RIT_M

USERS GUIDE V1.00

I.   Introduction

Thank you for purchasing the RIT_M Sequencer Module!

The RIT_M was designed for anyone that wants to create a clocked rhythm to control percussion, a sampler, a filter or VCO/ENV/VCA patch quickly and easily without having to worry about Gate times, CV's, and swing as on traditional sequencers.
Here is a list of questions you may have about the RIT_M:

How hard is this to use?
All that is required is a sense and love of rhythm, and something to patch into. Simply tapping out a beat on the velocity sensitive Rhythm Pad then concluding with a tap on the Loop Pad is all it takes to generate a clock signal, a true time gate, a velocity CV, and of course a main CV output. The Gate output reflects the true time the Rhythm Pad is touched so can vary from a tick to a long note. With a Clock input, the RIT_M sync's to your patch.

What if I want to modify the Sequence?
Adding beats to a running sequence is as easy as moving the CV Knob and just tapping them in, and removing beats can be accomplished by tapping on them, or holding from a beat to delete a whole series (if Delete mode is on)
A beat's CV can also be changed by dialing in the CV knob which will give a preview, and tapping on the steps you want to change, or patching a different external CV input and using the CV knob as an offset.
This provides a way to constantly change/evolve a running sequence.

Can the CV Recorded Vary from Step to Step?
With a CV Input along with the CV Knob as an offset, the RIT_M becomes a smoothCV recorder. In smoothCV mode (Red LED not flashing) only a single tap on the Rhythm pad is required to start recording, then a tap on the Loop pad to make the CV "sequence" loop. At 500 samples/second the CV is truly "smooth"!
The Rhythm pad can be tapped multiple times along the way if you want to make Gates as mentioned above.

The speed of the CV will speed up and slow down with the Clock Input if used, or create a clock to keep other modules in sync with the RIT_M. Also the Reset input can be used to re-start the CV recorded making it the perfect envelope generator!

Rhythmically I'm All thumbs!
There is a beat quantizer that can be turned on in settings that will align the Rhythm you tap in to the clock input (or sourced by the RIT_M) and it's PPQN clock divider/multiplier. Some love this feature while others do not, so the choice is yours! The RIT_M can also record a sequencer or keyboards, anything with a CV output.

Is this like a Tap Tempo?
The RIT_M is so much more but can also be used as a sort of tap-tempo if you're short one of those and need a low jitter clock. The only difference is the taps must be ended with a tap on the Loop. The longer the taps (loop time) the more accurate the tap tempo will be.
If you want a variable or swing clock, the swing can be tapped in and the Gate output used as your clock. To convert a regular clock to the swing clock, just patch your clock into the Clock in jack.

What is the Velocity For?
The velocity output can be used in interesting ways besides the obvious, a level control to a VCA or envelope generator. For example, if you tapped in 8 beats but every second beat was tapped lighter, the velocity output could be chained out to turn on certain logic inputs while others wouldn't be turned on. This of course depends on what module you are patching to.
With smoothCV playback mode, the Velocity is "real time" so a filter or level could be modulated simply by holding the Rhythm pad and varying the pressure (or finger angle) like on the string of a guitar.

How Can I Align to another Sequence already playing?
The Reset jack is bidirectional, so if it senses an input pulse, then will reset the sequence to it. This is ideal for feeding another sequencer's step 1 output into. If there is no input, then the Reset jack will output a pulse at the loop point (step 1). Using the sequencer's clock is handy, but not required.

Can RIT_M's Link Together?
Yes. If you have more than one RIT_M, it's clock, status, and even power can be daisy-chained together. With 1 master (usually the left-most module) and 2 or 3 slaves, a direct percussion control can be realized as the Rhythm Pads are played and all have the same loop time.

If the Master is already looping, then individual rhythms can be added with each Slave module, each with their own (clock sync'ed) loop point. (For clarity, Slave operations are in violet)
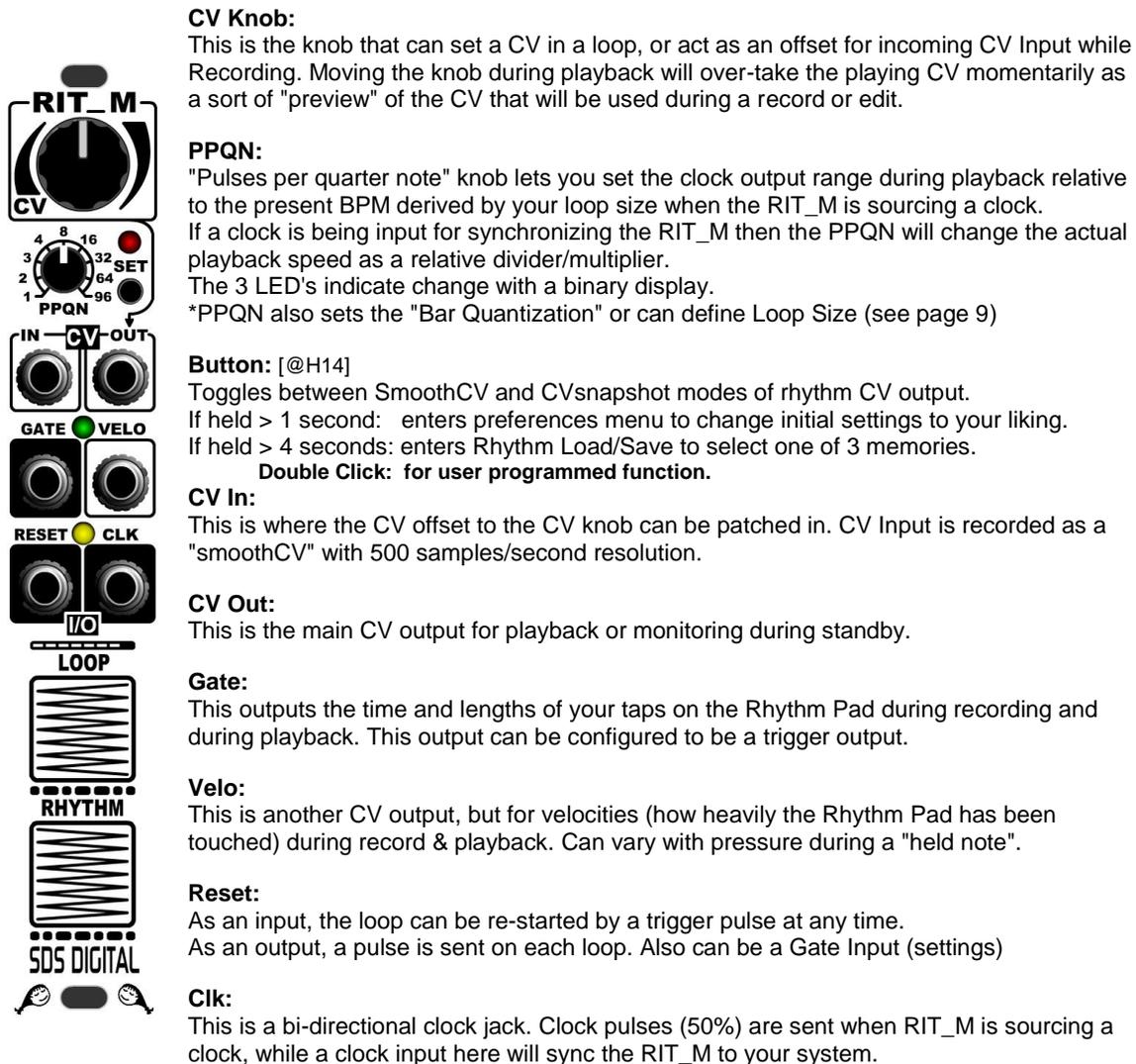When more than one RIT_M is purchased, the jumper wires (standard female-female 2.54mm header) to link them together behind the panel are included.

We Hope You Enjoy Your RIT_M! ▲   *Sandy & Gena* SDS Digital

II.   The Panel

The RIT_M Panel is pretty self explanatory, but there are some multiple use jacks and the round LED's as well as the RGB Pad's LED's can signal different states during operation, or making settings.

CV Knob:
This is the knob that can set a CV in a loop, or act as an offset for incoming CV Input while Recording. Moving the knob during playback will over-take the playing CV momentarily as a sort of "preview" of the CV that will be used during a record or edit.

PPQN:
"Pulses per quarter note" knob lets you set the clock output range during playback relative to the present BPM derived by your loop size when the RIT_M is sourcing a clock.
If a clock is being input for synchronizing the RIT_M then the PPQN will change the actual playback speed as a relative divider/multiplier.
The 3 LED's indicate change with a binary display.
*PPQN also sets the "Bar Quantization" or can define Loop Size (see page 9)

Button: [@H14]
Toggles between SmoothCV and CVsnapshot modes of rhythm CV output.
If held > 1 second: enters preferences menu to change initial settings to your liking.
If held > 4 seconds: enters Rhythm Load/Save to select one of 3 memories.
     Double Click: for user programmed function.

CV In:
This is where the CV offset to the CV knob can be patched in. CV Input is recorded as a "smoothCV" with 500 samples/second resolution.

CV Out:
This is the main CV output for playback or monitoring during standby.

Gate:
This outputs the time and lengths of your taps on the Rhythm Pad during recording and during playback. This output can be configured to be a trigger output.

Velo:
This is another CV output, but for velocities (how heavily the Rhythm Pad has been touched) during record & playback. Can vary with pressure during a "held note".

Reset:
As an input, the loop can be re-started by a trigger pulse at any time.
As an output, a pulse is sent on each loop. Also can be a Gate Input (settings)

Clk:
This is a bi-directional clock jack. Clock pulses (50%) are sent when RIT_M is sourcing a clock, while a clock input here will sync the RIT_M to your system.

The Loop Pad:
This pad is used to "close" a loop that has been started by tapping the Rhythm Pad. During Playback tapping Loop will re-start a loop. This re-start will sync to the incoming clock if present, so is great for bridging a sequence.

The Rhythm Pad:
This pad is where the rhythm you want to loop is tapped in. It is velocity sensitive, 5 elements, and can be held for long periods (to make long notes!) if desired.
A coarse Variable Velocity from changing pressure on this pad while held is recorded during a "smoothCV" Rhythm. This is great for filters on long "notes". (see sect. III. A & sect. III. C. & sect. VI. Tips & Tricks)

LED's and Illumination:
Red: [@H9] This LED primarily indicates movement on the CV knob for editing a Rhythm Loop (if Delete mode is on), and the time-out status when the knob/edit is no longer active. This LED flashing indicates CVsnapshot mode.
It also indicates PPQN changes and settings codes (as semi-binary).
Green: This LED indicates the Gate Output status. Also used for PPQN changes and Settings as with Red.
Yellow: This LED indicates the Clock Input/Output Post-PPQN. Also used for PPQN changes & Settings.

Tap Panel RGB's:
Behind each tap panel is an RGB LED that indicates the actual taps in **Cyan**, new edits fading **Pink** to **Cyan** if exists, and the loop point, which illuminates the Loop pad yellow/white.
A **Green** flashing Loop Pad indicates a pause. Tap it to continue.
A **Yellow** flash indicates a Loop point.   ▲
A bright **Red** flashing pad indicates "Armed to Record at Gate ", while a **Pink** Flashing pad is armed + Set Loop Size.

III.   Using the RIT_M

A.   Hand Tap In A Rhythm + Make A Clock (Self Clocked)

Tapping a rhythm in by hand using the touch pads is the primary function of the RIT_M. The CV Knob can set the CV for each tap on the RHYTHM pad. Once the rhythm is looped, a clock output will start.

Example 1: Control a VCO and Envelope/VCA with the RIT_M.

-1-   Touch and Hold both the LOOP pad and RHYTHM pad for 2 seconds to stop all and reset.

-2-   Patch the RIT_M's CV OUT to the CV in on your VCO

-3-   Patch the RIT_M's GATE to a VCA or Envelope (ADSR) Generator's gate input

-4-   Turn the CV Knob to the tone you want to start at. The VCO will change with knob movement.

-5-   When ready, begin tapping in a Rhythm on the RHYTHM pad while moving the CV knob.

-6-   On the "Downbeat*" time tap the LOOP pad to set the Rhythm Loop point.

*Downbeat: The beat that would be equal in timing to the first beat in a sequence

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At this point the Rhythm's CV will be playing into the VCO and the Gates into the Envelope/VCA.
Notice that the length of the gates are the time your finger was on the pad. This means "notes" can be held.

SmoothCV or CVsnapshot:
There are two types of CV playback after a Rhythm is tapped in. Pressing the Button will toggle:

Red LED off = SmoothCV
     Movements on the knob are recorded in real time so portamento or slides can be recorded.
     The Gate still outputs the taps from the Rhythm pad.
Red LED Flashing = CVsnapshot
     The Tap on the Rhythm pad takes a "snapshot" of the CV which remains until the next tap or beat.
     *Note that the velocity will still be variable as with SmoothCV for the first 2 minutes of the sequence.

Happily, these two modes can be toggled while playing or editing a loop at will! Keep in mind that the edit may not sound the same once looped/played if CVsnapShot is on at the time.
The SmoothCV size limitation is 2 minutes after which the play will become CVsnapshot regardless of the setting. This is due to high speed CV sampling and memory limitations.

CV Input Offset:
If a CV Input is present, this will affect the SmoothCV and the CVsnapshot <u>while recording & editing</u> and will be present in a preview while paused or stopped as the CV knob is moved.
See Part D. "**Hand Tap In A Rhythm Modulated With CV Input**" in this section for an example.

Velocity Output:
If your ADSR/Envelope Generator/VCA has a level offset, it can be patched to the VELOCITY jack on the RIT_M to have control based on how hard/light you tapped the RHYTHM pad.
 If the Rhythm Pad is held with varying pressure, this will be recorded and presented on the Velocity Output. This can be useful / expressive if your VCO chain has a filter element in it. The velocity is ~0 to ~5V

Clock I/O
After this example starts looping there will be a clock output. It's rate will depend on the PPQN knob's setting.
See Part E in this section for more on the "Magic Clock" jack. This example can be done with a Clock Input also.

Pause & Stop:
To pause a sequence at the next Loop point, tap LOOP and RHYTHM pads <u>together quickly</u>. To Stop and Reset a sequence at the end of the sequence, quickly press both pads for longer, about 1 second. This will also erase the sequence for a fresh start.

To do an "emergency stop and reset" at any time, hold both pads for > 2 seconds.   ▲

B.   Editing a Rhythm Loop Sequence:

The Sequence can now be edited if desired. Beats can be added, deleted, and modified. It's good to throw in a bit of change now and then and it's easy to do.

> Example 1B: Editing the Rhythm Loop Running from Example 1:
>
> **-1-**　　　To Add New beats into the Loop, adjust the CV Knob to momentarily hear what you'll be adding.
> 　　　　　Tap in the new beats with their new CV's. The knob can be adjusted to add varied CV's.
> 　　　　　The Red LED will light to show "adding" is active once the knob is moved. Cancels after full Loop.
>
> **-2-**　　　To Delete beats in the loop, don't adjust the CV Knob and make sure the Red LED is off or flashing.
> 　　　　　*If you did move the knob, you'll have to wait for an <u>entire Loop</u> to pass before it resets.**
> 　　　　　Tap RHYTHM pad on or near a beat to remove it's Gate. If the pad is held, all Gates under it
> 　　　　　 will be erased, even though the CV's will remain.   **Only if Delete Mode is on (see settings #13)
>
> **-3-**　　　To Modify the CV of an existing beat, adjust the CV Knob to the new CV you want to use.
> 　　　　　 The Red LED will turn on solid when the knob is moved**. It must be on to edit an existing beat.
> 　　　　　Tap RHYTHM pad on or near the beat you want to modify. The Gate's length can/will be modified.
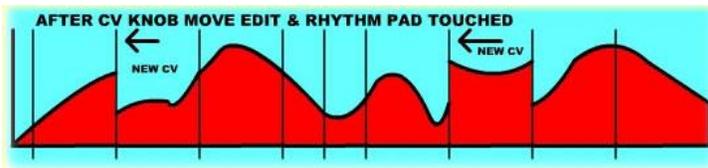
New CV's added or edited will fill the memory until the pad is released.
An edited beat's Gate length will be changed by the edit, as will it's velocity.
If the Pad is held past another beat, that beat will be over-written completely with new CV.

If the Gate is not used (say CV to a VCO, filter, other controller directly) then the CV's will appear interrupted by the edit at or between previous Gate points. If beat quantizing is used, all CV changes near a clock will snap to the clock. This is great for making a complex CV pattern that can continue to evolve with each edit.

Delete CV? (Delete Mode On in Settings)
When the Delete function is used (tapping on an existing beat without having moved the knob) only the Gate is deleted, the CV will remain. After much debate, it was deemed that the delete function would only be useful to remove a Gate as a CV recording can be edited to anywhere in the range in the same way.

SmoothCV or CVsnapshot?
During any record or edit, the CV is recorded as a constant stream, while Gates play the "beats" or "notes". When used with a gate or Envelope Generator + VCA only the Gated CV will be heard. The CV can be moving as you've probably discovered in previous examples.
CV SnapShot captures the CV at the gate's rising edge and can be used beyond the 2 minutes recording time as a result. During playback, the CV will remain the same until the next Gate. This can be a great way to get two similar cadences but very different sounds out of the same sequence.
Tapping the button toggles SnapShot mode, indicated by the red LED flashing. Variable Velocity output is unchanged unless the sequence is longer than 2 minutes at which point it also remains static.

Loop Pad CV Hold Feature:
During Playback, the Loop pad can be held to keep the CV knob + CV in offset over-riding the CV sequence.
As the Loop pad will also Re-start the sequence from the beginning, this should be done in a timely fashion. It is useful for adding a momentary fill without worrying about continually moving the CV knob to keep it in focus.
The Gates will still send as usual so the beat will have a new CV applied.
Releasing the Loop pad will revert the CV output immediately to the recorded CV's. (See VII. Quick reference)

On Beat Quantizing…
If Beat is being quantized to a Clock Input (see settings #4) then the initial beat will always try to align to the clock, but adding beats (inserting) may not if far enough away from the clock or a previous beat. This is by design to allow for intermediate beats and variance. This in mind, using a very slow clock remains undesirable!

On CV Quantizing…
If the CV Quantizer is on and set to "Chromatic Scale" (see settings #9) and there is no CV input patched, the knob will step along at the "standard" 1V/Octave instead of smoothly. This is useful for "playing" a VCO with the knob but becomes a smooth Offset when there is a CV input. The CV input is then quantized instead.
If the plug is removed, the CV knob won't return to being quantized until Play is paused or stopped.

There is also 2 other scales (Major & Minor7) that can be applied to the CV knob with a linear offset!
See Section III. J. : CV Knob Scale (Major/Minor7) Offset Feature for more on that.   ▲

C.   Record A CV And Gate Remotely

During the development of the RIT_M there have been many requests to be able to record a CV & Gate from a sequencer or CV type keyboard. This effectively turns the RIT_M into a synced CV Recorder.
The RESET I/O Jack is used to input the Gate but the RIT_M must recognize this condition and switch the jack from being a reset to being a Gate input. As nearly all applications start the downbeat with a Gate, the Gate is therefore used to start the recording of the sequence remotely.
  The LOOP Pad is used to "arm" for recording as well as set the end Loop point for the sequence.

> Example 2: Record a CV and a Gate to control a VCO and Envelope/VCA
>
> **-1-**   Touch and Hold both the LOOP pad and RHYTHM pad for 2 seconds to stop all and reset.
>
> **-2-**   Patch the RIT_M's CV OUT to the CV in on your VCO as in Example 1.
>
> **-3-**   Patch the RIT_M's GATE to a VCA or Envelope (ADSR) Generator's gate input.
>
> **-4-**   Patch the RIT_M's CV IN to the sequencer's or keyboard's CV output.
>
> **-5-**   Patch the RIT_M's RESET I/O to the sequencer's or keyboard's Gate ouput.
>
> **-6-**   Patch the RIT_M's CLK I/O to the sequencer's output (or other running clock for keyboard playing)
>
> **-7-**   Tap the LOOP Pad <u>once</u> to "Arm" for next Gate (RESET) to begin recording the sequence
> *The LOOP Pad will flash Red. If it flashes pink, then tap twice to cycle back to Red.*
> **-8-**   Once finished playing, sequencing, tap the LOOP pad to set the sequence's loop point.
>
> **-9-**   On the "Downbeat" time tap the LOOP pad to set the Rhythm Loop point.

Once the patching is complete (in green), but before arming, the sequence will be forwarded through as:
Gate→RESET Jack→GATE OUT   and   CV IN→Knob Offset→CVOUT.
In other words, you can monitor before recording, plus the CV Knob can be used to offset the CV input. This can be handy if the next step in the chain is a separate quantizer.
 If you don't want to change the CV input's level, set the knob to center if the bipolar option is on, or set fully CCW (fully left) if the bipolar option is off. (See VIII. Global Settings)

Smooth CV Recording:
When a Rhythm Sequence is created, the CV's are automatically sampled at a high rate even if the button is toggled to CVsnapshot. This means a modulated CV will record as well, not just at Gate points. This is great for portamento/slewing. If snapShot is active, then Gates will play as static CV after Looping.
The only drawback is the recording time is limited to 2 minutes after which the remainder of CV's become Gate points. This is generally not an issue, but with drones and such it can be important to know.

Editing a Recorded Rhythm Loop Sequence With Keyboard or Sequencer:
Once the sequence is running, you may wish to edit existing beats, or insert other beats. Provided the Beat-Snap setting is over 30, snapping to beats won't be difficult. If Beat-Snap setting is too high then you may snap to nearby beats too easily. See VIII. Settings for more.

-Editing from a keyboard is easy:
Wait until the appropriate point in the sequence (it helps to listen to it once or twice first) then play in your new beats.
Keep in mind the beat/note lengths do not snap to the older beat's lengths. This is by design so that several beats can be "ran over" by a new, or longer notes can be broken up or interrupted.
Interrupted notes will trim the old one by 2mS to make the gate a separate entity, or else there would be no edge.

-Delete Mode is on:
In interest of simplicity, there is unfortunately no way to delete beats remotely. This must be done from the Rhythm pad. Make sure the red LED is not on solid. (wait for complete loop of sequence and it'll go out), then tap away!

Regaining RESET Control:
With the RESET I/O becoming a Gate, you may want to use it as a Reset again. Unplug from the RESET jack so the RIT_M knows there's a patch change, then patch to your reset source or the thing you want the reset sent to. The RIT_M will automatically determine the direction of the jack, in or out.

Footnotes:
*   Please keep in mind that the Velocity output can only be varied with the RHYTHM pad. This example's original beats (or notes) will be full Velocity at the Jack.

** This example works best with built-in CV Quantizing on. ([Settings #9](#))   ▲

D.   Hand Tap In A Rhythm Modulated With CV Input

As a bonus, the CV Input can be used to modulate the recorded CV while you tap it in. This is useful for a random feel if patched to an LFO or a formatted feel (especially with a filter) if patched to a sequencer on the same clock, as with a percussive element, without worrying about adjusting the CV knob around.
The CV knob can also be viewed as an offset when used to record a CV input.
The following example uses just a VCO and Envelope/VCA patch again.

> Example 3: Control a VCO and Envelope/VCA with the RIT_M.
>
> **-1-**   Touch and Hold both the LOOP pad and RHYTHM pad for 2 seconds to stop all and reset.
>
> **-2-**   Patch the RIT_M's CV OUT to the CV in on your VCO
>
> **-3-**   Patch the RIT_M's GATE to a VCA or Envelope (ADSR) Generator's gate input
>
> **-4-**   Patch the RIT_M's CV IN to an LFO or other varying source.
>
> **-5-**   Press the button to toggle Red LED off (We'll use SmoothCV play for this example)
>
> **-6-**   Turn the CV Knob to the tone + modulation you want to start at.
>
> **-7-**   When ready begin tapping in a Rhythm on the RHYTHM pad (and moving the CV knob if desired)
>
> **-8-**   On the "Downbeat*" time tap the LOOP pad to set the Rhythm Loop point.

Now the modulated beats are in, try changing the modulation (LFO frequency higher) and editing some of the beats or adding in new ones. Remember to move the CV knob to edit existing beats. (See Example 1B for editing)

The CV knob + Modulation is recorded for overdubbing beats or creating new ones, but the same applies as any edit: To remove a beat from the sequence, the Red LED must be off or flashing, then tap on the beat to remove it.

CV Modulating A Playing Loop
When the CV knob is moved, the playing beat's CV's will be taken-over as a preview function. This is it's purpose, but can also be used to place a CV input + CV Knob modulation over the playing beats while the knob is being moved. This is great for variation without actually changing anything in the beat! Try patching VELO out to CV IN.
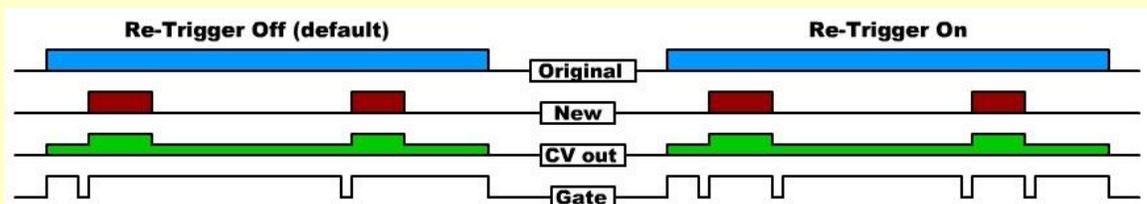
CV Input/CV Knob Quantizing Switch:
As mentioned previously, if CV Quantizing is turned on (see VIII. Settings) the CV input will be quantized, while the knob will act as an offset. If the CV IN jack is cleared, then the CV knob will be quantized. To defeat this, simply patch a "dummy" into the CV IN jack. The CV knob will be unquantized.

> **A Word on editing and overwriting (ReTrigger):**
> If a longer "note" has been previously placed in the sequence, then new short notes added over it, a short CV change will happen for the duration of the new note, then the CV will return to the original level or note.
> By default, there will not be a Gate edge at the return point. This is so the sound flows when used with a VCO or triggered filter. Settings #11 can defeat this and add a Gate Off, followed by a Gate On to re-trigger the original.
>
>
>
> The only issue with leaving Re-Trigger option off is during SnapShot play mode, the CV for the new gates will carry through and the original won't be heard after the first new gate. This may be desired, but perhaps not!

E.   The Magic Clock

   The Clock I/O jack can either be an input or an output. When it's an input, your clock source will control the rate of the Sequence being recorded and played. When it's an output, a derived clock is calculated based on the Loop length and the BPM Range setting in setup.

Clock Input:
If you want to sync to a Clock already running elsewhere, rather than generate the Clock with the RIT_M, simply patch in the External Clock Signal. The RIT_M will sense there is an external signal and switch to input. Use the Reset jack to re-start a playing sequence.
To re-enable a Clock output, it's important to remove the jack for a moment so the RIT_M knows there is no more Clock Input. If this isn't done, there will be no clock input or output and the Rhythm Loop will stop.

Rhythm Pad Start:
A tap on the Rhythm Pad will start recording at the nearest clock pulse. The tap can be up to 1/2 the clock time late and still register with the previous clock as that time is pre-recorded. Early taps wait for the next clock pulse.

Loop Snap:
When the Loop pad is tapped to end a recording and start playing, the nearest Clock Division will be snapped to. The PPQN knob setting acts initially as a divider for snapping the Loop Pad to a clock. This can be useful for fast clock pulses that can be missed. A good rule of thumb to set the Record PPQN is estimate the "clocks per bar".
 i.e. If it sounds like there's 8 clocks/bar, the set PPQN to /8 and loop can only occur on every 8th clock. (see F.)

Play Speed:
Adjusting PPQN during playback can also act as a relative divider or multiplier using the Record/Play ratio to change sequencer play rate, depending on where it was set during recording.
 i.e.   Rec@ 8 then Play@ 4 = /2, Rec@ 2 then play@ 16 = x8, Rec@2 then Play@3 = x1.5,
 Rec@96 then Play@3 = /24, Rec@8 then Play@96 = x12, Rec@32 then Play@16 = /2.
**NOTE: As a function of physics, original & divided clocks always track better to uneven/varying clocks than
multiplied clocks. Changing a multiplied clock rapidly can/will cause momentary/permanent sync position loss.

Beat Quantizing:
If the Beat Quantize Option is turned on (see sect VIII.) then beats will snap to a nearby Clock Input pulse. During editing, advance beats can be inserted off of a clock, so it's semi-quantized. Higher clock rates offer finer quantizing, but the PPQN divider should also be higher to compensate for easy Loop alignment.

Clock Output:
Once a Rhythm Loop has been started a Clock Output can be derived. The PPQN control can be adjusted to double or half the clock speed with each gradation, with no affect on Play speed. When PPQN=3 or 96 the output is in 3rds. If the clock is being adjusted to be faster, the change is immediate. If adjusted slower the change will be delayed to keep it in sync. Without this delay, you could end up with an offset clock which is useless.

Making Just a clock
   There are two simple ways to make just a clock using the RIT_M:

#1: Tap RHYTHM Pad, Then LOOP
        The Clock Output will be based on the time between the two pads being tapped as a
        clock, and adjusts to fit inside your BPM range. PPQN can be adjusted to suit.

Example 4: Clock in two Taps

-1-   Touch and Hold both the LOOP pad and RHYTHM pad for 1 second to stop all and reset.

-2-   Patch the Clock I/O jack to the module you want to clock

-3-   Set PPQN to 4

-4-   Tap RHYTHM Pad on one beat, then LOOP pad on the next. Clock output will begin.

-5-   If the beat falls into the Clock range set in Settings (Section VII.) then the clock will match the beat
         you tapped in. If it's slower, than the range, then 2 clocks will happen assuming a 8/4 time.
         Assuming Record PPQN=4, PPQN can be set to 2 to half the clock speed, or 8 to double it etc.

#2: Tap in a full bar of 4 beats (or more) on the RHYTHM Pad, then tap the LOOP pad.
        A more accurate way to achieve the same result is to tap in several beats before tapping in the
        downbeat on the LOOP pad. Always tap in multiples of 4 for simplicity (or 3 if is that timing).

        The Clock output can be now used, or the Gate output can be used as a clock output. This gives
        the flexibility of hand tapping some swing into your clock, or testing your hand-ear coordination! ▲

F.   Loop Snapping (Bar Quantization)   ▲

PPQN Loop Snapping:
To make creating a properly timed Loop easier, the PPQN setting acts as a clock quantizer based on the setting of the PPQN before record. The PPQN selection determines how many clocks must pass before a Loop request (tapping on the Loop pad) will set the Loop size. i.e.:

  If set to 4, then a Loop can only happen after 4 clocks, or 8 clocks, or 12 clocks etc.
  If set to 16, then a Loop can only happen every 16 clocks, 32 clocks etc.

This is particularly useful for fast clocks, say 16 per beat, where getting the Loop point right would be almost impossible. With Loop snapping simply set the PPQN to 64 (64/16=4 beats) to be able to Loop every 4 beats.

This can be thought of as a "Bar Quantizer" and only poses a limit if the PPQN is to be changed post-record. In the previous example of PPQN=64, there would be no way to make the playback faster (well.. there is 96!) so with such a high Clock rate coming in, a 2 beat Bar could be made be setting PPQN at 32 before recording.

For slow, easy to manage Clocks, or odd length Loops the PPQN can be set to 1 PPQN. When the Loop Pad is tapped, the RIT_M decides whether it's a "Late Tap" (just after a clocked Loop) or an "Early Tap" (before a Loop point by any amount of time except < 250mS after the last Clock/Loop).

PPQN Loop With no Clock Input:
If there is no Clock input, then the PPQN becomes a Clock Output divider or multiplier, so it's best to set the PPQN near the middle (4 or 8) before starting a fresh sequence (for most applications) if you plan to move the clock slower and faster.
As mentioned in the previous section, the length of the Loop will be divided until it falls into the BPM range. The PPQN setting is relative so if moved from 8 to 16, the clock rate will double, if moved from 8 to 4 it will half.
This is why it's a good idea to consider the end clock range desired.

G.   Loop Re-Starting, Repeating

When a sequence is playing, tapping the Loop Pad will re-start the Sequence. The Loop pad can be "played" for some great break FX, variance, or just re-alignment with other modules.
When using a Clock Input, the re-start will snap to the nearest clock, simplifying synchronization.
When using the RIT_M's internal clock, the re-start can happen at any time.

A Reset Input Pulse will act the same way as above. As a result, a reset signal out of sync with the clock signal can provide some interesting cadences, acting as a "trimmer" for your sequence.
1-Shot Play:
If the sequence is paused (quick tap on both pads) any pulse on the Reset jack will play once, then stop.

H.   Pre-Defined Loop Size

To assist in a played in sequence from a keyboard as in Section C, or even recording a sequencer, the loop size, in clocks, can be defined by the PPQN knob. The PPQN must be set before recording. Usually 8, 16, 32, or 64. Once that many clocks have passed, the recording will end and the sequence will loop.

Defining the Loop Size:
With the sequencer stopped (not paused) tap the LOOP Pad twice. The LOOP Pad will flash light pink.
*To cancel, just tap again and the LOOP Pad will return to standby.
Start tapping the RHYTHM Pad as usual. Once the number of clocks matches your PPQN setting, recording will end.
This also works with "Reset Input as a Gate" because the tapping the LOOP Pad still arms for input.
*Note: This mode only works with a clock input for obvious reasons.

I.   Programmable Double-Click Button

Double Clicking the button activates a pre-programmed Settings change. The assigned function can be programmed in Settings (*see VIII. Global Settings- #13*). Once double clicked, the Loop Pad will indicate the function's state as: Violet = On, Green = Off. An exception to this is CV input Quantizing Off→On→Major Scale→Minor Scale→Off… where the Loop Pad steps through Green, Dark Violet/Blue, Medium Violet, & Bright Violet to indicate.
How this feature is programmed is up to you but the factory default is #5: Quantizing Off(default)/On +Scales.

J.   CV Knob Scale (Major/Minor7) Offset Feature

When no CV input has been present since the last Stop, and if CV Quantizing is set to Major or Minor7 Scales, the knob is quantized to the selected scale during Record & Edit. To set the Root of the scale, while Stopped, adjust the
CV knob to the desired root key <u>and let it time-out</u> (Gate LED turns off too). Start recording!   ▲

IV.   Master/Slaving RIT_M's: Link

   It was suggested early on by some fellow Muff Wigglers that linking RIT_M's together would be a great idea. Who am I to argue! If you purchased more than one RIT_M then the order would have included a strip of 5 jumpers to link as a daisy chain from one module to the next. The Link connection also powers the Slave modules.
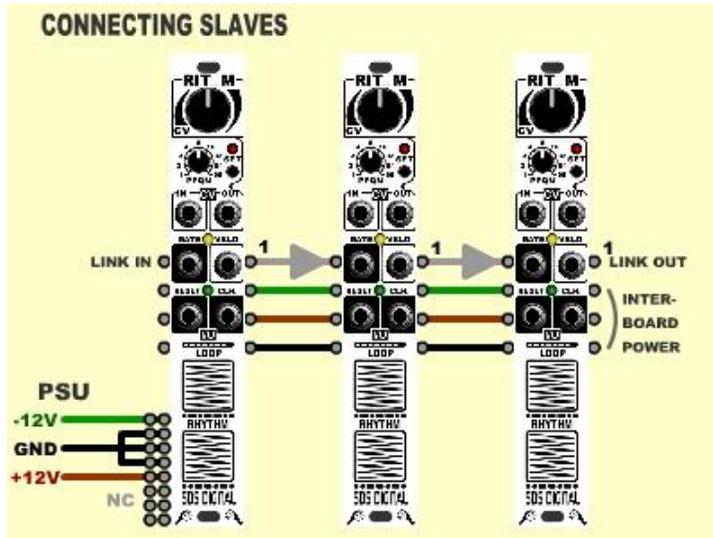
On the back of the RIT_M are two 4 pin headers (female) that when viewed from the panel, assume a left to right flow from the master. Thus link connection direction is as shown.

Connect the corresponding pin order (as shown) to make the link. Be careful as 2 of these are +/-12 Volts and it's important they are bridging in the same pin order! Do not cross wires.

The included patch ribbons have a tab on one side. Match the tab's direction to be sure they are both going the same way.

Plug the PSU ribbon into the Master Module. **Make sure to double check the connections before powering up!**

   Once powered up, go into settings on each of the Slave modules and turn on the Slave option. If this is not turned on then signals from the previous module will be ignored and passed through. This is set up this way so you can change the Slave Link type without having to pull the module.

   You can test the link(s) by patching in a clock input on the master module. All of the Slave's Clock LED's (yellow) should become active once the master has a clock input.

Information sent to the Slave Modules includes:
Clock Sync, which can be bypassed with the clock jack.
Start/Pause/Stop/re-start/CV knob information
Loop Markers for synced sequences of various sizes
Active Status for Slave or link pass-through
Other information for load/save status etc.

On power-up, the master (presumably the left-most module) sends data to the next link-in. This data is then forwarded to the next and so on.
If a Slave is turned off in settings, then it will become transparent, only passing data through.
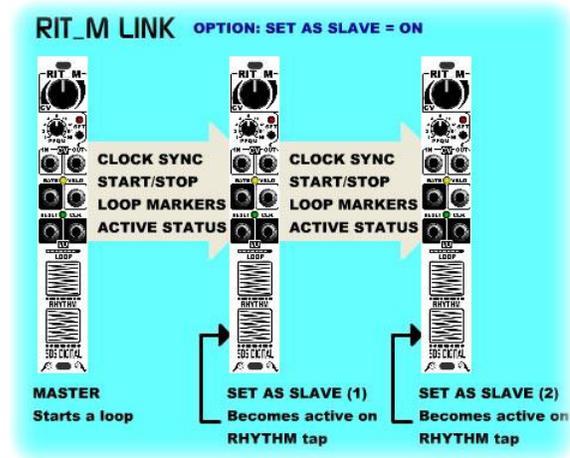

Master/Slaves clock only with a Clock Input on the Master, but if individual Slaves are self clocked (no clock inputs) and so is the master, the loop points will attempt to align / snap together (within 1/2 second). This can give you some interesting loop sequences!   There are two ways to use Slaves from a clocked master:

Post Master Loop:
   This method lets you have multiple loops running from the same clock that can all be different in length.
1 - Make a complete Rhythm Sequence on the Master module first.
2 - Add a Rhythm Sequence on each of the Slaves but tap Loop Pad at another time from the master if desired.
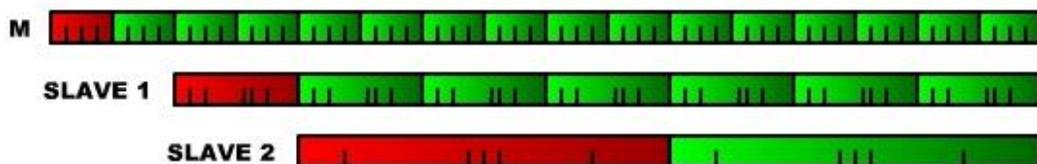

The Loops will all sync to the Master Clock, but their loop times can be different.

   *Note that a Pause/Stop (touch both pads) on the Master will pause/stop all slaves, but a Pause/Stop on any Slave will only stop that Slave. The Slave can be re-started or erased and have a new rhythm.

Simultaneous Loop:

This method will simulate a drum machine / pads setup so the Master and Slaves work together to output to different modules. This is ideal for using with separate percussive modules, each with their own trigger.
1 - Play the Rhythm pads like drum pads
2 - Tap the Master's Loop Pad on the downbeat to end recording on all.
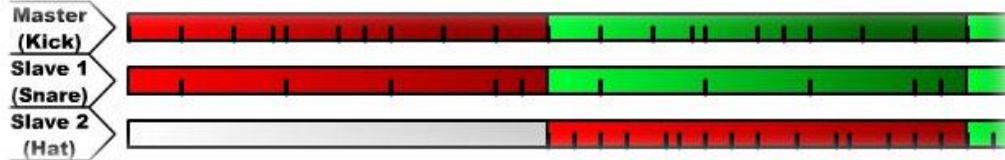
The Slave(s) recording doesn't start on the first tap on it's Rhythm pad, but rather is already recording along with the master so <u>any beat added</u> will be in sync with the master. The slave's CV inputs will always be recorded. **
 ** *If the Slave has been armed, then it will always be included with the Master without touching it at all.*

In the diagram above you may have noticed that Slave 2 wasn't started right away. If a Slave's Rhythm pad isn't tapped before any Loop pad is tapped, then it of course is not included in the sequence. ***
The "Hat" sequence in the example above was tapped in after the loop was ended so is regarded as a "Post Master" loop which required it's Loop pad tapped to end it's sequence. It could have just as easily been twice as long.
 *** *Post Master slaves can start at any time after loop and are not confined by the master's loop start/loop size.*

Once a Sequence Loop is set on the Master, each Slave can be modified as usual, but will stay inside the Master's Loop if created with the master..
<u>Note that when there is no Clock Input to the master, simultaneous mode cannot be achieved as there is no clock yet!</u>

<u>Global Master Controls:</u>
The master will affect all slaves in the following ways:
>Master CV Knob<
When the master's CV knob is moved, the slave's CV knob's become active as well. This is for easier control of multiple modules if Delete mode has not been disabled in settings. The slaves Red LED's will indicate this state.
>Master Pause<
When the Master is paused, all Slaves will pause. If the master is stopped, only Slaves started by the master will stop
>Master Re-Start<
When the Master's Loop pad is tapped to re-start a sequence, all slaves will re-start on the master's clock.

<u>Other Master - Slave Interactions:</u>

Patching A Slave's Clock In:
If a Slave gets a separate clock input from another source, it will break free from the chain according to it's Division / Multiplication Setting (PPQN Knob) in relation to the PPQN at record time. Each Slave's PPQN setting is independent. This may or may not be pretty! Re-joining the chain will require re-sync (Loop pad)

Patching A Slave's Clock Out:
By default, the Slave(s) will output clocks based on the PPQN setting, thus it's play speed compared to the record speed. Changing a Slave's PPQN setting can give you a multiplied/divided clock source for other parts of the rack, that is in sync with the RIT_M's. This effectively makes multiple RIT_M's multiple clock sources as well!
If *patching* clocks from one RIT_M slave to another, it's best to pause the receiver before patching.

Slave Loop Snapping:
When slaving modules to the Master's Clock (i.e. Slave's Clock jacks unused) as a ***Post Master Loop,*** the Loop sizes on the Slaves can be independent of the Master as mentioned above. This also applies to the "Loop Snap" or Loop Quantization mentioned in Section III. F.

Slave's Settings:
Each slave will conform to it's own settings, i.e. Beat Quantization, CV Quantization, Beat-Snap, T/G Delay etc.
This has been done intentionally so a certain slave can have a rhythm that is away from the clock (beat quant) or trigger output as opposed to a gate output.
The Slave Module setting (#2) must of course be set to "on" to become recognized as a slave.

A Slave First:
At one time or other you may have a slave running alone, but from the master's clock. If the master is started, this slave will be unaffected (except by Master's Clock) but will pass through information to a following slave. Thus a Simultaneous Loop can be worked around the independent slave. A Master's pause ***will*** pause all slaves though. ▲

There are 3 memory Slots to load/save Rhythms you really want to keep.

To save a sequence:
1 - *The Sequence <u>must be playing</u> to save (not stopped/paused)
2 - Hold the button for 4 seconds, all of the LED's will turn on, then off. Release button.
3 - Use the CV Knob to select LED's for slot 1, 2, or 3, or none to just exit.
4 - Tap the button to save. All LED's will illuminate for 2-3 seconds

To Save a sequence of Master + Slave RIT_M's use the Master as above and all will be saved to the same memory Slot in the active and currently playing Slaves. Slaves with no running sequence playing will ignore the command. **Warning!!** This may overwrite previously created Rhythms in Slaves in that slot!

To Load a Sequence:
1 - Touch and Hold the Loop & Rhythm Pads to erase any loop present.
2 - Hold the button for 4 seconds, all of the LED's will turn on, then off. Release button
3 - Use the CV knob to select a slot to load 1, 2, or 3 as indicated by the 3 LED's
4 - Tap the button to load.
* If the sequence was self clocked, i.e. RIT_M as the source, then it'll start playing when the Loop Pad is
   touched. The Loop pad will flash to indicate this. A Clock input can also be used to sync the sequence.
* If it was using an external clock, then <u>you will need to jack in a clock signal</u>, then tap Loop Pad to start playing.

If the module was assigned as a Slave, then the sequence type will also be loaded. The master should be used to load all of the Slaves at the same time though. Slaves already playing a sequence will ignore the command.

*Memory Space Note:
For smooth CV types of sequences, each memory can only hold about 30 seconds each. After this point, only the CV's at the gates will be saved (snapshot). This error/limitation is indicated by all of the LED's not coming on after button is pressed for a save.

Remember!!
If you want to load a saved sequence, the RIT_M must be stopped (hold both pads 2 seconds to be sure) or the presently playing sequence will overwrite the one stored.

▲

VI.   Tips And Tricks

The website http://www.freshnelly.com/ritm/ritm.htm has a section on Tips & Tricks more up-to-date, but here's some I thought up prior to the release of the RIT_M Rhythm Module.

Tip #1: Creating Sliding Notes (with a VCO)
Because the Rhythm Pad held will create a longer note, and the smooth CV is recorded as the knob is moved while the pad is held, portamento effects can be made & recorded when driving a VCO.
It's rather like playing a Slide Whistle or a trombone, takes some practice, but quickly becomes intuitive!

Tip #2: Remote starting a CV record sequence
As explained in Sect. III. B. there is an easy way to start recording a sequencer or keyboard, but what if you just want to record a CV en queue? Simply patching the CV into the CV in jack, and the trigger into the Reset will set this up. Just before the start time, tap the Loop pad once to arm for record. The Loop pad will flash red.
The next pulse on Reset jack (a gate or trigger) will start the sequence recording.

If you want a pre-defined sequence length, make sure the PPQN is set for number of clocks in the sequence and tap the Loop pad a second time (pink). Tapping a third time will reset the armed jack back to normal, like an "undo".
The third tap can be placed once the loop has started which will continue recording (more) gates into the loop.
Unplug & Re-plug the Reset so following pulses to the Reset act as a reset for the playing sequence again.

Tip #3: Variable Velocity
The velocity output can also output pressure/pad area covered as a relatively smooth CV that increases/decreases as pressure is changed. Because this sensor is on the Rhythm pad, the RIT_M will be either recording or playing velocities.
The velocity range is approximately 0-5V but may not reach a full 5 volts.
When editing a sequence, the new beats/taps/CV's will also include the velocities. This is really great to use!
A filter can be "played" by using the CV Knob+offset (frequency) and the velocity (resonance) and sequenced.

Tip #4: Quantized CV input & CV Knob:
If the quantize CV option is on, (chromatic, major, or minor7) an incoming CV will be quantized, while the CV knob will be a non-quantized offset. This is great for fine tuning any VCO being controlled.
When the CV Input is unplugged, the CV knob becomes quantized for easier selection of semitones (in the VCO application) but only after a pause or stop.
Maj/Min7 quantizer on CV knob alone (no CV in) uses knob position as offset at record time. Scale will start from there!
If you hate quantizing, then this option can be disabled with Settings #9.

Tip #5: Editing -Glitch Insertion
One of my favorite FX when driving a VCO with the RIT_M is to create a simple sequence then patch in an LFO or envelope gen. to the CV input, then tap over/between beats to add a variety of faster LFO waveforms.
A great groove can be tapped into existence using a variety of signals including audio.

Tip #6: Doubling/Halving Rhythm speed
Beat quantized or not, this sounds really great!. Select a lower PPQN, say 4, for record then moving it up to 8 during play will double the beat after the Loop point has passed. This always livens up a mix and is always in sync.
Remember though that this change will happen based on the original Loop Time, not the clocks or Loop end itself. This means that if the PPQN is slowed to, say 2, changing it back up to 4 in the first half of the loop will happen halfway through

Tip #7: Extreme Clocking
There are some extreme clock ranges that work and some that don't. For example, if you have a 96PPQN clock rate, it's best to set the PPQN at 96, not at 3. While the RIT_M will work at 3 PPQN with 96PPQN coming in, the upward multiplication will be inaccurate. If set at 32 during record, multiplying to 64 will double the sequence rate, but 96 will triple it and again jitter somewhat.
A very fast clock rate, say 2KHz will track or divide nicely running at these frequencies, but won't multiply well…or at all. The CV sample rate and/or clocking routines simply can't keep up.

On the other end of the spectrum, while a 0.2 Hz (5 seconds) clock will multiply upward just fine, and divide downward equally as well, a beat quantization (if on) will be limited to the extremely slow clock, as would be the Loop Snap.
On multiplication or clock speed increases, a good rule of thumb is "no more than 50X", which is pretty much the limit.

Tip #8: Using CV Knob & Major/Minor7 Scales
To be able to easily select no-quantizing, chromatic, major, & minor7, assign the double click button to #5 (see settings: #14 ..this is factory default) which will step through the CV quantizer modes on each double-click.
The steps are indicated by the Loop pad as: **GREEN→DEEP VIOLET→VIOLET→BRIGHT VIOLET**
Scales can be changed on the fly (but not the root key) so you could start with a Minor7 Scale then switch to the chromatic or no quantizing add embellishments.
Remember the Root Key offset can only be set before recording a sequence by adjusting the CV Knob and waiting for it to time-out (Gate LED goes out after a second).
The CV knob can be moved again before recording but just before record is started or it may time-out and reset your key offset!

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VII.   Quick Reference

First, here's a pictorial reference of some main functions of the RIT_M that you may want to print up to keep handy:

RIT_M BASIC USE QUICK REFERENCE

Quick Gate Recording:
If you have a Gate input patched to the Reset Jack, tapping the Loop Pad <u>once</u> (while RIT_M is stopped) will arm to start recording at the gate input (on next clock if present). Tapping Loop again will end the recording and set the loop size. Tapping Loop once more will start constant Gate input recording.editing.
Tapping the Loop Pad <u>twice</u> (white RIT_M is stopped) will arm for preset PPQN set loop size. (4,8,16, etc)

Panel Record a Rhythm Sequence (Using Gate Output) :
Patch a VCA (or Env.) trigger to the Gate Output.
Toggle desired Play Mode with button: Red LED off for SmoothCV, or flashing for CVsnapshot mode.
Tap your Rhythm into the Rhythm Pad (while turning CV knob if desired), then Tap the Loop pad to play it.

▲

Panel Record a SmoothCV Loop (Not using Gate Output):
Press button to toggle Red LED so is off (not flashing) to set to play in SmoothCV mode.
Tap the Rhythm pad to start a Loop. Adjust CV knob as you want recorded, then Tap the Loop pad to play it.

Clock Input: PPQN Loop Snap:
Adjust the PPQN to how many clocks (after start) you want the Loop point to "snap" to. (usually 4 to 16)
Start playing on Rhythm pad in sync with your clock input.
Tap loop on/near the downbeat clock and the loop will begin at the Loop Snap clock count.

Record an External CV or CV Modulation (SmoothCV Sequence or Loop):
Patch in the CV source to CV in jack.
Press button to toggle Red LED off (not flashing) to set to play in SmoothCV mode.
Adjust CV Knob set the CV offset. (Red LED will light solid if delete mode has been turned on in settings)
Tap the Rhythm pad to start a Loop and tap in your Rhythm if required to have Gates in recording.
Tap Loop pad to end recording and start looping the Recorded CV

Record a Keyboard's CV + Gate (SmoothCV Sequence):
Patch the keyboard's CV to CV in jack. Patch in the Gate to the Reset I/O Jack. Add a Clock input (optional)
Play a note or two and adjust the CV knob for offset. (Red LED will light if delete mode is on.)
Tap the Loop pad <u>once</u> to "Arm" for the next note to start Record of the Sequence. (Pad flashes red)
Tap Loop pad to end recording and start looping the Recorded CV

Record from a Sequencer's CV, Gate, and Clock. (SmoothCV Sequence):
Patch the sequencer's CV to CV in jack. Patch in the Gate to the Reset I/O Jack, & Clock to the Clock I/O
Send a Gate if possible to tune the CV knob offset if required.
Tap the Loop pad **Once**: to "Arm" for the next Gate input pulse to start Record of the Sequence.
        Twice: to "Arm" for the next Gate and define the loop length (in clocks) with PPQN settng
*If **Once**: Tap Loop pad to end recording at the next ClockDiv and start looping the Recorded CV & Gates*.

Switch Between SmoothCV and CVsnapshot modes:
Press button to toggle SnapShot Mode (Red LED flashing) or SmoothCV Mode (Red LED off)
This change can be done when paused or while playing a rhythm loop. No affect on record.

Edit: Adding Beats To A Running Sequence:
If Delete Mode is Active, the CV knob must be moved first (Red LED timeout). Otherwise, just tap the
Rhythm Pad to add/insert gate beats and CV's with CVin + CV Knob offset

Edit: Changing Beats In A Running Sequence:
If Delete Mode is Active, the CV knob must be moved first (Red LED timeout). Otherwise, just tap the
Rhythm Pad on existing gate beats to change / overwrite their CV's with CVin + CV Knob offset

Edit: Removing Beats From A Running Sequence (Delete mode must be ON in settings):
Make sure Red LED is not on solid. If it is, wait until it goes out. (after one full loop)
Tap / hold Rhythm pad on (or close) to beats you want to remove from the loop.

Pause A Running Sequence:
Tap both Rhythm Pad and Loop Pad <u>together</u> briefly. Will pause at end of loop or arm for a 1-shot if using a
reset pulse. Tap Loop Pad to resume, or Rhythm Pad to start with an edit on first "beat"

Stop A Running Sequence And Reset/Erase:
Hold both Rhythm Pad and Loop Pad together for about 1 second. Will stop and erase at end of loop.
Hold both Rhythm Pad and Loop Pad together for >2 seconds to do "emergency stop" & erase

Save Running Sequence:
Hold the button for <u>4 seconds</u>. Use the CV knob to select memories (LED 1, 2, or 3), or 0 (no LED's) to exit
Tap button to save.

Load A Saved Sequence:
Hold the button for <u>4 seconds</u>. Use the CV knob to select memories (LED 1, 2, or 3), or 0 (no LED's) to exit
Tap button to load.

Set A Jack To It's Default State:
Unplug from the jack, wait a moment, then plug back in. (Clock I/O, Reset I/O, CV Input during stop)

▲

To enter the Settings / Setup menu, hold the button for about 1 second (until all LED's illuminate) release, then select the setting with the CV knob according to the following LED patterns (binary):

LED's	Settings #	Description
Fully CCW: No LED's	#0	Fully CCW: *Just Exit Settings, escape (accidental Entry)
Red	#1	CV Knob Voltage Range: 5 Volts(default off) or 1V(on). *If Bipolar, +/- 1V
Green	#2	Bi-Polar CV Knob: Bi-Polar(on) or Unipolar (Default=off)
Red + Green	#3	Slave Module Option: Slave=on or Ignore/pass-thru=off (default)
Yellow	#4	Beat Quantizer: (default=off) or quantize to clock=on
Red + Yellow	#5	Trigger Out instead of Gate: off (default) or on (Trigger Outputs)
Green + Yellow	#6	BPM Range: Red =low, Green =medium, Yellow =high (See below)
Red + Green + Yellow	#7	Beat-Snapping Range: 10mS to 137mS (50mS=default) (see below)
All Off + Violet pad	#8	Reset Jack can be Gate Record input on (default) / off
Red + Violet pad	#9	CV Quantizing off (default) / On / Major / Minor7 (See below)
Green + Violet pad	#10	CV Knob Preview during Play. on (default) / off
Red + Green + Violet	#11	CV → Gate/Trigger Delay. 0-7mS default = 1 mS
Yellow + Violet	#12	Retrigger on Beat Overwrite on / off (default) (See Below)
Red + Yellow + Violet	#13	Delete Mode On/Off(default) CV knob must be moved to edit, (see below)
Green + Yellow	#14	Double-Tap Button Function (0-7) LED's Show as binary (see below)
Red + Grn + Yel + Vio	#15	Factory Settings Recall (knob must be turned left after selecting this)

Press the button to select the setting#, then use CV knob to turn it on/off or select a range.

<u>Red LED indicates On/Off.</u> *On=CV knob right of center, Off=CV knob left of center*.
Binary LED Values are: Loop RGB Violet=8 (+) Yellow=4 (+) Green=2 (+) Red=1**. i.e. Yellow + Green + Red = 7**
Once done, tap button. All LEDs will flash as setting is saved.

#6: BPM Ranges:
RIT_M is Clock Source. The 3 BPM ranges are: Low:60-110, Medium: 80-150 (default), and High: 100-190
You may want to change this setting to more closely match the type of Rhythms you will be creating, but keep in mind it's all relative and only a PPQN adjustment away!
The LED's Indicate these as Red->Green->Yellow.

#7: Beat-Snapping Range:

This adjustment is primarily for the Delete Beats function, and how far from the beat a tap would be considered valid to delete it. If the setting is too slow (100mS) and you are very quick on the pad, you may end up editing a beat instead of adding a new one close by, so the setting will need to be adjusted to a tighter speed of say 1/4 of the way up on the CV knob, or 42 mS.

Inversely, if you are missing beats that you want to edit and inserting others, then perhaps a slower time is required, say 1/2 up on the CV Knob (75mS).
*The ideal (and factory) setting is 50mS. (1/3 of the way up)

Keep in mind this range is +/- so 100mS actually covers 200mS of space in the loop, nearly 1/4 second.
While setting, the 3 LED's will show the range as 3 bit binary (all off, red, green, red+green, yellow, etc.)
This setting of course only applies to editing a loop already running with the CV modifier (Red LED) off, not the initial recording or a CV / add type of edit (after moving the CV knob)

#8: Reset Jack Can Be Gate Record Input:
As mentioned in Tips & Tricks section, the Reset jack, when used with the Loop Pad to arm for recording, will switch over to be a Gate Input.
After using Reset input as a gate, set back to a reset input by simply unplugging from the Reset jack, then plugging back into it.

<u>When this option is on:</u>
  During standby or initial Record the pulses received at the Reset jack will be output from the Gate jack.
  Once a Loop has been created, the Reset jack must be cleared (unplugged) then patched over to your reset source or input to use it as a reset on the loop, or sense the loop point (RIT_M will sense input/output)
<u>When this option is turned off:</u>
  The Reset jack will be exclusively for Reset / Loop operations only

#9: CV Quantizing on/off(default):

This option affects both the CV knob (Chromatic Quantizing) and the CV input (Chromatic, Major Scale, Minor Scale). When there is a CV input, the knob returns to non-quantized mode, while the CV input is quantized.
Select OFF (No LED's, no quantizing), or:
    Chromatic Scale (Red LED),   Major Scale (Green LED),   or Minor7 Scale (Yellow LED).
The Major & Minor7 scales on the knob alone can have an offset, before Recording, by
simply adjusting the CV knob to the offset and waiting for CV knob time-out (about1.5 seconds) then record.
The quantizing is based on the 1V/Octave (.0833V/Semitone) standard. If the voltage is not aligned, please refer to the calibration guide.

#10: CV Knob Preview during Play:

By default, the CV Knob+CV input will take over the CV Output for a brief period when moved. This allows the user to preview a sound before editing or inserting it into an existing Sequence playing. While this can sound artistic, in some patches, it could be downright confusing in others (i.e. selecting samples in a sample player).

When turned off, the LED's will still briefly indicate 1/16 steps of the knob which can be used as reference points if CV quantizing is off (or used with a CV input) or indicate semi-tones in binary 8's.

#11: Gate/Trigger Delay:

The amount of time between when the CV change is presented to the CV output and the Gate/Trigger is sent. This can be useful for sampler module's sample selection, slice/splice selection, and other digital modules that require the CV to be set before the sample or event is triggered. Delaying by a couple of milliseconds allows their CV circuitry to settle in time for the gate/trigger edge.

LED's display as binary 0 - 7 mS (No LED's to all on: Red =1, Green =2, Yellow =4)

#12: Re-Trigger On Beat Overwrite:

If a long beat/note is overwritten in part by short beats, by default the short beats will just flow until the next Gate Off, this may be just before the next short beat or the end of the original longer beat. Turning on this setting will send a Gate Off after the short beat inserted over the longer one.

While this sounds logical, it isn't musically conducive (especially with a VCO+T/G/Env) so has been made an option. (for more on this, see section III. D.)

#13: Delete Mode On/Off:

Delete Mode allows Gates or "Beats" to be removed from a sequence by tapping on them. The trade-off for this function is that the CV knob must be moved to add new Beats or edit old ones.
By Default Delete Mode is off which is best for beginners!
Turn CV knob CW to turn on delete mode, or CCW to turn off. Red LED will indicate state.

#14: Double Tap Button Function:

As a bonus feature, double tapping the button will toggle or step certain settings *. Loop RGB Indicates State with **Violet** for On, **Green** for off. The double taps must be within 1/2 second or so. The Functions can be:

0: RGY CV Quantizing On/Off	1: RGY Unipolar / Bipolar CV knob
2: RGY CV Knob Range Normal / Half	3: RGY Beat Quantizing On/Off
4: RGY CV Preview On/Off	5: RGY Select Next Q-Scale.(** See Below)
6: RGY 1-Shot Play from Loop Pad On/Off	7: RGY Gate or Trigger Output

* **NOTE: If any Global Setting is changed, the double-tap's present state of a function/setting will be saved permanently**
** **Function 5 will step through No CV Quantizing [Loop Pad Green], Chromatic Scale [Blue], Major Scale[Deep Purple], Minor Scale[Bright Purple], then back to none.**

#15: Factory Reset:

Selecting this setting, then turning knob CCW so Red LED is off will do a factory reset.
None of your sequences will be deleted, but all settings will return to defaults as shown in Settings table.

▲

IX. Specifications:

CV Input / Output Range:	-5V to +5V (0V to +5V unipolar option on) {+ or - .1 V}
CV Input Impedance:	100K
Clock/Reset/Gate input impedance:	4K
Clock/Reset/Gate input Trip Voltage:	.65V
Clock/Reset/Gate output impedance:	4K low level, 500 ohms high level
Clock/Reset/Gate output Voltage:	4.4 V under 100 ohm load.
SmoothCV Sample Rate:	500 s/s
SmoothCV Max Time:	120 seconds
Maximum Beats Recorded:	500
Maximum Record Time:	10 Hours *(untested)*
Minimum Clock Speed:	8.3 seconds
Maximum Clock Speed:	100Hz~7000Hz {depending on PPQN Rec->Play settings}
Clock Edge Delay:	< .5 uS
Minimum Clock Width:	< 1.0 uS
Minimum Reset Input Width:	< 300uS
Minimum Gate Width	4 mS
CV I/O Bit Depth:	CV I/O:12 bits, Velocity Output: 8bits derived
Current Draw:	@+12V, 40mA max, @-12V, 15mA, @+5V, 0mA (nc)
PSU Header:	16 pin (2x8) Male Box Header (-12/g/g/g/+12/nc/nc/nc)
Module width:	4 HP (20.32 mm)
Module depth (with PSU plug):	32 mm max.

X. Appendices (Updates, clarifications, firmware info)

Firmware Updates;
Occasionally a firmware update for the RIT_M may become available online in the spirit of improvements or alternate functions of the module. The RIT_M is very easy to update from a mobile device, laptop, or PC using an MP3 file.
1) Check the RIT_M webpage at http://www.freshnelly.com/ritm/ritm.htm for any updates (always a good idea!)
2) Ready your audio source (phone**, computer etc) **Use airplane mode and disable any audio notifications/alarms*
   Patch this source into the CVin jack on the RIT_M. A mono patch cord can be used.
3) Turn up your audio source to near maximum and ready the file in your player (rewind to beginning)
4) Power up your RIT_M if not powered, then hold the button until LOOP pad goes white (10 seconds)
5) Release the button and both pads will turn violet. Play the firmware mp3 file within 15 seconds
 Do not press the button again as this may take you into Calibration mode!

While the MP3 file plays, the LOOP pad will change intensity and the 3 LED's will flicker wildly! (About 3 minutes)
If the violet RHYTHM pad goes dark blue, then the upload is a success. The Pad's startup splash will follow and the RIT_M is ready to use again!

Problems?
If this doesn't happen, turn up the audio source, check patch cable, and listen to file to make sure you're not programming with the wrong audio (I've seen it happen!) Rewind the file before trying again.
Try a different player like a notebook or mp3 player (mobile devices can be problematic because of all of the beeps and dings from so many sources, even a short pause in play can mess up the upload)

Pausing a Sequence:
Tapping both pads simultaneously may be difficult for some. If a finger hits the Rhythm pad first, while the other finger is still not near the Loop pad, this may insert or modify a beat. Similarly if the Loop pad is hit first, the pause will still be registered, but the Sequence will play from the start before actually pausing.

The best way to deal with this potential issue is to tap both pads quickly
(like touching a hot burner!) so there is less chance for error.
To practice, lock both fingers together, index above forefinger, and attack
from lower right (if you are right-handed). A fast tap always works better.

LOOP PAD   RHYTHM PAD
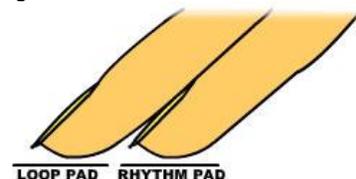
Master/Slave Information:
All entries in this document that are violet (this color) are exclusively for using multiple RIT_M's together.
Be sure to place jumpers as shown or catastrophic damage may occur !! (i.e. +/- 12V into the Link pin)

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