED and change it to the new setting, /1 to /16.
2) Tap the REC T/F/C button again to exit and save.
By default, the REC T/F/C selection will jump to CLK, assuming you want to use Clock right away.

This setting will primarily affect the REC button actions when in Clock mode. For example, if you set the ClockDiv to /12, then patch in a clock to the REC T/F/C input jack, tapping REC will "arm" a record for the very next clock, but the next REC button step will happen after 12 clocks, then continue.
Any tap on the REC button following this will only arm for the next step, which will happen in 12's. If you were also clocking a 12 step sequence from this same clock, then the Reflex will always be in sync.

Secondary functions affected by ClockDiv are Timed Slice Groove Sequencer clocks output in a 4/4 bar, and the Rate Locked Clocked Echo multiply/divide by value. These have already been covered in detail, so no point in covering them here!

**Odd ClockDiv's:**
The following table is re-listed here to help further explain ClockDiv:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cd = 1 | 1 clk/4beats | Cd = 5 | 5 clks/4 beats | Cd = 9 | 9 clks/4 beats | Cd = 13 | 13 clks/4beats |
| Cd = 2 | 1 clk/2beats | Cd = 6 | 3 clks/2 beats | Cd = 10 | 5 clks/2 beats | Cd = 14 | 14 clks/4beats |
| Cd = 3 | 1 clk/1.5beats | Cd = 7 | 7 clks/4 beats | Cd = 11 | 11 clk/4 beats | Cd = 15 | 15 clks/4beats |
| Cd = 4 | 1 clk/ beat | Cd = 8 | 2 clks/ beat | Cd = 12 | 3 clks/ beat | Cd = 16 | 4 clks/ beat |

The Pink regions in the table are the more useful ClockDiv's, and the "beats" assumes a 4/4 bar of time. The relationship between how ClockDiv settings would act outside of 2, 4, 8, 16 settings is still simple for settings like ClockDiv=6 (re-aligns with sequencer every 3x4 clocks) or 12 (every 3x8 clocks) and are desirable, but ClockDiv=7 would loop 1 clock early on each 8.
To each their own!

## D. Settings Menus (For Your Eyes Only)

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. . . or just power down!
* It is recommended to only enter Settings when not in Slice mode, ClockDiv setup, or with any triggers.

**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 normal (+/-5 octaves) |
| 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. Default = LED #4 |
| LED # 5 (+1) | LED Brightness 1-8 | All LED's will change in brightness | Adjust left to right for Brightness |
| LED # 6 (+2) → → → → | User Options SubMenu (see table 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<br><br>- using Feedback knob, and top PlayFX knob to select Left/Right Feedback gain. | 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 (opt) | 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. OFF: Will update knob position after a loop occurs |
| 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!

## E. Memory Erase (A Clean Slate)

This feature wasn't really needed, but in the interest of playing a "non-slice" to silence, or "just knowing" the memory is blank yo can hold SLICE and REC buttons together until LED circle lights. The Reflex will be clean as freshly fallen snow!

### F. "Broken Echo Mode" NEW!

Although this added mode for Echo may sound like it was incomplete of needed to be fixed, rest assured it is entirely intentional. Broken echo originated in the Phonogene delay module, and as some have become accustomed to it's use, it only seemed right to add it to the Reflex. The way to use broken echo may seem a bit confusing at first (I was) so I'll attempt to explain it here in this example:

1) Press PMODE and MODE buttons together to enter Broken Echo Mode (Echo LED flashes)
2) Turn up Feedback fully clockwise
3) Turn Blend fully clockwise. This is your "audio insertion control"
4) Start an Echo by tapping REC, then tapping again after 4 seconds or so.
5) Introduce audio input to the RP (right) side only. This is important.
6) Add to Echo: Quickly turn Blend control to left, then back up again.

This brief swing into the input audio will continue echoing that period/fade-in
In the Phonogene the default position is the same as Infinite Echo in the Reflex. The loop can continue indefinitely until a new element need sto be added to the loop.
When you wish to add to the Echo, record must be also started first. With the Reflex, it's the same but with such a low rate of degradation, the Echo can be left recording for a time.

The more the Blend control is turned to the left, the more it will replace the sound it is record on to. By the halfway point (center) the sample will be almost completely over-run, or over-dubbed, by the new audio. This is the nature of audio levels on a linear system.
This method does offer a smooth fade-in/fade-out of running audio, and offers some control of the amplitude envelope (if you are fast on the knob!)

The weak point of this emulation is that you can't hear the sound until you sample it using the Blend knob (or whatever it is called on the Phonogene panel) but the sound can be previewed while running infinite Echo (> 4 seconds in this case) without affecting the loop.

To Exit this mode, just tap the MODE button to return to the regular 3 modes.

Tip:
To preserve the loop in near pristine quality, remember to switch to infinite Echo until the new sound has been introduced. Using this mode with an mp3 player, or SD card sample player can be a lot of fun, but even adding in different notes from a synth / VCO playing can be a great experience! Kudos to the makers of Phonogene!

Tip:
The Blend CV input (all EQ LEDs off = Blend CV) can be used with this mode on the positive side as with the knob: +5 V is no mix, 0V is full mix into Echo. If the EQ CV is switched away from bi-polar (start-up default) to uni-polar, then the right channel will output the original input without interruption while the right channel outputs the Broken Echo. In bi-polar mode the right channel outputs the CV controlled level of the audio input as well as the echo, while the left channel outputs the echo only!
This is very confusing so it's best just to give it a try yourself! It adds a whole new dimension to this mode like a multiple stage echo when used with an LFO on EQ CV input.
*Remember to select EQ away from "All LED's off" to use Blend knob again!

## X. Using The Reflex LiveLoop

When using the Reflex, every once in a while something may happen that is either surprising and exciting, or frustrating and confusing. This still happens to me every once in a while when using mine, but usually it's something I forgot to do, or thought I'd done and hadn't, or just didn't work to my expectations that particular time.

Over time I've come to recognize some of the plusses and minuses of trying new things, and certain practices start to evolve. I understand that nobody else has used the Reflex as much as I, as I am the designer, so I've compiled a list of tips, and tricks to help you get the most out of you Reflex LiveLoop.

### A. Avoiding Disaster (Safety And Security)

Here's some things to avoid like the plague!

Recording:

Auto-Slicing in Echo mode is a wonderful feature, and pausing after an ace stream of fading effects to validate Slices created by playing them should always be preceded by a switch to infinite Echo. This way echo won't come around in 3 minutes and run over your wonderful Slices!

A nice Slice sequence playing sure would be good to record to memory. (This can be done) So you switch to R/P mode, go to tap Record, and chaos! This is because of the Slice overdub function. When a Slice(s) is playing, the REC button can be used to overdub that Slice. So to bypass that, you start a PlayFX on the Slices, and now the REC button can start a record. But suddenly Slices start to change, then fade away! …What has happened is the new R/P record has recorded over your Slices!
That makes recording Slice Sequences interesting sometimes, but can be discouraging other times. The solution is to start creating your Slices after some time recording, whether it be in Echo or R/P mode. This way the new R/P recording won't get to where the Slices are, and you'll have a fancy thing looping in no time! *Also, a normal Record can be triggered from the REC input jack, at any time!

Adjusting the Blend control over to the right is a good way to fade out incoming audio, but don't forget the audio is still there! I have done this many times doing an "internal record" only to discovered it was laced with whatever audio happened to be feeding in at the time.

Playing:

Karplus strong overlays resulting from a very tight Echo/delay can emulate some amazing sounds that are recording and can be Sliced in actuality. The Slice engine in the Reflex will recognize this and won't create 10mS Slice times from the Echo, but treat them as a sequential set of Slices.
**NEW!** PlayFX now recognizes this tight echo condition and will capture (rather than a "buzzz") as:
**Pos/size:** From present position to end of memory. This can yield some bizarre FX as the PlayFX "head" can be moved past the recorded area! ***G-Move*** also does this as before.
**Start/End:** Starts at beginning of recording, and ends at present position

Playing a Peak Sliced Slice sequence with trigger and CV inputs is great fun, and can go very fast. Over 100 Slices per second in fact, and up to 400 if the pulse width is short on the trigger input. But even getting 20 Slices per second can result in the Slices disappearing all together. What?? Why?
This is because Peak Slices (and perhaps triggered if your trigger is advanced) have a slight delay to verify the audio is a real "Peak" and that delay can be set back in settings using "Back Slice". It comes at a default all-use setting, but sometimes can vary. (See settings)
To verify this, try starting PlayFX in Start/End mode and adjust the Start position slowly up from zero (CCW) position. Suddenly the Slices will appear!

## B. Audio Considerations (Sounds Good To Me!)

As the Reflex LiveLoop is a modular sampler, it must allow modular levels. This means if you want to patch in off of your phone or an mp3 player, the results will be less than spectacular. This is because those only put out around 1Vp-p, whereas modular levels are 10Vp-p. Thus, you are only using 10% of the dynamic range. Think of it as cranking up a plart of a song on a record or cassette of old, to hear a very quiet passage of music. The hiss, crackle from scratches, and rumble all must come up to that level as well.

While the Reflex is much lower noise than cassettes, there are sounds that normally you'd never hear that may become evident. Be it a nearby PSU, noise in the amps, what-have-you, it's a good idea to insert a pre-amp for incoming audio from these low level devices.

The output on the Reflex LiveLoop can be quite high if the EQ is turned up a lot and the incoming signal is loud. This is because there is another + 15dB in the EQ, and it is to be used more in a band "cutting" way, although cranking is fun! But keep in mind that there can be as much as 20Vp-p shooting out of there!

High levels on the EQ can be used for tweaking or "grungifying" a running Echo by simply lowering the feedback level and raising an EQ band, lowering the feedback level . . .etc. Just be careful not to get into a run-away situation with that feedback!

## C. Cabbage Patching (Reap what you Sow)

The word "Cabbage", in this context, refers to the brain, or a non-functional replacement for the brain, while the word "Patching" refers to planted things, like plugs into holes. Pertaining to the Reflex, in other words, this means randomly plugging things in to other things, and what may happen. Here is some specs on the panel inputs and outputs to de-mystify and delight!

Firstly, it should be known:

All Trigger inputs (REC/PLAY/SL.PLY/SLICE) are .6 volts compatible, which is great for small signals and audio. They have an upper limit of just over 100/second, but 400/second can be achieved with short pulse widths (<1 mS). 100/sec should be fast enough! Just sayin'.

All CV inputs with no attenuvertor (SL.CV, ST/GM/POS, END/SIZE) are uni-polar 0-5 volts while the 2 CV inputs with attenuvertors are +/- 5V range. Higher voltages can be input without risk, but this isn't license to attach it to a lightening rod!

**REC T/F/C:** Always records/plays/echo's/overdubs/stops a sample except when:
a) REC LED Flashing: Peak Slice is turned on. Will start recording on first audio peak.
b) Layer Mode after first layer: Won't act until a Layer Loop Point is reached
c) CLK is selected: This input becomes a Clock input (see sect. IX.A.3.) or output

**PLAY T/F/G:** Always starts/re-starts/stops/exits a PlayFX loop, always.

**SL.PLY:** Always Plays a Slice on rising edge (regardless of SLICE SEL LED state)

**SLICE:** Always creates a Slice on rising edge except when:
a) There are 400 Slices, at which point no more Slices can be made.
b) In SGS mode where this input becomes a step sequencer clock until SGS exited.

## D. Extreme Usage (No Fear Guide)

Some of us have a somewhat abusive nature when it comes to electronics. I don't mean physically, but testing the extremes to see how far it can be pushed, possibly opening new doors (and windows if in PlayFX!) to previously unthought-of patches and uses. I myself am on this side of the line, but not to the extreme end compared to some.

All of these examples I have devised and tested myself, and know their characteristics plus have made slight design and software modifications to accommodate them.

### 1. Karplus Strong Fast Echo Notes

Overlaying sound waves until they pile up to have their own dynamics seems to be a favorite among modular sampler users, and the Reflex can fit the bill. Phasing audio into a Karplus Strong effect is a persnickety task, and fails with some sounds and wins awards with others. A really save bet though is to create a "ring" by turning an echo into a very tight delay, then setting the feedback to the point where it almost feeds back on itself.

1) Switch to Echo Mode (MODE button) and turn the Rate control to the bottom.
2) Double-tap the REC button to start a fast (albeit dirty at this Rate) echo
3) Raise the Rate to the center or near center
4) Turn up the feedback almost all the way while listening to incoming audio
5) Adjust the feedback, Rate, and Blend controls to tailor the sound.

I find percussion / percussive sounds benefit well from this effect immediately. Triangle VCO's seem to find "sweet spots" along the way and their shapes can change heavily.

Sequencing the sample Rate CV can be a funky effect if changing these sweet spots on-the-fly is your thing. It certainly is mine! Especially if it's in sync.

If you want to drastically change the dynamics, try turning up or down a Band on the EQ. **Turn down feedback A LOT if raising an EQ band as they're in 1dB steps.

Slices can be made from tight Echoes like this (100mS or less @ 48Ks/s) that won't loop at the Echo size as the longer ones do. They instead become 1-Shot slices (or play through if Slice LOOP is turned off) to be modifiable with PlayFX. This is intentional.

### 2. Speed Slicing / Sequencing

Because the Reflex is so good at creating Slices, and the speeds of triggers is considerable, you don't have to be disappointed by the recent mention that a tight Echo won't quickly create many Slices. If you want to make 400 Slices in 4 seconds, just trigger SLICE them!

1) Select R/P Mode to create Slices from and start recording audio
2) When ready, patch a 50-100Hz trigger/clock/audio into the SLICE jack
3) The LED circle's scan rate will cause LED to bounce all over, but will stop when full.

We now have 400 tiny Slices! Playing them back can be a bit different than you might expect if you haven't given much thought to this:

1-Shots (Sliced @100/second) will be 10mS long or so, mere clicks if the Slice LOOP is on.
>PlayFX will work for shortening them more, but reversing them will likely run off unpredictably.

Play through Slices will cover the time between playback triggers if Slice LOOP is off, but there needs to be CV movement over 1 volt to cover just 1 second's worth of Slices.

G-Move on these Slices can be very cool! Zipper FX, pops, clicks, yay! Speaking of G-Move . . .

### 3. G-Move Fine Notes

Granulizing and grains on their own are an addictive addition to the Reflex LiveLoop, but G-Move's fine mode opened up a "sub-mode" way of sequencing notes from G-Move grains.

1) Sample in some audio to work with in G-Move
2) Select GM with PSEL, and start PlayFX.
3) Center the GM knob (Blue LED goes out) and Tap PSEL again to enter G-Move Fine mode
4) Bring down the SIZE knob then patch in your favorite sequencer to the SIZE CV input.

G-Move Notes!! These of course won't be 1V/oct, but who cares!

At this point, try running slowly through the sample by moving the GM knob to the right a bit. Notice how it sounds like selecting a waveform? That's because basically that's what's going on.

Before you try to play Mozart's Magic Flute, keep in mind these "notes" are inverted to normal, i.e. the higher the voltage the lower the notes become as a larger grain ensues.

Finally, try adjusting the Rate knob, or sequence it too. Pretty "fine" sound ain't it partner?

**NEW! G-Move Stereo:**

If you only have a mono signal / sample, don't despair! G-Move will play it in stereo!

1) Feed the mono signal into the RP (right) channel only as this one is not normalized to the other channel as FX (left) is.
2) Record in your sample to grab a G-Move from.
3) Turn off PlayFX LOOP and switch PMODE to GM to set for G-Move
4) Tap PLAY to begin G-Moving in stereo!

What is actually happening is each grain is toggled L->R->L etc. So if a stereo sample is used it'll still do this, but will be less noticeable as usually some of each channel is included in the other.

### 4. Recording CV's

Originally I had decided to use my "creator's license" and not cover this subject in this guide, or anywhere for that matter. The Reflex was designed for audio, but has a fairly decent low-end cut-off so CV's, as long they are moving, can be recorded. Here's some good points on the topic:

- Echoing an LFO can instantly make a complex wave form.
- Running through a G-Move or Stutter effect can yield some great manipulations.
- CV's noticeably clash at the Blend control, phasing in and out.
- CV'ing the Rate moves Echoing CV's forward and back so they overlap.
- PlayFX captures can be Sliced, then the CV Slices played. Moving LFO's are fun!

### 5. Varied Clocks

While a stable clock is recommended for good sync when echoing or looping in both Rate shifted sync and Rate locked sync, these can be made to act in a very bizarre way if the clocks aren't even such as, say, a trigger or gate from a sequencer, or added / complex square waves. Sometimes things can completely go crazy.

Here's as example to try out:

1) Switch to Echo mode and turn up the Feedback as preferred
2) Turn the Rate down slightly (between center and -1) to give some headroom.
2) Switch REC T/F/C input to CLK and Patch in the "Clock" signal
3) Tap the REC button, and let the Echo begin.
4) If the "Clock" input (trigger/gate/CV) is constant, give it some skips or breaks.

The Echo will try to track the changing clock input and the Rate will change to compensate. If the Rate didn't move around, then perhaps the Rate is locked (Hold the MODE button so LED's zip down/outward)

## XI. Firmware Updates, Specifications, And Other Annoying Things

Congratulations!! You have managed to reach the end of this Guide!
I hope you have gained vast knowledge and confidence to begin your sonic journey into sampling with the Reflex LiveLoop, and are less intimidated by it now you know how easy it is to use. (Ok, well there's always this guide for reference!)

The rest of this chapter is just information on Firmware Updates, release issues if any, and some specifications on the Reflex.
Thankyou for joining me in this journey through the "Complete Idiots Guide To Running the Reflex LiveLoop". It's been fun!

*SDS

### 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.2.00 is the newest firmware version for the Reflex LiveLoop

**Known issues:**

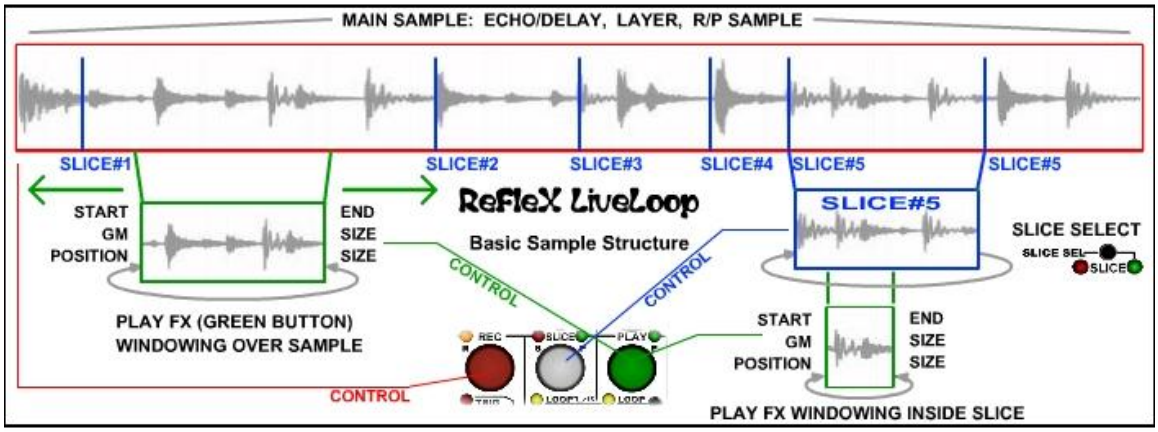
-When Rate is LOCKED, Clocking in R/P & Layer modes as of V1.03b is not supported, but in Echo mode it is. This may be resolved in a future FW release.
-When using the Reflex LiveLoop for extended periods, time ceases to exist. *Be careful ! !*

**Reflex LiveLoop Specifications**

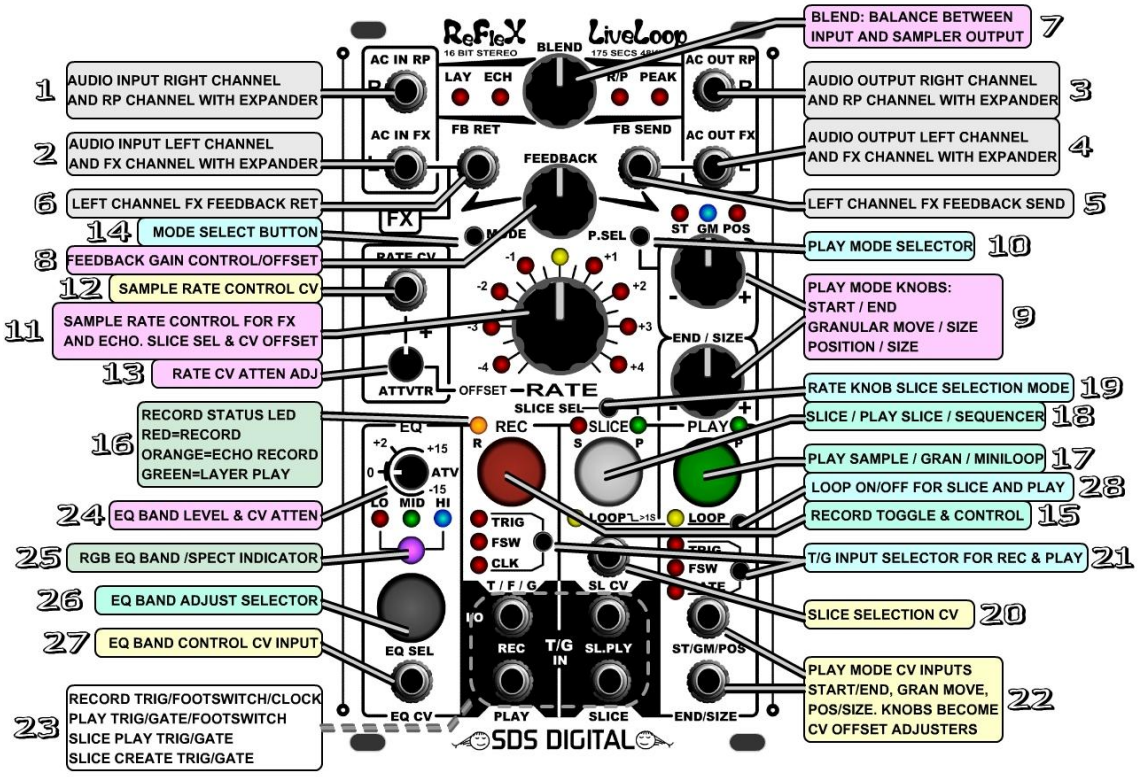
| Parameter | Spec | Notes |
|---|---|---|
| Power Supply | +12V @190mA; -12V @ 60mA | Standard 16 pin box header. No +5 V line |
| AC in (Left&right) | 10 V p-p, 30 V tolerant | Standard Modular audio levels. |
| AC out (Left&Right) | 10Vp-p, 21Vp-p EQ@+15dB | Runaway Feedback: EQ @ 0dB, EQ @ +15dB all bands |
| EQ boost/atten. | +/- 15dB | 1 dB increments |
| EQ MID Bands | 500Hz/1kHz/1.5kHz/2.5kHz | * Changeable in "Settings" menu 2. Q=1.0 |
| EQ LO Band | 100Hz, Q=2.0 | * Fixed band |
| EQ Hi Band | 17.5KHz, Q=1.0 | * Fixed band |
| Spectrum Analyzer | 7 bands, standard spread | Drives RGB LED as R=[1+2], G=[3+4], B=[5+6+7] |
| DAC Resolution | 16 bits +/- 5V | 65536 Levels |
| DAC THD | -104 dB | Total Harmonic Distortion |
| ADC Resolution | 16 bits +/- 5V | 65536 Levels |
| ADC THD | -102dB | Total Harmonic Distortion |
| Max Sample Rate | Record: 48Ks/s, Play: ~1.5 Ms/s | Play Range: 1.5 Ks/s - 1536Ks/s (equiv) |
| Max Record Time | 174.76 seconds (2:55) | @ sample rate of 48s/s |
| | 93.2 minutes | @ lowest sample rate of 1.5Ks/s |
| Minimum Play Time | 5.46 seconds | @ highest sample rate of 1536Ks/s |
| Max/Min CV voltage | +/- 5V nom. +/-30V max | Inputs> 15Vp-p not recommended for long periods |
| CV Response Time | 2 mS Max | All CV inputs |
| CV impedance | 100K | All CV inputs |
| Max/Min T/G volts | +/- 30 V | > +5V will reduce cycle response time |
| T/G low-high logic | Min 0.6V, max 0.7V | Filtered LPF cutoff at 200Hz, Max (short pulse) 500Hz |
| T/G Response Time | < 1 mS → output | In all modes (internal < 200uS) |
| T/G impedance | 12K / 470K | @>.6V / @<.6V |
| Rail - Rail V Dim. | 112.3 mm max (112mm nominal) | |
| Dimensions (mount) | 128.5 mm x 81.2 mm x 46mm | 16HP, depth includes 30-pin expansion box header |
| Panel Thickness | 2mm Aluminum | |
| Shipping dim. (box) | 11cm x 11cm x 17cm | 4.33" x 4.33" x 6.7" |
| Shipping Weight | 0.35 KG / .77lb | Includes box / packing /quick quick start guide |

## XII. Diagrams, Addendums, Updates:

This diagram shows the main basic functions of the Reflex LiveLoop in a "nutshell".




This diagram locates all of the panel elements




**Great Patches!!**

There are numerous patches listed online at http://www.freshnelly.com/reflex/reflex.htm (Look under "support" "Patch Manual") - or just get the .pdf at: http://www.freshnelly.com/reflex/00-Reflex-Patch.pdf

**NOW AVAILABLE! Flash-8 Expansion Board: http://www.freshnelly.com/reflex/flash8.htm**

Have Fun!!

Dec 1, 2016 Update!
V.1.04a included new features: Live Pitch Shifting [IV.G.], Global Slice Sequence Record/Overdub [VII.D.]
V.2.00 added "Broken Echo" mode and stereo G-Move, plus support for the new Flash-8 + MIDI expansion

Written by Sandrine Sims / designer Released for V.2.00 December 8th 2016