

RIFF **BOX**

Intelligent Looping

Users Manual Version 4.1

For the latest Users Manual, go to:
www.backline-eng.com

BackLine Engineering LLC

Warning: Do not open chassis.



NOTE: Before using your RiffBox, carefully read these operating instructions and safety suggestions:

1. Repairs should be performed only by qualified service personnel.
2. Do not place this unit near heat sources, such as radiators, heat registers, or appliances that produce heat.
3. Guard against objects or liquids entering the enclosure.
4. Use only the supplied AC adaptor. Use of other AC adaptors may void the warranty.
5. Do not step on power cords. Do not place items on top of power cords so that they are pinched or leaned on. Pay particular attention to the cord at the plug end and the point where it connects to RiffBox.
6. Unplug RiffBox when not in use for extended periods of time.
7. Do not listen for prolonged periods at high volume levels as it may damage your hearing.

CAUTION: To reduce the risk of fire or electric shock, do not open the case. There are no user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.

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1 Product Overview

Welcome to the world of intelligent looping. If you are frustrated with traditional loopers that require you to hit a footswitch at just the right time in order to get the correct loop timing, you have come to the right place. RiffBox™ uses a patent applied for algorithm that creates perfectly timed loops. You can even have the loop start repeating automatically without pressing a footswitch! MIDI messages can be used to control the looping process and special effects such as automatic layering and automatic fading can be easily achieved. Here is a list of some of the features available.

- The length of the recording can be timed to your playing rhythm or to a note pitch using a patent applied for algorithm.
- RiffBox can automatically detect repeated playing patterns to create a loop either bases on your playing rhythm or your note sequence.
- The start and stop of loop recording can be timed to your playing, timed to an external audio source, timed to a footswitch or timed to MIDI start and stop commands.
- You can sync an external drum machine to your playing during loop playback.
- Unique delay effects can be achieved that are timed to your playing.
- 76 different looping modes including automatic layering and automatic fading.
- Store up to 100 configurations as presets.
- 16-bit stereo or 16-bit mono recording modes, both with 48KHz sampling rates.
- Up to 40 seconds of recording time in stereo or 80 seconds in mono at 48KHz.
- Full MIDI implementation including program change messages, continuous controller messages, start and stop commands and sysex data dumps.
- Recording and playback can be controlled using MIDI program change messages, an external footswitch or a built-in footswitch.
- Half speed playback mode for learning complex recorded passages.
- Reverse mode for unique playback effects.
- Toggle between normal, reverse and half speed mode during playback.
- Change the loop length during playback.
- Multiply modes that allow you to automatically increase your loop length.
- Doubling mode that adds a fuller sounding loop playback.
- Trigger a MIDI drum machine with your playing
- You can download firmware updates to protect your investment.

2 Quick Start Guide

If you can't wait to get started, the following step-by-step process will allow you to start using RiffBox using one of several methods.

General Setup

There are seven ways that RiffBox can identify the length of the loop that you want to record. The loop can be timed to when you press a footswitch, the loop can be timed to when notes or chords are played, the loop can be timed to the pitch of notes that are played or the loop can be timed to MIDI start and stop messages. The following instructions are common for all seven.

1) Connections

Connect the supplied AC adapter. Connect your instrument to the RiffBox 'Audio In' using a standard guitar cable. Connect the 'Audio Out' of RiffBox to the input of an amp or mixing board using a standard guitar cable.

2) Turn on the power

Turn on the power switch. The two LEDs will turn yellow while the display will remain blank. In less than 10 seconds, an audio test tone will sound and the display will cycle from 0 to 99. At this point, RiffBox is ready to use.

3) Set the record mode

Move the right slider switch to 'Record Mode'. Turn the right control knob until only the 'Mono 1' display segment is on.

4) Adjust the input level

Move the left slider switch to 'Input Level'. Play some chords on the guitar. Adjust the left control knob until the input level is high as possible without the center decimal point LED on the display blinking. The decimal point identifies input overdrive conditions.

1- Loop Length Determined by the Footswitch

You can operate RiffBox like a traditional looper. In this case, loop recording starts and stops exactly when you press the footswitch.

1) Set the operating mode

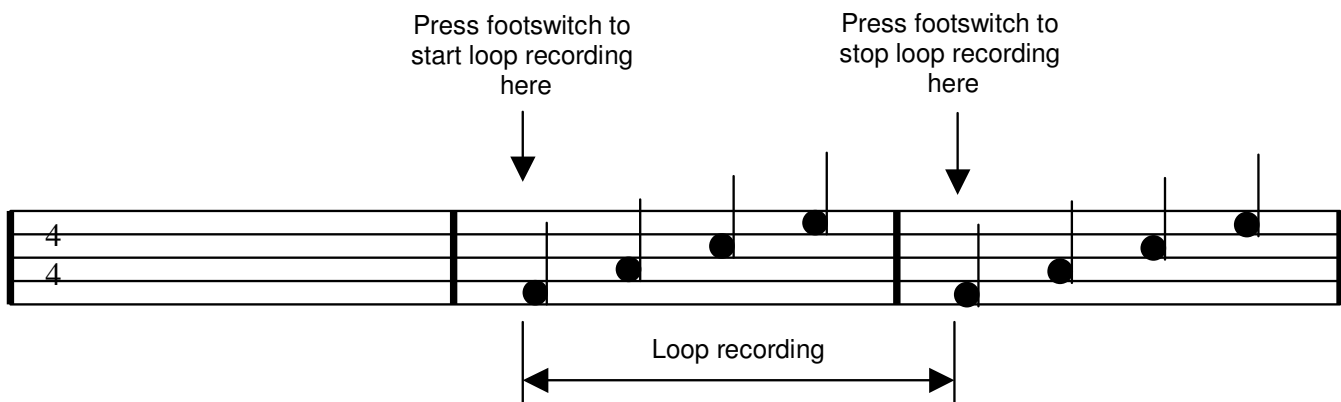
Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

2) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 90. This means that RiffBox will use the footswitch to identify the loop length.

3) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will turn solid yellow to identify that it is recording. When you get to the point where you want to stop loop recording and start loop playback, press the footswitch again at which point the left LED will turn green. See the figure below which is an example based on four quarter notes. Press the footswitch to stop loop playback.



2- Loop Length Determined by a Note or Chord after the Footswitch

In this operation, after you press the footswitch to arm RiffBox, loop recording starts with the first note that you play. When you press a footswitch for a second time, the very next note or chord that you play identifies the end of the loop.

1) Determine the threshold

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 0. Move the left slider switch to 'Threshold'. Set the threshold using the left control knob to a value between 1 and 20. Set it to a higher value if you plan to play chords or to a lower value if you plan to play single notes: A) Press the footswitch and start playing how you would play to record a loop. The display should increase in value by reacting to your playing (it does not need to react perfectly to every note or chord that you play in order to create perfect loop timing, but it should react consistently to the first note of your loop). Press the footswitch again, adjust the left control

knob to a different threshold and repeat from point 'A' above until a good threshold value is achieved.

Note: Remember that the control values cannot be adjusted when the unit is actively recording. Make sure one of the LEDs is red before adjusting any control value.

2) Set the operating mode

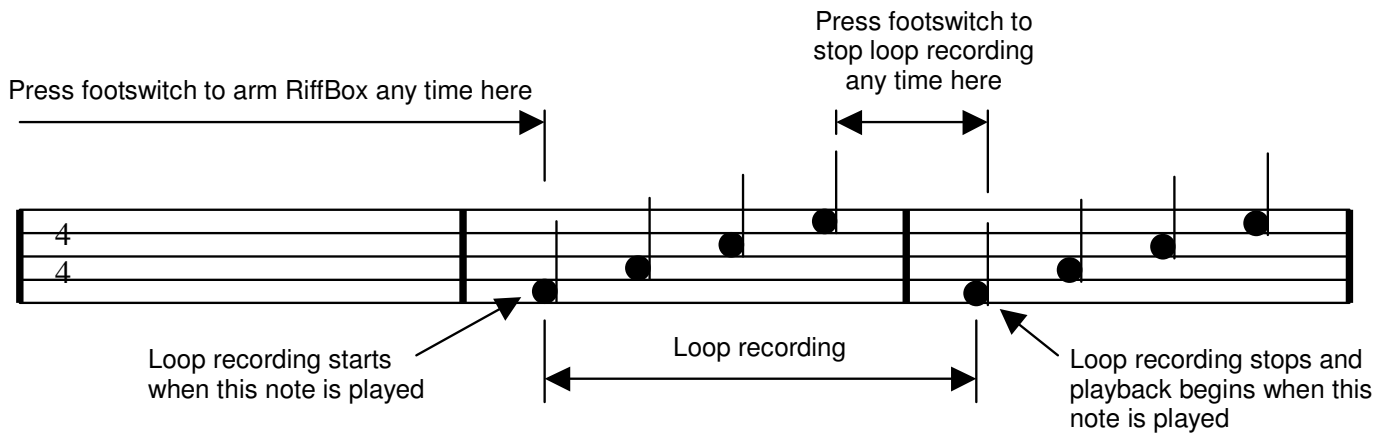
Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

3) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 0. This means that RiffBox will wait for your footswitch press to help identify the loop.

4) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will flash yellow until you play the first note at which time it will turn solid yellow to identify that it is recording. At any time between the last note of your loop and the note where you want to start repeating the loop, press the footswitch again. This alerts RiffBox that the next note or chord you play will be the time to stop loop recording and to start loop playback at which point the left LED will also turn green. Make sure to play through to the first note of the loop again. See the figure below which is an example based on four quarter notes. Press the footswitch to stop loop playback.



3- Loop Length Determined by a Programmed Note or Chord Count

In this operation, after you press the footswitch to arm RiffBox, loop recording starts with the first note that you play. After RiffBox identifies a programmed number of notes or chords that you play, loop recording will automatically stop and loop playback will begin. This requires consistent playing and should only be used for short passages.

1) Determine the threshold

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 0. Move the left slider switch to 'Threshold'. Set the threshold using the left control knob to a value between 1 and 20. Set it to a higher value if you plan to play chords or to a lower value if you plan to play single notes: A) Press the footswitch and start playing how you would play to record a loop. The display should increase in value by reacting to your playing. Press the footswitch again, adjust the left control knob to a different threshold and repeat from point 'A)' above until a good threshold value is achieved.

Note: Remember that the control values cannot be adjusted when the unit is actively recording. Make sure one of the LEDs is red before adjusting any control value.

2) Set the operating mode

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

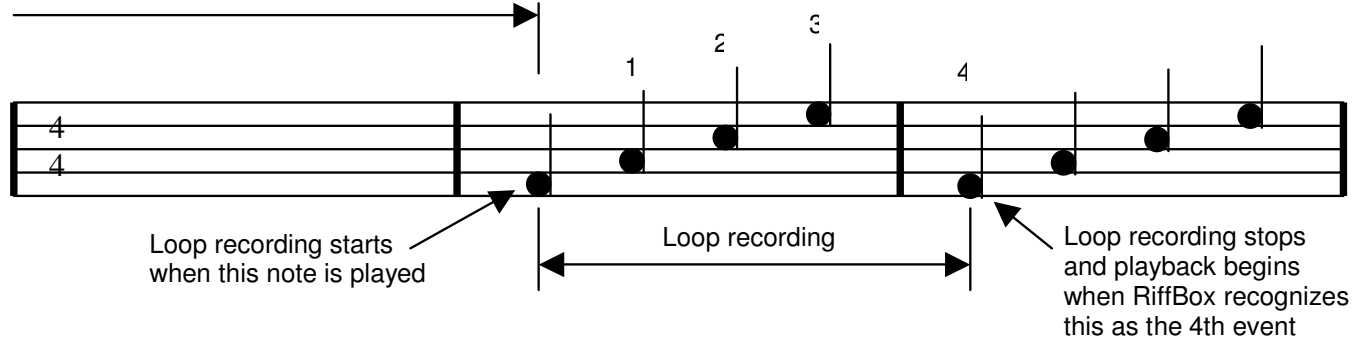
3) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 4. This means that RiffBox will start playback after 4 events (notes or chords) have been recognized.

4) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will flash yellow until you play a first note at which time it will turn solid yellow to identify that it is recording. After you play 4 additional notes or chords that RiffBox recognizes as events, recording will stop and playback will begin at which point the left LED will also turn green. See the figure below which is an example based on four quarter notes. Press the footswitch to stop loop playback. Automatic loop playback requires consistent playing and is best used for short loops. To see how this can be used for delay effects, repeat the two steps above, but set the event count to 1 and the operating mode to 5 or 45. This sets the delay value to the time between the first two notes that you play. At this point, you can also try all of the other operating modes available in RiffBox.

Press footswitch to arm RiffBox any time here



4- Loop Length Determined by a Repeated Playing Pattern

In this method, after you press the footswitch to arm RiffBox, loop recording starts with the first note that you play. RiffBox then starts to look for a repeated playing rhythm pattern to determine the loop beginning and end points. Even if you make a mistake one time through, RiffBox will ignore it since it must see a correct pattern repeated at least twice. The rhythm pattern is determined by the length of time between the notes that you play. After playing the passage several times, the loop is detected and it will start playing along with you in synch with your playing. To do this, you can press the footswitch at almost any time since RiffBox will not do anything until you start to play a repeated pattern. You never need to press a footswitch to start loop playback and the loop is always perfectly timed to your playing, unlike other loopers.

1) Determine the threshold

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 0. Move the left slider switch to 'Threshold'. Set the threshold using the left control knob to a value between 1 and 20. Set it to a higher value if you plan to play chords or to a lower value if you plan to play single notes: A) Press the footswitch and start playing how you would play to record a loop. The display should increase in value by reacting to your playing. Press the footswitch again, adjust the left control knob to a different threshold and repeat from point 'A)' above until a good threshold value is achieved.

Note: Remember that the control values cannot be adjusted when the unit is actively recording. Make sure one of the LEDs is red before adjusting any control value.

2) Set the operating mode

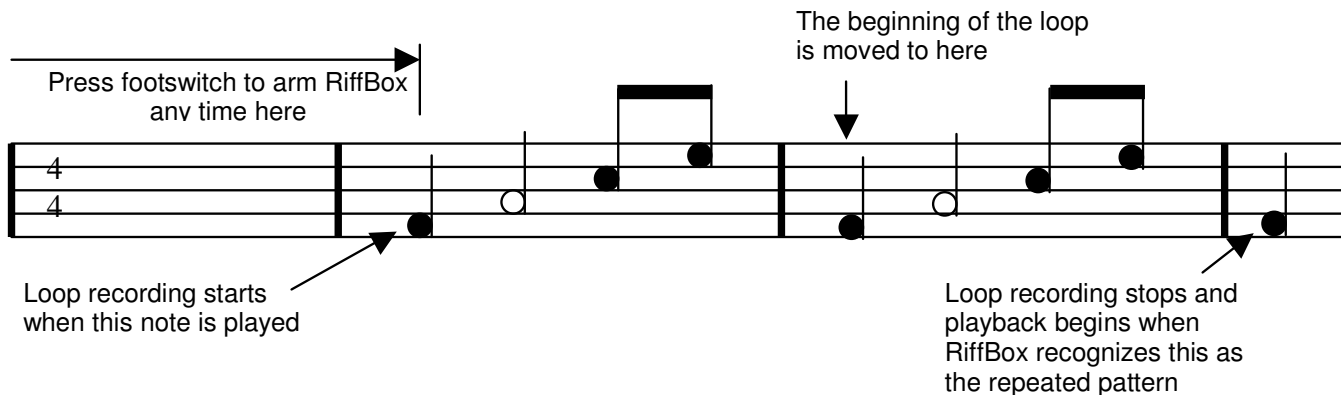
Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

3) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 84. This means that RiffBox will look for a repeated pattern of timing between notes or chords that will repeat every 4 notes.

4) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will flash yellow until you play a first note at which time it will turn solid yellow to identify that it is recording. Play a repeated pattern of 4 notes twice after which the pattern will be recognized and loop playback will start as shown in the figure below. In some cases, you may need to play the pattern twice for it to be recognized. Press the footswitch to stop loop playback.



5- Loop Length Determined by a Repeated Note Pitch

In this operation, after you press the footswitch to arm RiffBox, loop recording starts with the first note that you play. RiffBox also remembers the pitch of this note so it must be a clearly identified note. In this case, only higher notes such as the upper three strings of a guitar will work consistently. Chords, low notes or distorted tones will not be recognized very well and should be avoided. After RiffBox identifies that you have played that same note pitch a programmed number of times

(identified by the Event Count control), loop recording will automatically stop and loop playback will begin.

1) Determine the threshold

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 0. Move the left slider switch to 'Threshold'. Set the threshold using the left control knob to a value between 21 and 40. Adjust it so that it reacts well to your playing: A) Press the footswitch and start playing single notes like you would play to record a loop. The display should show the relative pitch (frequency) of the note you are playing. The display should show a consistent value for the note that you want to start and stop loop recording on. Press the footswitch again, adjust the left control knob to a different threshold and repeat from point 'A' above until a good threshold value is achieved.

Note: Remember that the control values cannot be adjusted when the unit is actively recording. Make sure one of the LEDs is red before adjusting any control value.

2) Set the operating mode

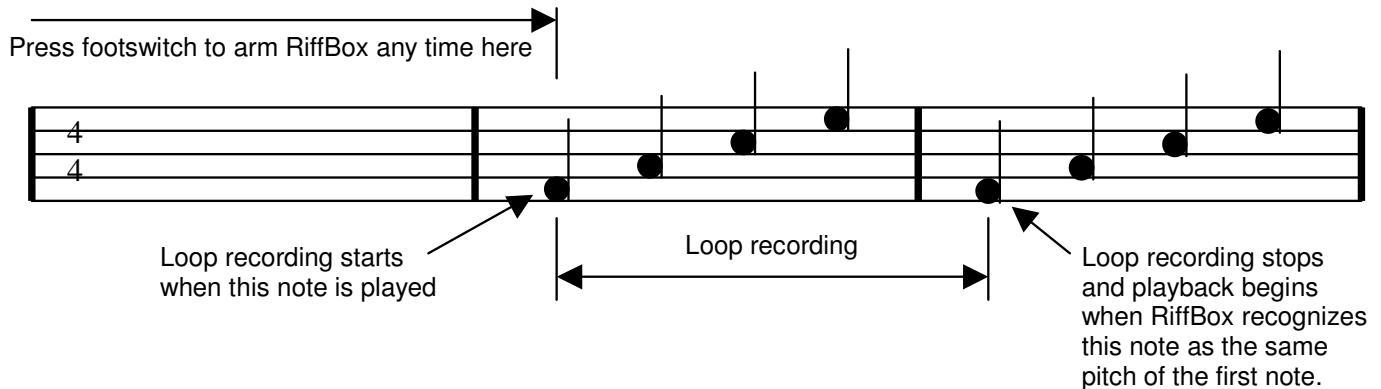
Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

3) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 1. This means that RiffBox will start playback after the first pitch that was recorded is repeated for the first time.

4) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will flash yellow until you play a first note at which time it will turn solid yellow to identify that it is recording. Now play as many notes as you like as long as they do not match the first note pitch of the loop. When you play a note pitch that matches the first one in the loop, recording will stop and playback will begin at which point the left LED will also turn green. See the figure below which is an example based on four quarter notes. Press the footswitch to stop loop playback. This method requires consistent playing of the first and last note of the loop.



6- Loop Length Determined by a Repeated Note Pattern

In this method, after you press the footswitch to arm RiffBox, loop recording starts with the first note that you play. RiffBox then starts to look for a repeated note pattern to determine the loop beginning and end points. Even if you make a mistake one time through, RiffBox will ignore it since it must see a correct pattern repeated at least twice. After playing the passage several times, the loop is detected and it will start playing along with you in synch with your playing. To do this, you can press the footswitch at almost any time since RiffBox will not do anything until you start to play a repeated pattern. You never need to press a footswitch to start loop playback and the loop is always perfectly timed to your playing, unlike other loopers. This will not work well with chords, low frequency notes or distorted tones.

1) Determine the threshold

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 0. Move the left slider switch to 'Threshold'. Set the threshold using the left control knob to a value between 21 and 40. Adjust it so that it reacts well to your playing: A) Press the footswitch and start playing single notes like you would play to record a loop. The display should show the relative pitch (frequency) of the note you are playing. The display should show a consistent value for the note that you want to start and stop loop recording on. Press the footswitch again, adjust the left control knob to a different threshold and repeat from point 'A)' above until a good threshold value is achieved.

Note: Remember that the control values cannot be adjusted when the unit is actively recording. Make sure one of the LEDs is red before adjusting any control value.

2) Set the operating mode

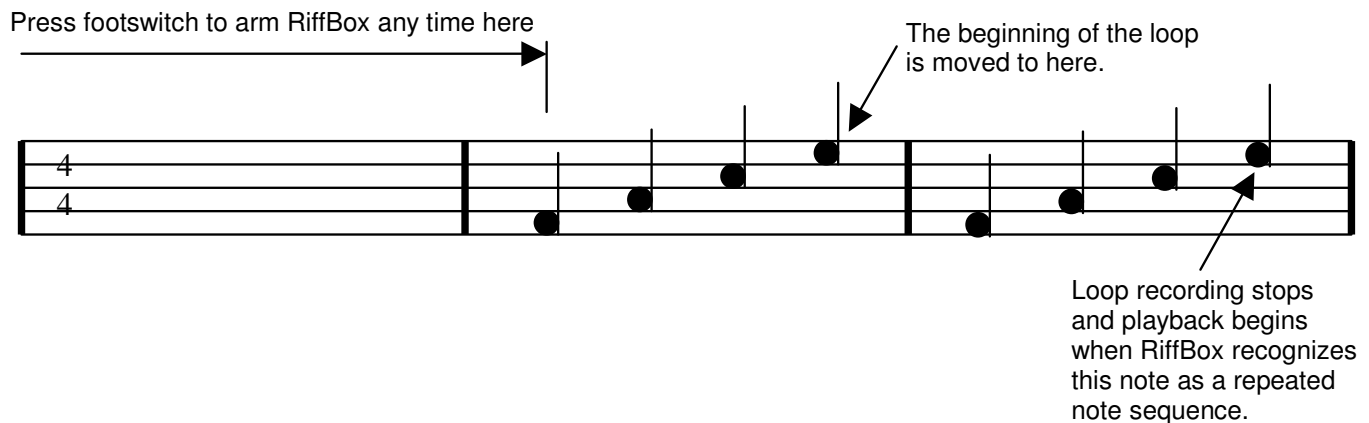
Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

3) Set the event count

Move the right slider switch to 'Events / Notes'. Use the right control knob to set the event count to 82. This means that RiffBox will start playback after it detects a repeated note pattern.

4) Record and playback a loop

You are now ready to record and playback a loop. Press the footswitch. The left LED will flash yellow until you play a first note at which time it will turn solid yellow to identify that it is recording. Now play a repeated sequence of notes. After the second time that you play the sequence, loop playback will start automatically as shown in the figure below. In some cases you may need to play the sequence a third time before RiffBox will recognize it.



7- Loop Length Determined by MIDI Start and Stop Messages

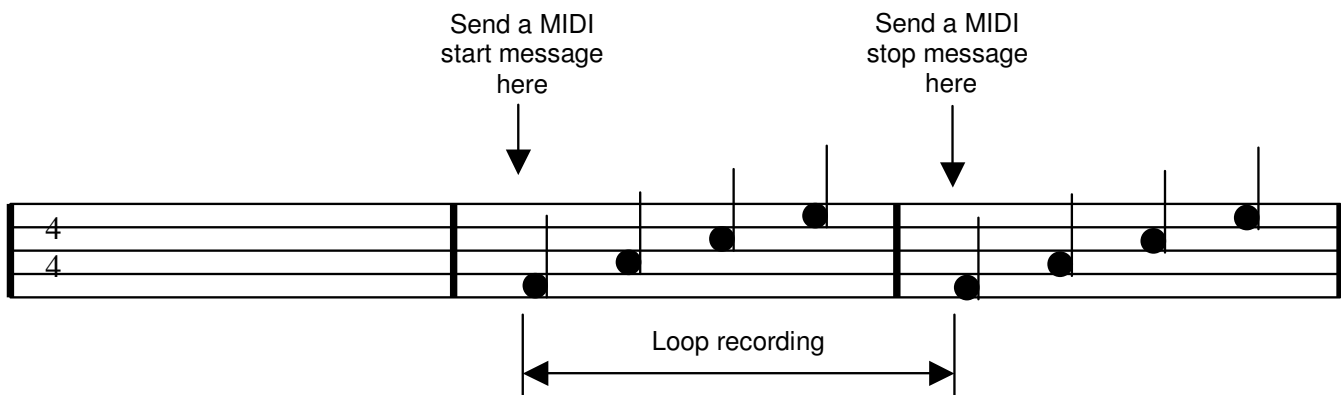
When a MIDI start message (CC=27, value=1) is received, recording will start immediately and will not be timed to the next audio event. When a MIDI stop message (CC=27, value=0) is received, recording will stop immediately and loop playback will begin without being timed to the next audio event.

1) Set the operating mode

Move the left slider switch to 'Operating Mode'. Use the left control knob to set the operating mode to 9, which simply records and repeats a loop. (You can try other operating modes later after you have completed these instructions).

2) Record and playback a MIDI loop

You are now ready to record and playback a manual loop. Send a MIDI start message at which time the left LED will turn solid yellow to identify that it is recording. When you get to the point where you want to stop loop recording and start loop playback, send a MIDI stop message at which point the left LED will turn green. See the figure below which is a loop based on four quarter notes. Press the footswitch to stop loop playback.



3 Applications

There are many applications for RiffBox. These include improving your playing skills and enhancing your live performances. Some of the many applications are described in this section.

Practice with Yourself

You can use RiffBox to lay down a rhythm pattern. This pattern can be used to practice another rhythm part along with the first one, or to practice your soloing skills. In half speed mode, you can play a guitar passage that you want to learn, and continuously loop it at half speed and one octave lower. Amp simulators or effects units can feed RiffBox to provide different tones for rhythm and soloing. The headphone output on RiffBox can be used for silent practicing. If you record something that you want to keep, a single loop can be easily output to an external recording device. You can even synchronize and external MIDI drum machine to your playing for a one-man band experience!

Add Another Member to Your Band

While playing live, it may be desirable to have a second player during certain songs, but it may not be always possible to have another member added to your band. RiffBox allows you to add additional instrumental parts without adding another member. One common example is a guitar rhythm part can continue looping during a guitar solo with only one guitar player. This gives the audience a fuller sound than just leaving it up to the bass player to fill in the background.

Create Self-Timed Digital Delay Effects

RiffBox can create delay effects where the delay time is set by the tempo of the music you are playing much like an automatic tap-tempo. You can do this by using a low event count, and automatic looping on the event count using operating mode 5, or modes 41-50. In addition, very long delay effects of up to 80 seconds can be achieved.

Create a Fuller Rhythm Sound

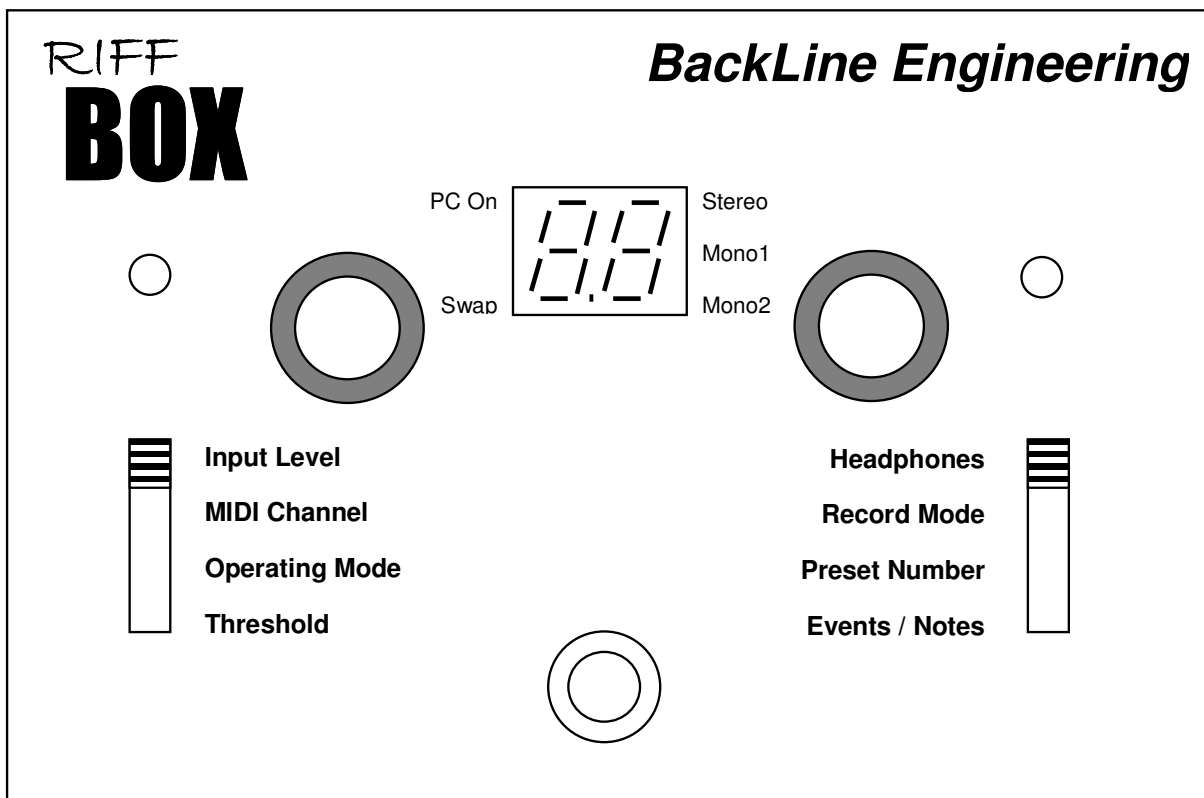
RiffBox can automatically detect repeated rhythm patterns or repeated note patterns. Once detected, the pattern will start to play back automatically synchronized to your playing. It's like having a magical second rhythm guitarist appear out of nowhere! You can create a loop of note sequences and then play along with the loop at a third or a fifth above these notes for instant harmony parts.

4 Interfaces and Controls

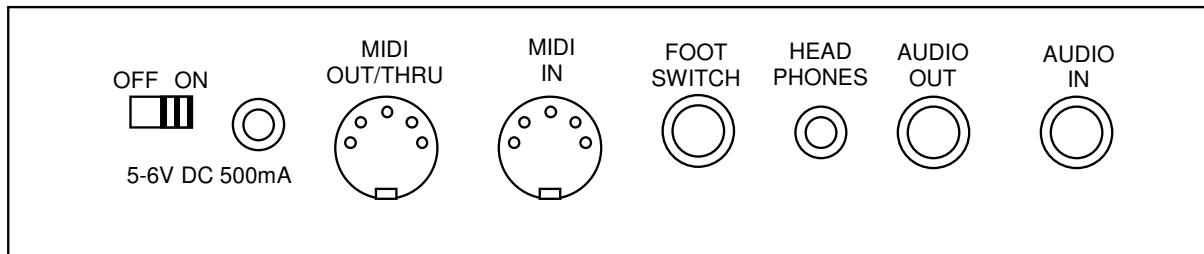
This section describes the user interfaces and controls. There are several example configurations and control setups described in later sections.

Inputs and Outputs

The layout of the top panel and back panel are shown in the figure below. On the back panel, there is one 1/4" audio input jack and one 1/4" audio output jack. You can plug a mono or stereo (TRS) plug into these jacks. In most cases, both should be either mono or stereo. There is also a 1/8" stereo headphone output.



Other interfaces include a power switch, a power input for the included AC adapter and a ¼” jack for connection to an optional external footswitch. There is also a MIDI input and a MIDI output/thru jack



Display

The two-digit display is used for several purposes. It shows the value of the parameter currently selected by the right or left controls as described below. It also displays the event count or note pitch during learn mode, or loop countdown sequences in other modes. In addition, the decimal point is used to indicate input overdrive conditions, or that a preset has been modified.

LED Indicators

There are two multicolored LEDs that indicate the status of the recording and loop playback process. The general record or playback status associated with each color is listed below. The meaning may differ depending on the operating mode, which will be described in section 5.

- Left LED red Unit is inactive, left control knob is active
- Left LED yellow Unit is armed to start recording
- Left LED green Unit has completed loop recording and has started playback
- Right LED red Unit is inactive, right control knob is active
- Right LED yellow Unit is recording a new layer on top of the current loop
- Right LED green Unit has completed recording a new audio layer

Left Switch and Control Knob

The left switch selects the parameter that can be controlled by the left knob. If the left switch or knob is changed, it will show that parameter in the display. The left LED will become red to identify that the left control knob is active. The knob cannot be used if the unit is recording or playing back a

loop. The left knob can also be pushed to save preset data, dump MIDI sysex files or change the global input level as will be described later. The parameters that it controls are as follows:

Input Level

The input level controls the digital gain of the incoming signal. In stereo mode, it equally controls the left and right channel. The value ranges from 0 to 99. If the input level is too strong, the center decimal point will flash in the display. If the input signal is increased and becomes too strong during loop playback, it will be automatically reduced to avoid digital output distortion. Section 5 will describe how to adjust the input levels for all presets at once. You can also control the input volume during playback using MIDI controls (see section 6).

MIDI Channel

This setting selects the MIDI channel that will be used to recognize incoming MIDI signals. Values are 0-16. Channel 0 can be used to dump or load MIDI sysex files containing all the preset data or adjusting the global input level as will be described later. Channels 1-16 are used for normal MIDI operation.

Note: MIDI channel 0 should not be used during normal operation as it can add audio artifacts to the signal.

Operating Mode

There are several operating modes that can be selected. The mode numbers are shown below. More operational details of these modes will be described in section 5. You can also switch from any mode to reverse mode and/or half speed mode during playback using MIDI controls (see section 6).

- 0 Learning mode that shows how many events or notes you have played.
- 1-4 Automatically records new layers up to the count specified.
- 5 Automatically records a new layer while playing current layer, which stops.
- 6 Press of a footswitch records new layer while the current loop fades and stops.
- 7 Press of a footswitch records new layer and the current loop stops.
- 8 No layering, playback fades during the next loop after the footswitch press.
- 9 No layering, playback stops at the end of the current loop after the footswitch.
- 10 Manual layering is enabled during playback with the press of a footswitch.
- 11-30 Loop playback automatically stops after the number of loops specified.
- 31-40 Automatic fading. After N loops, the playback is faded with manual layering.

- 41-50 Automatic fading. After N loops, the playback is faded with auto layering.
- 51-60 Loop plays back using audio doubling, which can be set in 10mS steps.
- 61-70 Duplicate and lengthen the loop multiple times while recording the first layer.
- 71 Fade in during the first loop playback with manual layering.
- 72 Playback loop in reverse.
- 73 Playback at half speed, one octave lower.
- 74 Loop playback stops after one loop and then unit is re-armed for recording.
- 75 Loop playback is muted. Allows MIDI sync with no loop playback.
- 76 Disabled. Unit will ignore the footswitch.

Threshold

The threshold is a value that is used to qualify events or notes, which are used to determine the loop timing. Threshold values between 1 and 20 are used to detect the rhythm of your playing. As the value is adjusted lower, there will be more events recognized per musical passage, until a point where too many events are recognized. As the value is adjusted higher, fewer events will be recognized per musical passage, until a point where almost no events are recognized. RiffBox adapts to the strength of the input signal and event triggering will be automatically adjusted to the first note that you play while recording is active. This insures that subtle string noises or other background noises do not trigger an event.

For threshold values between 21 and 40, you can adjust the threshold to recognize the note pitches that you play based on the input volume level and other factors. The best procedure is to set the unit in Learn mode and find a threshold that yields note pitches that work consistently with the number of notes that are played. In Learn mode, the notes are represented by numbers that increase as the frequency increases. When the threshold is set to these values, chords or low frequency notes should not be used to start the loop. In addition, distorted tone will not work in this mode so you should place RiffBox early in your signal chain.

Right Switch and Control Knob

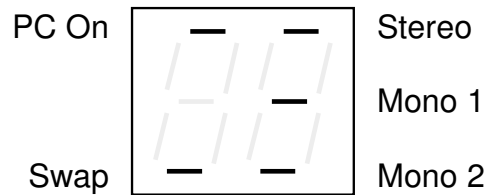
The right switch selects the parameter that can be changed by the right knob. If the right switch is changed, it will show that parameter in the display. The right LED will become red to identify that the control knob is active. The knob cannot be used if the unit is recording or playing back a loop. The parameters that it controls are as follows:

Headphones

The headphone parameter controls the headphone volume. The volume can be adjusted between 0 and 99. Press down on the right control knob and the right LED will blink. This allows you to turn on or off the built-in noise gate function. Set to 1 for ‘on’ or 0 for ‘off’. Press the right control knob again to set it back to headphone volume.

Record Mode

Audio loops can be recorded in mono or stereo. The right side of the display indicates Mono 1, Mono 2 or Stereo mode by lighting the bars as shown in the figure below.



The maximum audio storage time depends on the record mode selected. In stereo mode, up to 40 seconds of audio can be recorded. In mono mode, up to 80 seconds of audio can be recorded.

In Mono 1 mode, the left channel is used to both record audio data, and to trigger audio events. Use this mode if you have a moderately clean audio signal. In some cases, high gain amp modelers or high distortion stomp boxes may provide too much sustain for RiffBox to recognize events properly. You can either move RiffBox before these devices in the audio chain, or use the Mono 2 mode. In this mode, the clean input is sent to the right channel to trigger events while the high gain tone is routed and recorded through the left channel. This requires splitting off the clean audio signal early in the audio chain. You can also use this mode to trigger audio events through the right channel with an external source such as a drum beat.

You can use MIDI Program Change (PC) messages to turn loop recording on and off just like a footswitch. MIDI PC messages can also be used to change the preset number. The PC On LED on the left side of the display indicates if the preset number will be automatically changed when the recording is activated with a MIDI PC message. In some applications, it may be desirable not to change the RiffBox preset number when a MIDI PC message is used to start loop recording. In this case, make sure the PC On indicator is not lit. See chapter 6 for more information.

If the Swap LED is lit, the live audio is normal while the loop playback left and right channels are reversed. In Mono 1 or Mono 2 modes, this allows the loop to playback through the right output

while the live audio plays through the left output which can give you interesting stereo spread effects through a PA. In Mono 1 and Mono 2 modes, when Swap is off, the mono left input is duplicated in both the right and left output channels. In this case, you could send the same signal to two different amplifiers for example. The record mode options are summarized in the table below.

Mode	Swap	Left In	Right In	Left Out	Right Out	Record Time
Stereo	Off	Left Ch	Right Ch	Left In + Left Loop	Right In + Right Loop	40 seconds
Mono 1	Off	Mono	None	Left In + Left Loop	Left In + Left Loop	80 seconds
Mono 2	Off	Record Signal	Event Signal	Left In + Left Loop	Left In + Left Loop	80 seconds
Stereo	On	Left Ch	Right Ch	Left In + Right Loop	Right In + Left Loop	40 seconds
Mono 1	On	Mono	None	Left In	Left Loop	80 seconds
Mono 2	On	Record Signal	Event Signal	Left In	Left Loop	80 seconds

Preset

The preset parameter shows the current active preset, which can range from 0 to 99. For each preset, seven values are stored; the input level, the operating mode, the threshold, the record mode, the preset change value, the event count and the note count. If any of these parameters are changed, the decimal point will blink in the display except for preset 0. Preset 0 can be used to try things out without getting a flashing display. To save to a different preset number, change the preset value while the decimal point is blinking. To revert to the previous values, press the right control knob.

New preset values can be saved by pushing down on the left control knob (make sure the MIDI channel is not set to zero). When you press the left knob for the first time, the entire display will flash asking to confirm the save. To confirm, press the left knob again. To abort the save, press the right knob, which will also restore the original preset values. The preset number can also be selected using MIDI program change messages, which will be covered in section 6.

Events

When the right switch is set in the Events/Notes position, you can press the right control knob to toggle between changing the Events value and changing the Notes value. To change the Event value, make sure the right LED is solid red.

Events are related to the notes or chords that you play. A loop segment can be created based on the number of events if the event parameter is set between 1 and 81. For example, if the event parameter is set to 4 and the threshold is set between 1 and 20, then the loop can start automatically after 4 events are played. If the event parameter is set to 4 and the threshold is set between 21 and 40, then the loop can start automatically after the note pitch that started the loop is played 4 more times. You can determine the correct settings for a passage while in learn mode. You can always start the loop playback before the number of events or notes are reached by pressing the footswitch or by sending a MIDI program change message. In this case, the loop will start on the event right after the footswitch is pressed or MIDI PC message is received. In any case, the looping can be event based, which means it is timed to the music not to when you press a switch. The total number of events for the loop can be reduced during playback using MIDI controls (see section 6).

The event parameter can range in value from 0 to 99. When set to 0, loop playback must be initiated using a footswitch or MIDI PC message and will be timed to the next event. When set to 82 and the threshold is set between 21 and 40, RiffBox will automatically detect a repeated sequence of notes to determine the loop. When set between 83 and 89, RiffBox will automatically detect a repeated rhythm pattern to determine the loop. The minimum number of notes or chords that will be compared is this value minus 80. For example, if you set the event parameter to 85, RiffBox will compare the timing between at least 5 notes to identify a rhythm pattern.

When set to 90, the footswitch acts as a traditional looper and the loop recording will start and stop at the exact time that you press the footswitch. When you set the event parameter between 91 and 99, you can delay the number of events from when you press the footswitch until loop recording starts and stops. The number of events delayed is the event parameter minus 90. For example, set to 93 and the recording will start and stop three events delayed from when you press the footswitch. Looping based on a note pitch will not work with the event count set to 0 or set greater than 82. See the table below for more information.

Note: Automatic looping on the event count (threshold set from 1 to 20) requires consistent playing. Longer passages with higher event counts have a higher chance that playing differences will cause inconsistent loops. It is generally recommended that automatic looping on the event count be used for short passages. Longer passages should have the event count set to 0 for looping initiated with a footswitch or MIDI PC message. If you plan to use automatic looping, it is best to set the threshold

value high enough in order to minimize the number of events per loop. This will give you more consistent results.

Events	Threshold	Description
0	1-20	The loop will be timed to the note or chord after you press a footswitch
1-81	1-20	The loop will be started after you play the specified number of notes or chords defined by the event parameter value.
1-81	21-40	The loop will be started after you play the same note pitch that started the loop the number of times specified by the event parameter value.
82	21-40	The loop will be automatically determined based on a repeated sequence of notes.
83-89	1-20	The loop will be automatically determined based on a repeated rhythm pattern. The minimum number of notes or chords compared is determined by the event parameter minus 80.
90	NA	The loop recording will start and stop when the footswitch is pressed.
91-99	1-20	You can delay the number of events from when you press the footswitch until loop recording starts and stops. The number of events delayed is the event parameter minus 90.

Notes

When you press down the right knob so that the right LED is blinking, you can specify the number of quarter notes in your loop. This should not be confused with the note pitch that is used to time the loop length as discussed above. Use this feature if you want to synchronize to an external MIDI drum machine. If you are not using an external drum machine, set this value to zero. See section 6 for more information.

Footswitch

RiffBox includes a built-in footswitch allowing it to be used as a stompbox. If you want to place the unit closer to your amp, there is a ¼” jack that can be used to plug in one of many off-the-shelf

external footswitches that are available. The footswitch must contain a single latching on-off type switch.

Note: The external footswitch is in parallel with the internal footswitch. If the external footswitch is not working, press the internal footswitch once to disconnect it. Now the external footswitch should work fine.

Power-on Self Test

When you turn the unit on, it takes about 10 seconds to run through a series of on board system tests. During that time, the two LEDs will be yellow and nothing will be shown in the display. All of the audio memory is tested along with most of the key components. Once the system tests are complete, a test tone will be played, and all of the presets will be loaded from memory while the display cycles through the preset numbers.

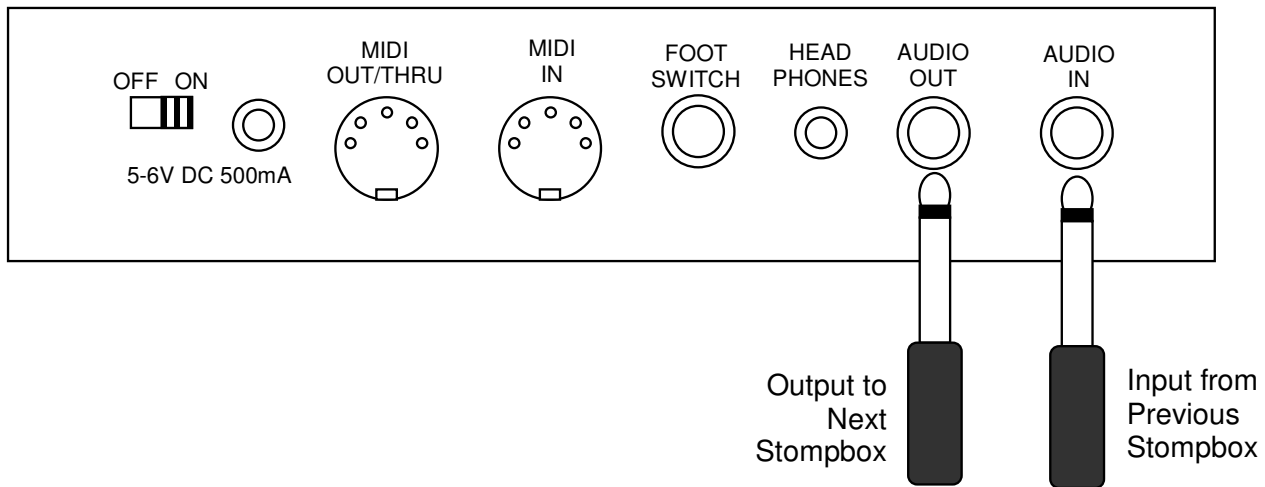
5 Basic Operation

This section gives an overview of the basic operation of RiffBox. The operation is generally described in the order of use. Keep in mind that the controls cannot be changed when the unit is activated to start recording or during loop playback. When RiffBox powers up, the display will cycle from 0 to 99 while it is loading presets from internal memory.

Note: Throughout this section, the press of a footswitch means the press of the on-board footswitch, the press of an optional external footswitch or receipt of a MIDI program change message. For more information on how a MIDI program change message controls record or playback, see section 6.

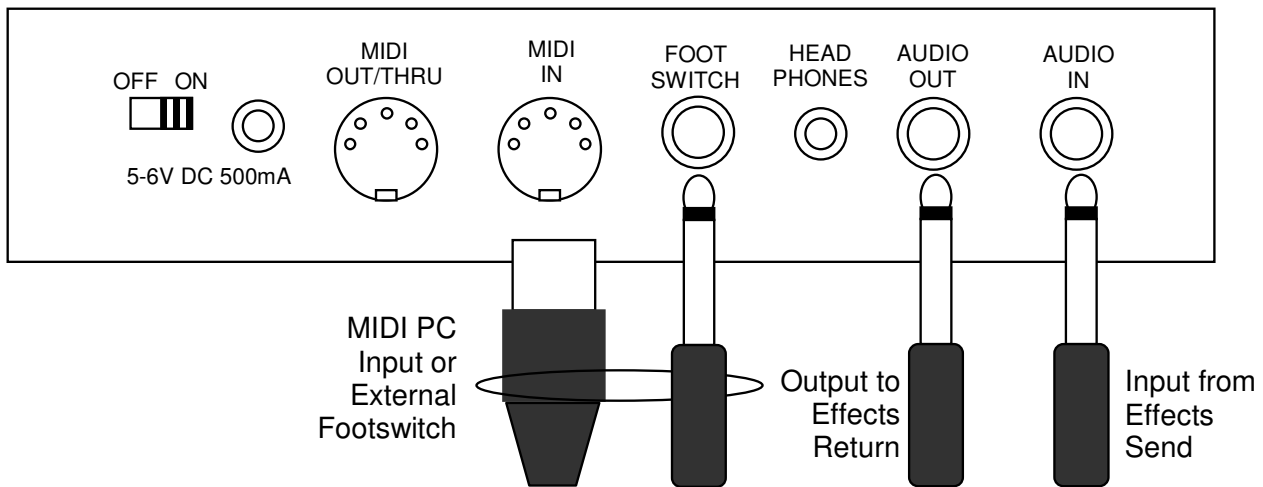
Setting Up as an Effects Pedal

RiffBox can be used as a stompbox along with your other effects and floor pedals. In this case, you can connect a 1/4" mono plug from a stompbox or instrument to the input audio jack, and a 1/4" mono plug from the output audio jack to the next stompbox or amp as shown in the figure below. The unit should be set to Mono 1 record mode. It is best to place RiffBox after any volume pedals and before any distortion or delay boxes in the audio chain.



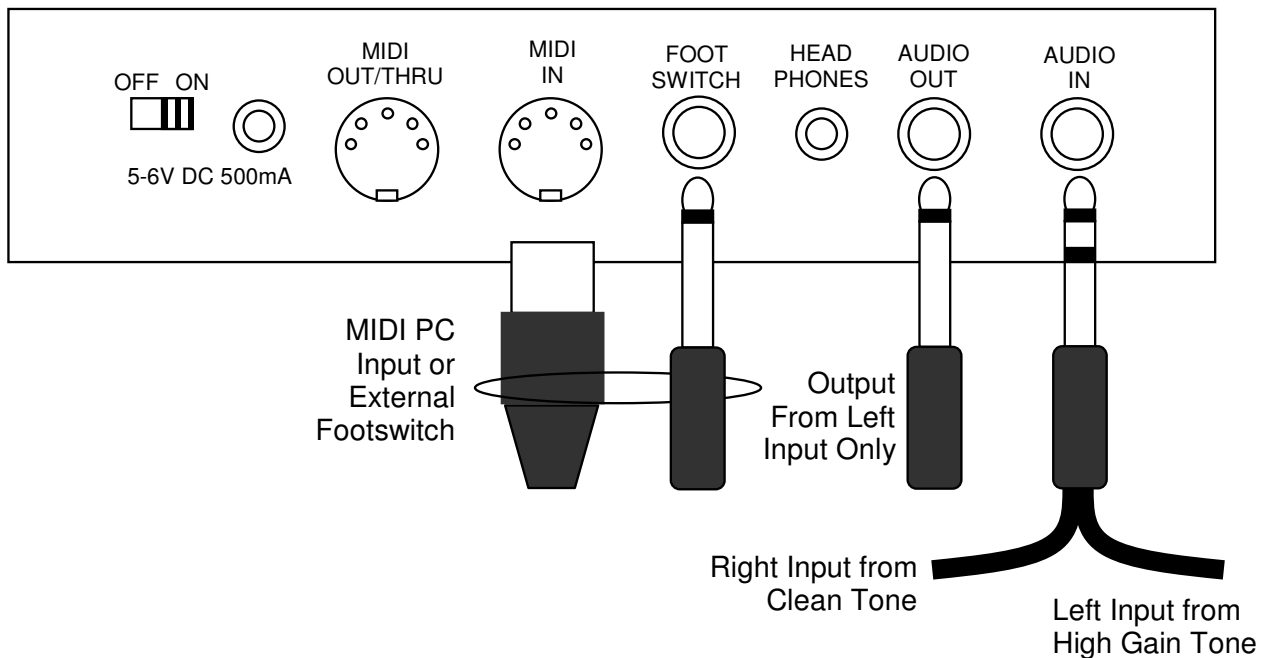
Setting Up in a Mono Effects Loop

If you are using RiffBox in a mono effects loop of a guitar amp or other device, it may be easier to place the unit close to the amp in order to minimize cable distances. In this case, a remote footswitch can be used to control the unit, or a MIDI controller can be used. Connect a ¼” mono plug from the effects loop send to the input audio jack, and a ¼” mono plug from the output audio jack to the effects loop return as shown in the figure below. You can also use a stereo output cable to send the mono signal to two amps. The unit should be set to Mono 1 record mode.



Setting Up in a Mono Effects Loop for High Gain Tones

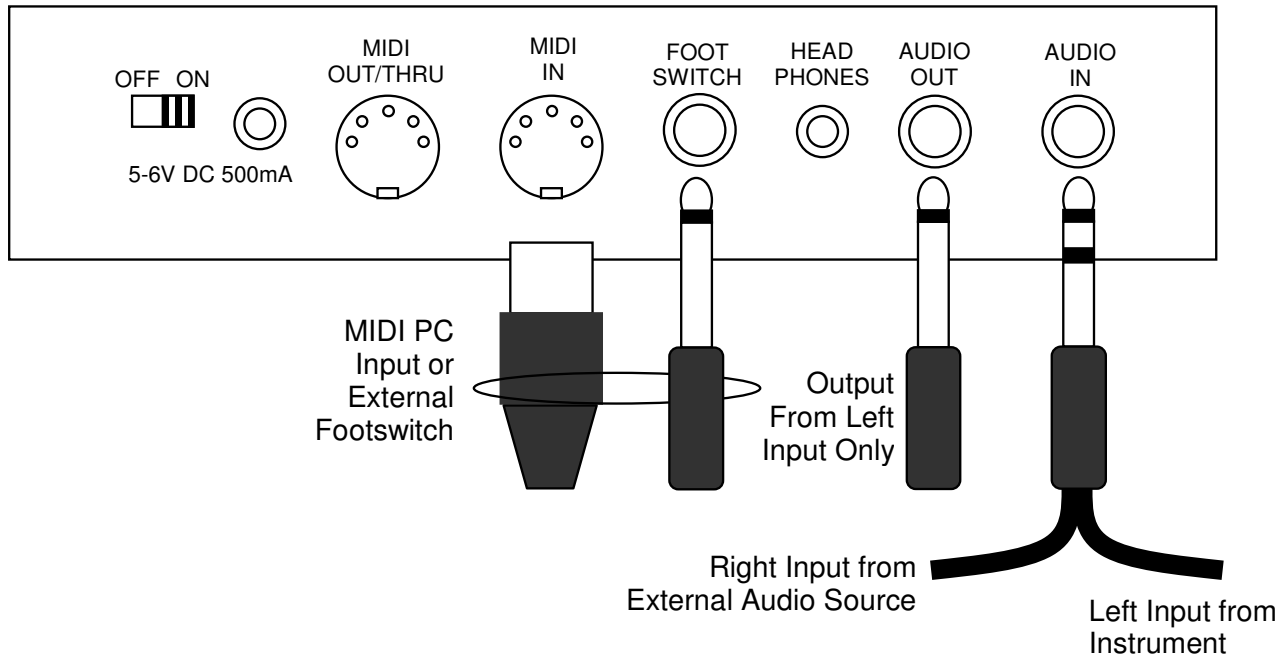
High gain guitar amps and distortion boxes have large amounts of sustain which make it difficult to distinguish between different notes and chords. To solve this, RiffBox can be configured to use a clean signal to trigger events while using the high gain signal for recording and playback. To do this, send a clean guitar tone into the right audio input and the high gain tone into the left audio input as shown in the figure below.



One mono cable can be used to send the output signal to a single amp or you can also use a stereo output cable to send the mono signal to two amps. In this case, the unit should be set to Mono 2 record mode. An external footswitch or MIDI controller can be used if the unit is placed near the high gain amp. Some effects units and modern amps have the capability to send both a clean and high gain tone to RiffBox through a stereo effects loop, which makes it easy to change between this mode and normal stereo effects loop operation. Of course you can always set the event count to 90 and time the loop to when you press the footswitch like a traditional looper.

Synchronizing to and External Audio Source

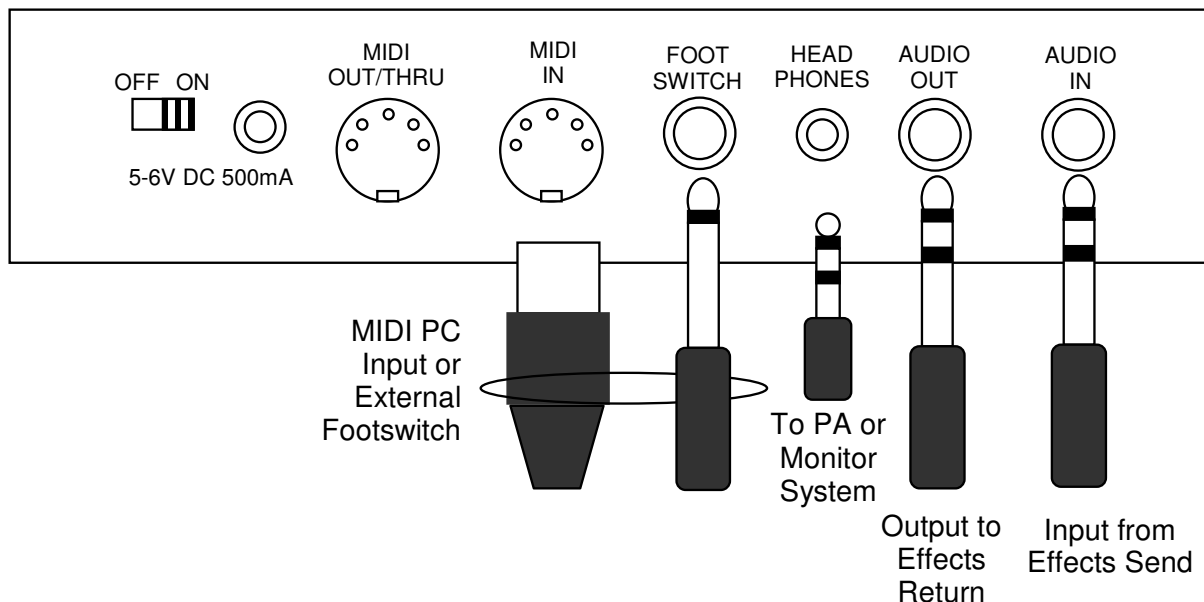
In some cases, you may wish to synchronize the loop timing to an external audio source such as a CD, drum machine or even another player in your band. If you want to do this without also recording the sync source as part of your loop, use the setup shown in the figure below.



One mono cable can be used to send the output signal to a single amp or you can also use a stereo output cable to send the mono signal to two amps. In this case, the unit should be set to Mono 2 record mode.

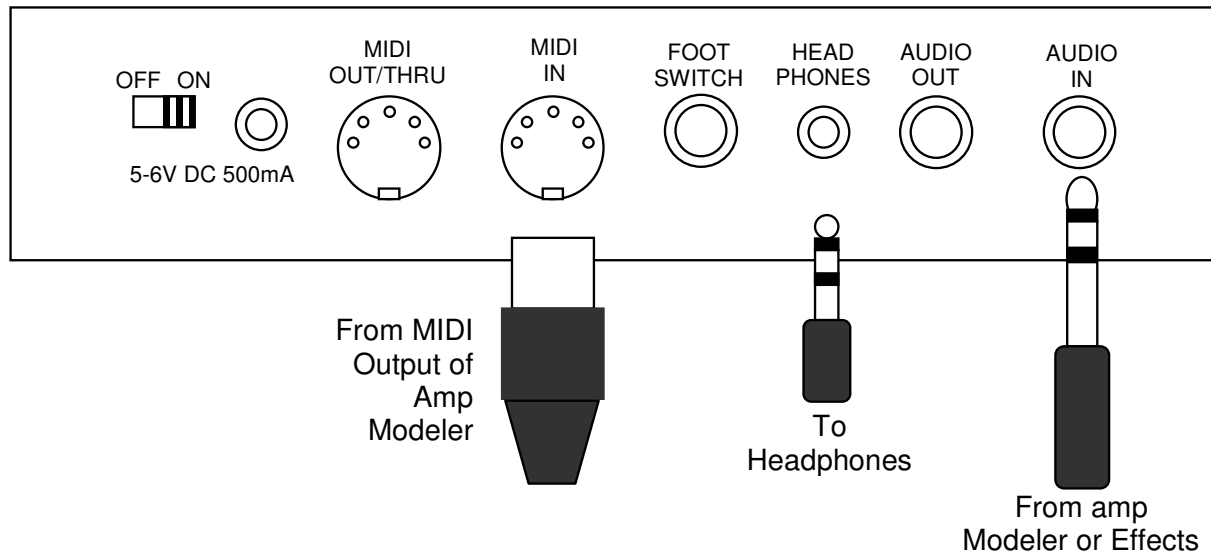
Setting Up in a Stereo Effects Loop

Many modern guitar amps, PA systems and effects racks have stereo capability. The figure below shows an example of using a stereo effects loop with RiffBox. In this case, you can connect a 1/4" stereo TRS plug from the effects loop send to the input audio jack, and a 1/4" stereo TRS plug from the output audio jack to the effects loop return. The unit should be set to Stereo record mode. An external footswitch or MIDI controller can be used if the unit is placed near the amp or effects unit. In addition, if used in a guitar amp effects loop, the headphone jack can be used as an auxiliary send to the PA system or monitor system.



Setting Up for Silent Practice

For silent practice, the stereo output from an amp simulator or effects unit can be sent to the audio input as shown in the figure below. Use the headphone output to monitor the loop playback along with your playing. The stereo output can also be sent to an external recording device. The unit should be set to Stereo record mode. If you have created a loop that you want to keep, set the MIDI channel to 0 and press the right control knob. Each time you press this knob, the last recorded loop will be played back one time.



Setting the Record Mode

Before starting, set the record mode as described in the previous sections based on one of the setups described above.

Note: In general, it is best to place RiffBox in the audio chain after any tone shaping circuitry such as an effects loop. This will allow you to have loop playback with one tone while playing on top of it with another tone.

Setting the Input Level

To avoid digital distortion, the input level needs to be adjusted based on the strength of the input signal. The input level can be adjusted between 0 and 99. Set the input level as high as you can, but make sure that the decimal point does not flash in the display with the loudest notes or chords. If you're using a volume pedal or boost before RiffBox, adjust the input signal using the highest volume input.

In some cases, you may want to change the input level on a global basis. You can set the input level to the same value for all presets as follows. Set the MIDI channel to zero, set the left switch to Input Level and press down on the left control knob. This will cause the left LED to start blinking. You can then adjust the input level as before but now it will be adjusting the input level for all

presets at once. To exit this mode, press on the left control knob again. This will save the selected input level to all 100 preset locations.

Setting the Headphone Volume

You can monitor the loop or practice in silence by using the headphone output. The headphone output can be adjusted between a value of 0 and 99.

Learn Mode

Operating mode 0 is the learn mode. Learn mode allows you to determine the proper settings for the threshold and event count. With threshold values between 1 and 20, the number of events should roughly equal the number of notes or chords that are played. With threshold values between 21 and 40, the notes are represented by a relative value that increase as the frequency increases.

To activate the unit while in learn mode, press the footswitch and the left LED will blink yellow and then turn solid yellow after the first note is played. During the learn process, the number of events or the note pitches will be updated in the display. To end learn mode, press the footswitch again. If the recording time runs out during learn mode, RiffBox will exit from learn mode and the left LED will no longer be yellow. This allows you to judge the recording time available to you.

Note: for RiffBox to automatically loop on an event or a note pitch, you must play the event or note the same way each time. In learn mode, you can practice this by making sure you get the same event count or note pitch each time you play. If this becomes too difficult for a given passage, you can always set the event count to 0 or 90 and start the loop playback using a footswitch. Also, effects units such as delays or reverbs may cause extra triggering of events. This may not be an issue if you are using a tap-temp to time the delay to your playing. But if the delay is too strong and repeats randomly while you play, you may get a different number of events each time you play. One way to solve this is to move RiffBox before these effects in the audio chain.

Setting the Threshold to 1-20 for Events

While in learn mode, adjust the threshold until the number of events roughly equals the number of notes played. Reducing the threshold will generally increase the number of events. Increasing the threshold will generally reduce the number of events. If you want loop playback to start automatically, you should keep increasing the threshold until you get the same event count each time that you play. If you plan to start loop playback using a footswitch, you just need to make sure

that the event where you want loop playback to begin is recognized, but in this case the count is not important. The threshold cannot be adjusted when the learning process is active.

Note: The strength of the first note that you play will determine the trigger for all other events during loop recording. This allows the event count to automatically adjust to the input level and keeps background noises from causing false triggers.

Setting the Threshold to 21-40 for Note Pitches

While in learn mode, adjust the threshold until you see consistent note pitches in the display. The strength of the input signal will effect how notes are recognized. You should set the threshold value as low as possible while still reacting well to different notes. For high input levels, the threshold should be set higher to recognize notes. Chords or low frequency notes should not be used to start the loop. In addition, distorted tone will not work in this mode so you should place RiffBox early in your signal chain.

Setting the Event Count

If you want the loop playback to start automatically, the event count can be adjusted between 1 and 81 to determine the point at which automatic looping will begin. For threshold values between 1 and 20, each note that you play will be an event. For threshold values between 21 and 40, each note that matches the first note pitch of the loop will be an event. To change the event count, press the right control knob until the right LED is not blinking.

For threshold values between 1 and 20, it is best to determine the event count for a musical passage by first operating in learn mode. After exiting learn mode, the event count will be set to the number of events learned but will not be saved in the current preset.

Set the event count to zero if you plan to use the footswitch to start loop playback. Set the event count to 82 and the threshold between 21 and 40 to automatically detect a loop based on a sequence of notes. Set the event count to a value between 83 and 89 and the threshold to a value between 1 and 20 to automatically detect loops based on a repeated rhythm pattern. Set the event count to 90 to configure RiffBox as a traditional looper. Set the event count to 91-99 to delay the recording start and stop time. See the event control described in section 4 for more information.

Note: A series of events must include a repeat of the first note or chord played in order for the loop timing to be correct.

Setting the Notes

If you plan to synchronize an external MIDI drum machine to RiffBox, you need to adjust the Notes value, otherwise, keep it set to zero. To change the Notes value, press the right control knob. The right LED will blink indicating that the Notes value can be changed. Set this value equal to the number of quarter notes in the loop that you are recording. Press the right control knob again to display or change the Event count. See section 6 for more details.

Automatic Start

The loop recording can automatically start based on the input value exceeding a threshold value (if the event count is not set to 90). This method is good to use if you are starting a song with a loop. To do this, press the footswitch and the left LED will blink yellow. Recording starts with the first note or chord played at which point the left LED will become solid yellow. Before the first note is played, recording can be aborted by a press of the footswitch. After the first note is played, recording can be aborted by a double press of the footswitch.

Footswitch Start

If you want to create a loop in the middle of a song, a footswitch can also be used to start loop recording. Loop recording is locked to the next event after the footswitch is pressed if the event count is not set to 90 or right when the footswitch is pressed if the event count is set to 90. After the first event is played, recording can be aborted by a double press of the footswitch.

Adjusting Parameters During Playback

Several parameters can be changed during loop playback using MIDI CC messages. These include the input volume, the loop playback volume, some of the operating modes can be changed and the loop length can be changed. See the MIDI description in section 6 for more information.

End Loop Recording After a Footswitch

In this method of operation, the loop recording can be stopped with a press of the footswitch. The end of the loop segment is timed to the next event right after the footswitch is pressed if the event count is not set to 90 or right when the footswitch is pressed if the event count is set to 90. This event should be a repeat of the first note or chord played in order to get the correct loop sequence. Once this event is reached, loop playback will automatically begin.

End Loop Recording on Event Count

If the threshold is set between 1 and 20 and the event count is set between 1 and 81, the loop recording will automatically stop when the number of events is reached. Once the programmed event count is reached, recording will stop and loop playback will automatically begin. The events are precisely timed to make perfect loops. For consistent results, set the threshold to the highest values that still recognize the notes or chords that you play. Looping will start sooner and be timed to the next event, if the footswitch is pressed before the event count is reached.

End Loop Recording on a Note Pitch

If the threshold is set between 21 and 40 and the event count is set between 1 and 81, the loop recording will automatically stop and playback will begin when the number of additional times that the first note pitch (the one that started the loop recording) is played equals the event count. For consistent results, set the threshold to the lowest values that still recognize the note pitches that you play. Looping will start sooner and be timed to the next event, if the footswitch is pressed before the event count is reached.

End Loop Recording on a Repeated Rhythm Pattern

If the threshold is set between 1 and 20 and the event count is set between 83 and 89, RiffBox looks for a repeated rhythm pattern. After you play a passage several times and the repeated rhythm is detected, the loop recording will automatically stop and playback will begin in synch with your playing. RiffBox uses the timing between notes to determine if a rhythm pattern is repeated. The minimum number of timings compared is the event count minus 80. For example, if the event count is set to 85, the last 5 periods between notes will be used to detect a repeated rhythm. Looping will start sooner and be timed to the next event, if the footswitch is pressed before the pattern is detected.

End Loop Recording on a Repeated Note Pattern

If the threshold is set between 21 and 40 and the event count is set to 82, RiffBox looks for a repeated note pattern. After you play a passage several times and the repeated note pattern is detected, the loop recording will automatically stop and playback will begin in synch with your playing. The pattern must contain at least three notes. Looping will start sooner and be timed to the next event, if the footswitch is pressed before the event count is reached

MIDI Start and Stop

If you want to sync the loop recording to an external MIDI source, you can send a MIDI continuous controller message to RiffBox. In this case, the recording will start immediately and not wait for the next audio event. You can also send a MIDI continuous controller message to stop recording and start playback. In this case, the recording will stop immediately and not wait for the next audio event. See section 6 for more details.

Stopping Loop Playback

In several of the modes listed below, loop playback will stop at the end of the current loop with the single press of a footswitch. In all modes, loop playback will stop immediately with two presses of a footswitch within a given loop period.

Play back a Single Loop

If you record a loop that you would like to keep, you can play it back once to an external recording device. First, stop the loop playback as described above. Connect the audio output or the headphone output to the analog input of your recording device. Set the MIDI channel to 0 and press the right control knob to output a single loop playback. This playback can be repeated as many times as you like. Make sure to set the same record mode that used to record the loop. You can also use MIDI to do this as described in section 6.

Operating Modes

The following table gives a brief description the various operating modes available. ‘Stop’ means stop at the end of the current loop. ‘Record’ means record a new layer.

Mode	Layering	Single Footswitch	Comments
0	None	Stop	Learn mode
1	Auto	Stop	1 layer is automatically recorded during playback
2	Auto	Stop	2 layers are automatically recorded during playback
3	Auto	Stop	3 layers are automatically recorded during playback
4	Auto	Stop	4 layers are automatically recorded during playback
5	Auto	Stop	New layer is automatically recorded, current loop stops

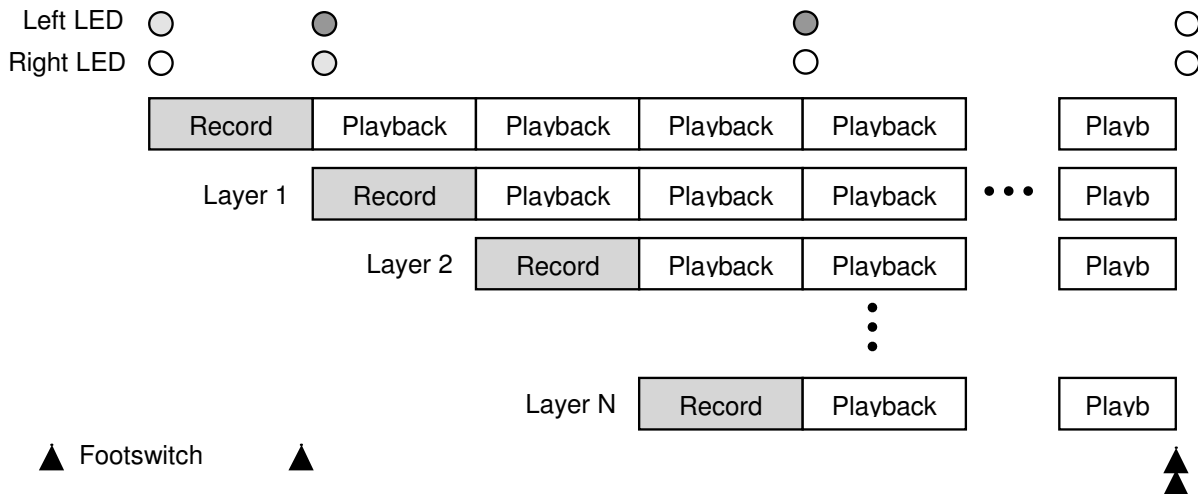
6	Manual	Record	Next loop fades while a new loop is recorded
7	Manual	Record	One more loop is played while a new loop is recorded
8	None	Stop	Playback fades during the next loop and then stops
9	None	Stop	Loop repeats with no layering
10	Manual	Record	Record an infinite number of layers on the loop
11	Manual	Record	Playback stops after 1 loop
12	Manual	Record	Playback stops after 2 loops
13	Manual	Record	Playback stops after 3 loops
14	Manual	Record	Playback stops after 4 loops
15	Manual	Record	Playback stops after 5 loops
16	Manual	Record	Playback stops after 6 loops
17	Manual	Record	Playback stops after 7 loops
18	Manual	Record	Playback stops after 8 loops
19	Manual	Record	Playback stops after 9 loops
20	Manual	Record	Playback stops after 10 loops
21	Manual	Record	Playback stops after 11 loops
22	Manual	Record	Playback stops after 12 loops
23	Manual	Record	Playback stops after 13 loops
24	Manual	Record	Playback stops after 14 loops
25	Manual	Record	Playback stops after 15 loops
26	Manual	Record	Playback stops after 16 loops
27	Manual	Record	Playback stops after 17 loops
28	Manual	Record	Playback stops after 18 loops
29	Manual	Record	Playback stops after 19 loops
30	Manual	Record	Playback stops after 20 loops
31	Manual	Record	Recorded audio fades during the playback of 1 loop
32	Manual	Record	Recorded audio fades during the playback of 2 loops
33	Manual	Record	Recorded audio fades during the playback of 3 loops
34	Manual	Record	Recorded audio fades during the playback of 4 loops
35	Manual	Record	Recorded audio fades during the playback of 5 loops
36	Manual	Record	Recorded audio fades during the playback of 6 loops
37	Manual	Record	Recorded audio fades during the playback of 7 loops
38	Manual	Record	Recorded audio fades during the playback of 8 loops

39	Manual	Record	Recorded audio fades during the playback of 9 loops
40	Manual	Record	Recorded audio fades during the playback of 10 loops
41	Auto	Stop	Recorded audio fades during the playback of 1 loop
42	Auto	Stop	Recorded audio fades during the playback of 2 loops
43	Auto	Stop	Recorded audio fades during the playback of 3 loops
44	Auto	Stop	Recorded audio fades during the playback of 4 loops
45	Auto	Stop	Recorded audio fades during the playback of 5 loops
46	Auto	Stop	Recorded audio fades during the playback of 6 loops
47	Auto	Stop	Recorded audio fades during the playback of 7 loops
48	Auto	Stop	Recorded audio fades during the playback of 8 loops
49	Auto	Stop	Recorded audio fades during the playback of 9 loops
50	Auto	Stop	Recorded audio fades during the playback of 10 loops
51	None	Stop	Playback is doubled with a delay of 10mS
52	None	Stop	Playback is doubled with a delay of 20mS
53	None	Stop	Playback is doubled with a delay of 30mS
54	None	Stop	Playback is doubled with a delay of 40mS
55	None	Stop	Playback is doubled with a delay of 50mS
56	None	Stop	Playback is doubled with a delay of 60mS
57	None	Stop	Playback is doubled with a delay of 70mS
58	None	Stop	Playback is doubled with a delay of 80mS
59	None	Stop	Playback is doubled with a delay of 90mS
60	None	Stop	Playback is doubled with a delay of 100mS
61	Manual	Record	Loop is duplicated 1 time during first layer recording
62	Manual	Record	Loop is duplicated 2 times during first layer recording
63	Manual	Record	Loop is duplicated 3 times during first layer recording
64	Manual	Record	Loop is duplicated 4 times during first layer recording
65	Manual	Record	Loop is duplicated 5 times during first layer recording
66	Manual	Record	Loop is duplicated 6 times during first layer recording
67	Manual	Record	Loop is duplicated 7 times during first layer recording
68	Manual	Record	Loop is duplicated 8 times during first layer recording
69	Manual	Record	Loop is duplicated 9 times during first layer recording
70	Manual	Record	Loop is duplicated 10 times during first layer recording
71	Manual	Record	First loop playback fades in

72	None	Stop	Loop play back in reverse
73	None	Stop	Loop repeats at half speed with no layering
74	Manual	Stop	Playback stops after 1 loop then record becomes active
75	None	Stop	Loop is muted. Allows MIDI sync with no playback.
76	None	None	Idle mode. Ignores MIDI PC messages and footswitch

Modes 1-4: Automatically Layering Audio on a Loop

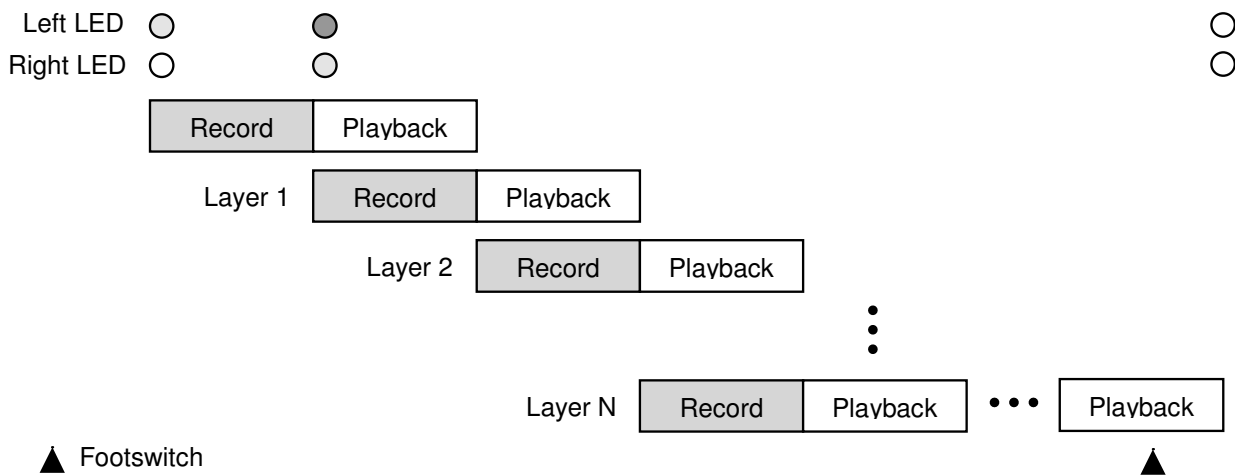
In operating modes 1-4, from 1 to 4 layers can be automatically added every time the loop repeats as shown in the figure below.



This example assumes the first note starts the record process, which continues until the footswitch is pressed. These modes can provide some interesting harmonizing effects. When a loop recording is complete, the unit starts playing back and automatically starts recording a new layer at the same time. This process repeats for the number of layers that you select based on the mode number. The display counts down as each new layer is recorded. After the final layer is reached, layer recording will stop, and the loop will keep repeating with all audio layers playing back. A single press of the footswitch will stop playback at the end of the current loop. A double press of the footswitch stops the loop playback immediately.

Mode 5: Automatically Layering Audio on a Loop That Ends

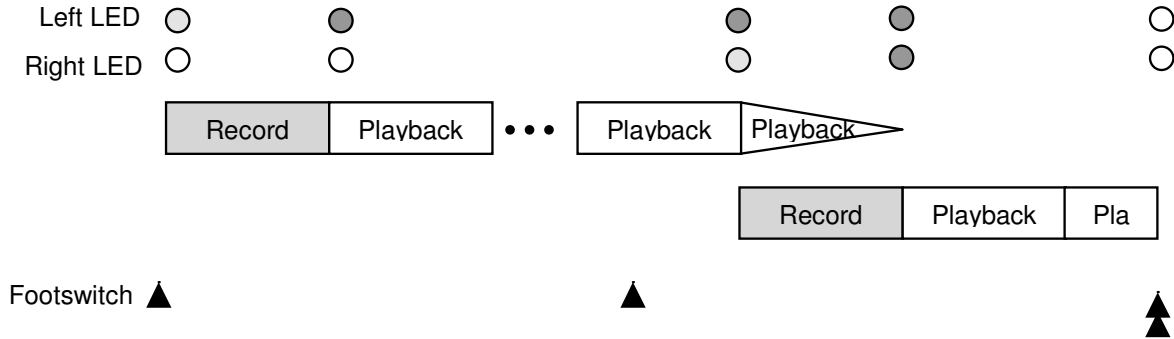
In operating modes 5, layers can be automatically added every time the loop repeats as shown in the figure below. After recording a new layer, playback stops for the current layer. This can create interesting delay effects. This example assumes the first note starts the initial record process, which continues until the event count is reached. When the loop recording is complete, the unit starts playing back and automatically starts recording a new layer at the same time. When the new layer recording is complete, the current loop playback stops and the new layer playback starts and it automatically starts recording a third layer. This process repeats indefinitely. A single press of the footswitch will stop playback at the end of the current loop. A double press of the footswitch stops the loop playback immediately.



Mode 6: Fading Current Loop While Recording a New Loop

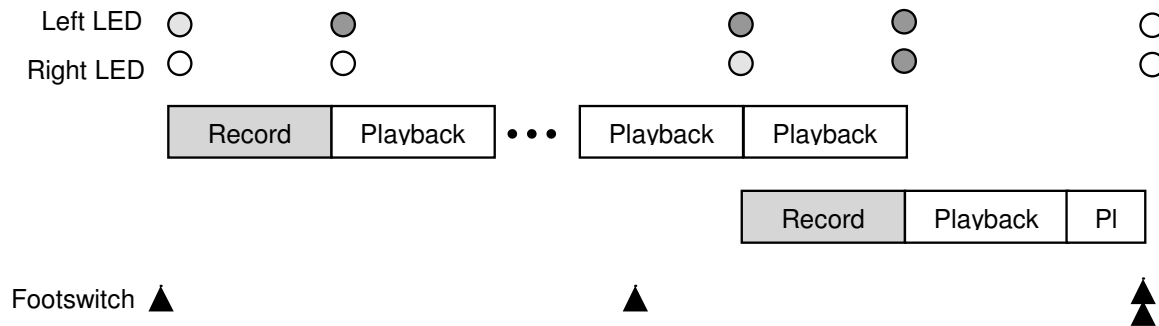
When a loop is repeating, you can fade it away during the next loop while at the same time, record a new loop if operating mode 6 is active as shown in the figure below. This example assumes the record process continues until the event count is reached. If the footswitch is pressed during playback, loop recording is enabled during the next loop, at which time the right LED will turn yellow to indicate that layer recording has begun. During the new layer recording, the previous loop playback will fade out and stop. Once the new layer has been recorded, the right LED will turn

green and the newly recorded loop will play. This process can be repeated indefinitely. The playback can be stopped at any time with the double press of the footswitch.



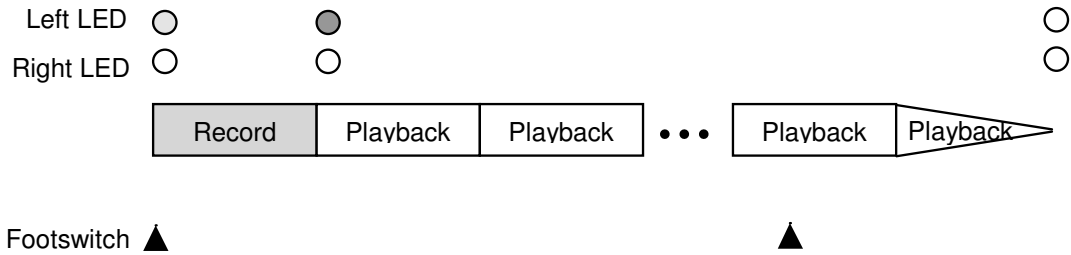
Mode 7: Stopping Current Loop While Recording a New Loop

When a loop is repeating, you can stop it at the end of the next loop while at the same time, record a new loop if operating mode 7 is active as shown in the figure below. This example assumes the record process continues until the event count is reached. If the footswitch is pressed once during playback, loop recording is enabled during the next loop, at which time the right LED will turn yellow to indicate that layer recording has begun. Once the new layer has been recorded, the right LED will turn green and the previous loop will stop playing while the newly recorded loop will start playing. This process can be repeated indefinitely. The playback can be stopped at any time with the double press of the footswitch.



Mode 8: Fading During the Next Loop

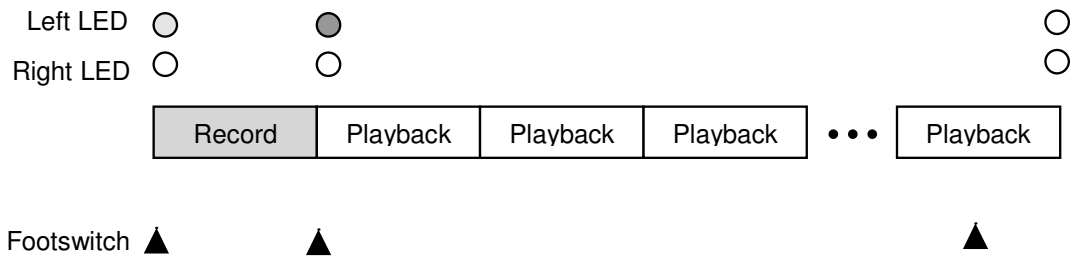
When a loop is repeating, you can fade it out during the next loop if operating mode 8 is active as shown in the figure below.



This example assumes the record process continues until the event count is reached. During playback, if the footswitch is pressed once, playback fades during the next loop and then stops. The playback can be stopped at any time with the double press of the footswitch

Modes 9, 72, 73: Stopping at the End of the Current Loop

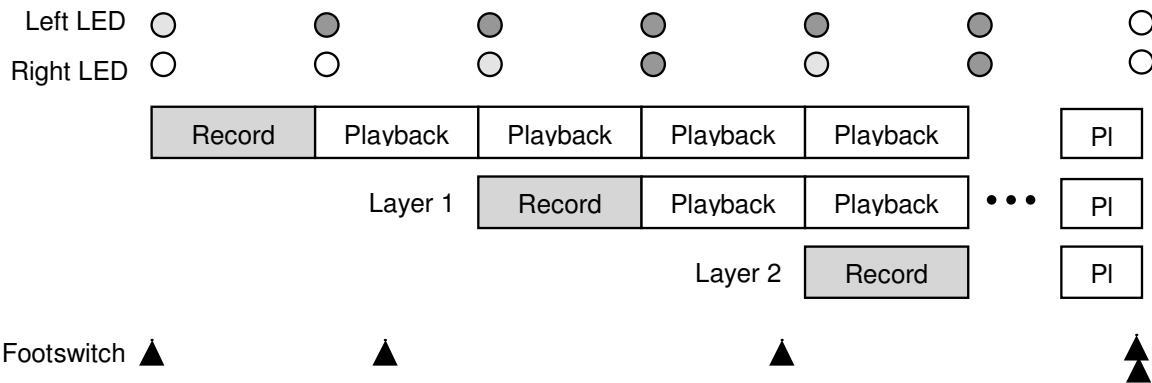
When a loop is repeating, you can stop it at the end of the current loop if operating modes 9, 72 or 73 are active as shown in the figure below.



This example assumes the record process continues until the footswitch is pressed. During playback, if the footswitch is pressed once, playback stops at the end of the current loop. The playback can be stopped at any time with the double press of the footswitch. In operating mode 72, the loop plays back in reverse. In operating mode 73, the loop plays back at half speed and one octave lower.

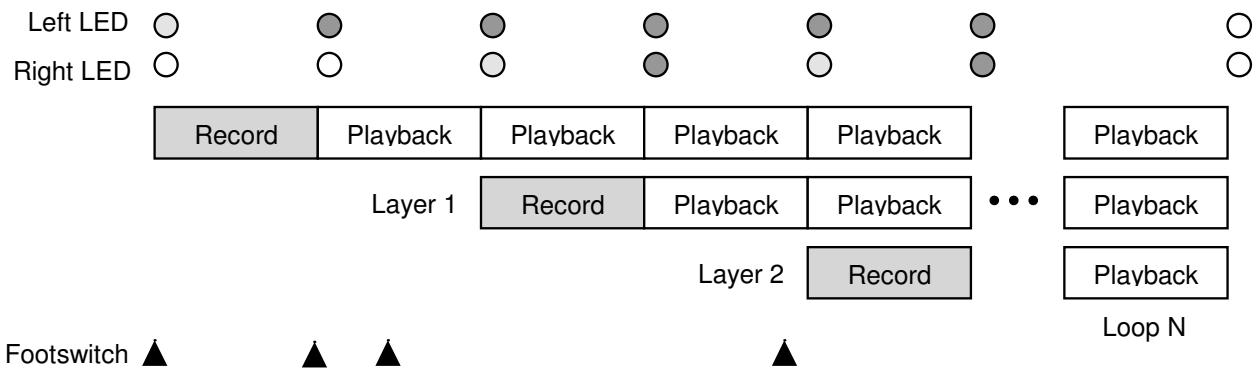
Mode 10: Selectively Layering Audio on a Loop

When a loop is repeating, new layers of audio data can be added to the loop if operating mode 10 is active as shown in the figure below. This example assumes the record process continues until the event count is reached. During playback, if the footswitch is pressed once, loop recording is enabled during the next pass of the loop, at which time the right LED will turn yellow to indicate that layer recording has begun. Once the new layer has been recorded, the right LED will turn green. This process can be repeated indefinitely. The playback can be stopped at any time with the double press of the footswitch.



Modes 11-30: Automatic Ending of Loop Playback

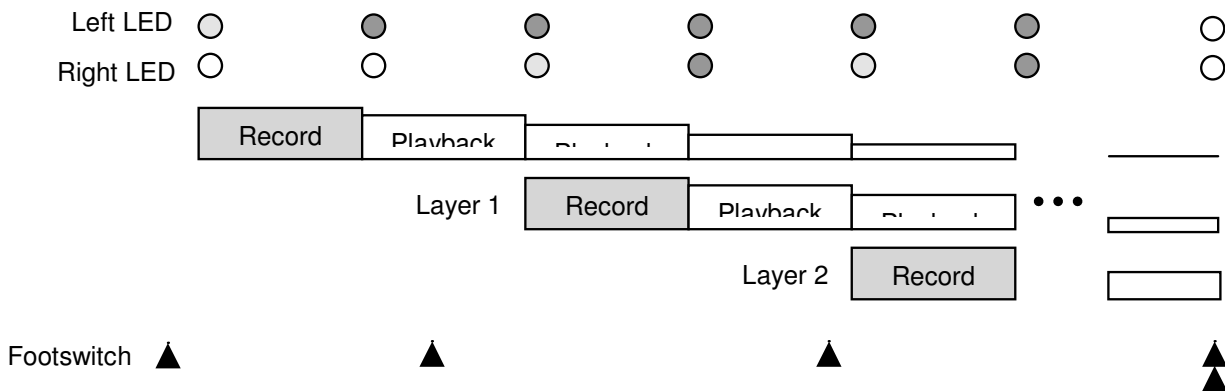
In operating modes 11-30, the loop playback will automatically end after N loops as shown in the figure below.



This example assumes the footswitch starts the initial record process, which continues until the footswitch is pressed again. The value of N is determined by the mode number minus 10. Selective layering can be used in this mode, just like mode 10. A double press of the footswitch stops playback immediately. During loop playback, the display shows the number of loops left to play. All layers will stop playback at the same time.

Modes 31-40: Automatic Fading of a Loop

Operating modes 31-40 cause the loop playback to fade away over time as shown in the figure below.

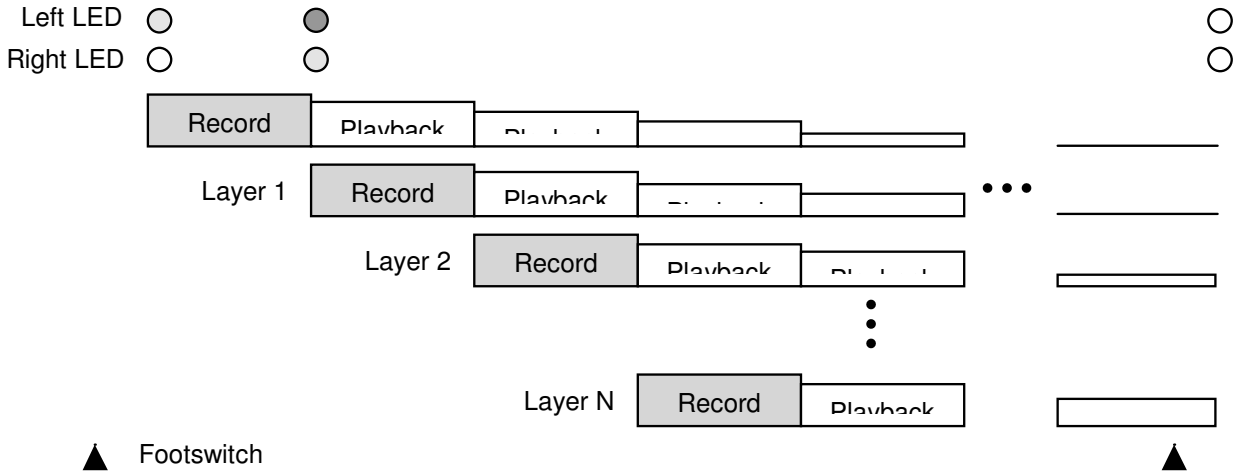


This example assumes the first note starts the initial record process, which continues until the event count is reached. The number of loops required to completely fade the signal is determined by the mode number minus 30. Manual layering can be used in this mode. New layers will start at full volume and then fade over time like the original loop. This allows interesting effects such as continuous layering of new music passages. Loop playback can be stopped with the double press of a footswitch.

Modes 41-50: Automatic Fading of a Loop with Auto Layering

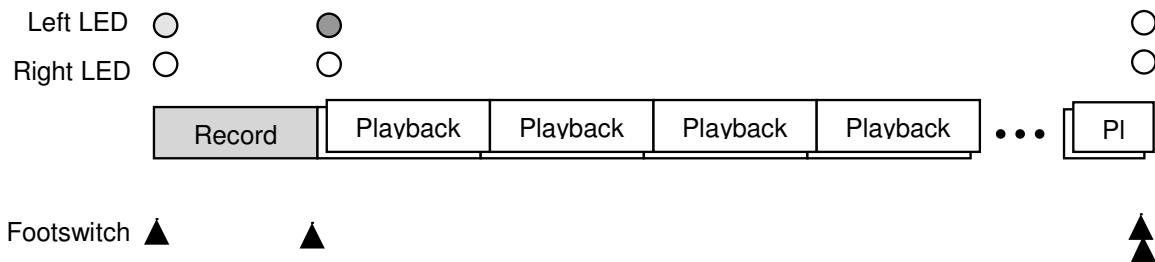
Operating modes 41-50 are the same as the automatic fading modes described above, except that automatic layering is used during loop playback as shown in the figure below. This mode can be used to create feedback delay effects. The number of loops required to completely fade the signal is determined by the mode number minus 40. This example assumes the footswitch starts the initial

record process, which continues until the event count is reached. A single footswitch press will stop playback at the end of the current loop. A double footswitch press stops the loop playback immediately.



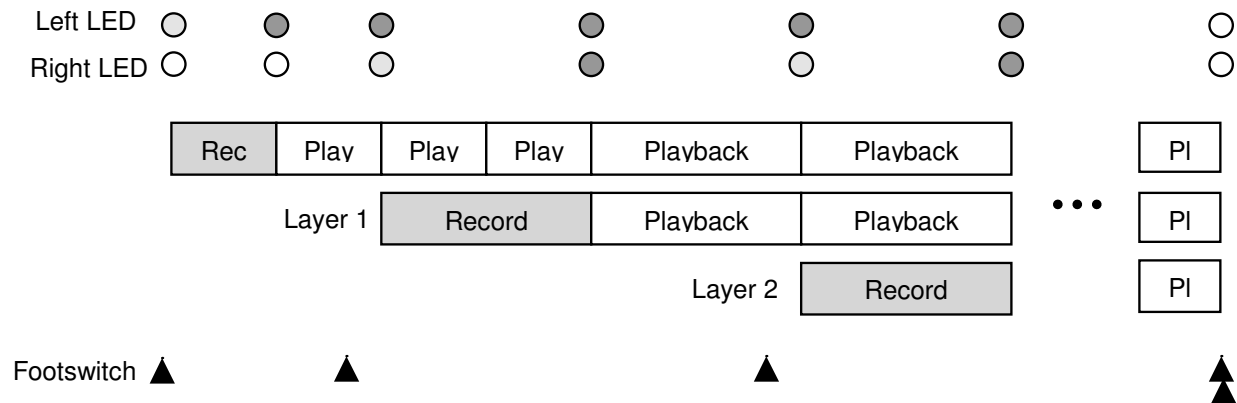
Modes 51-60: Doubling Mode During Loop Playback

In operating modes 51-60, the loop playback will create a doubling effect as shown below. The loop playback includes the original audio plus the audio delayed by a time specified by the mode number. The mode number minus 50, times 10mS determines the delay time. This allows the delay to vary from 10mS to 100mS. This example assumes the footswitch starts the initial record process, which continues until the footswitch is pressed again. A single footswitch press will stop playback at the end of the current loop. A double footswitch press stops the loop playback immediately.



Modes 61-70: Duplicate Loop During First Layer Recording

A given loop can be duplicated multiple times during the first layer recording using operating modes 61-70. This can be useful if you have a short phrase that you want to play back multiple times while you record a longer phrase over it.

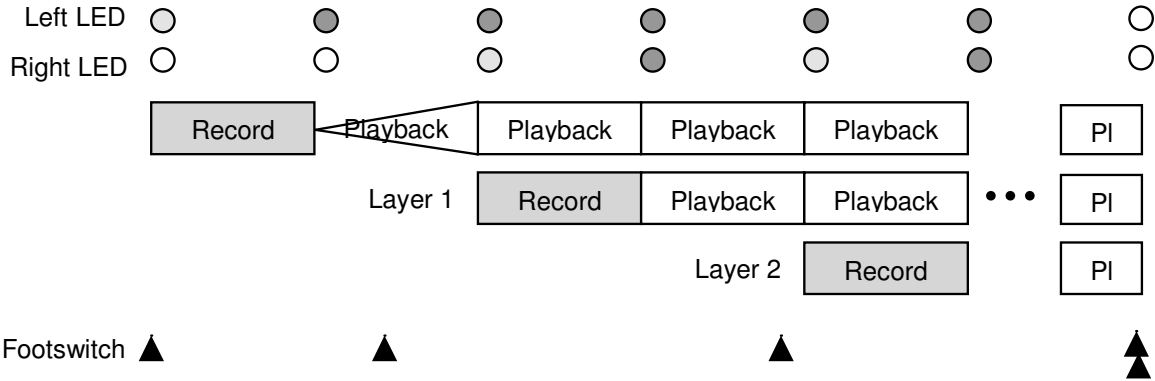


The number of repeat times is set by the operating mode minus 60. If the selected number of duplications exceeds the memory capacity, then next lower value is used. The example below shows operating mode 62. After loop playback begins, the first press of a footswitch for layer recording will duplicate the loop 2 times while a new layer is recorded on top of it. The display will count down the number of duplications left while the original loop is played. After this layer recording is complete, the longer loop will start playing back. From this point forward, it acts the same as operating mode 10 in which multiple additional layers can be recorded with no additional duplication. Once a new layer has been recorded, the right LED will turn from yellow to green. This process can be repeated indefinitely. The playback can be stopped at any time with the double press of the footswitch.

Mode 71: Fade in With First Loop

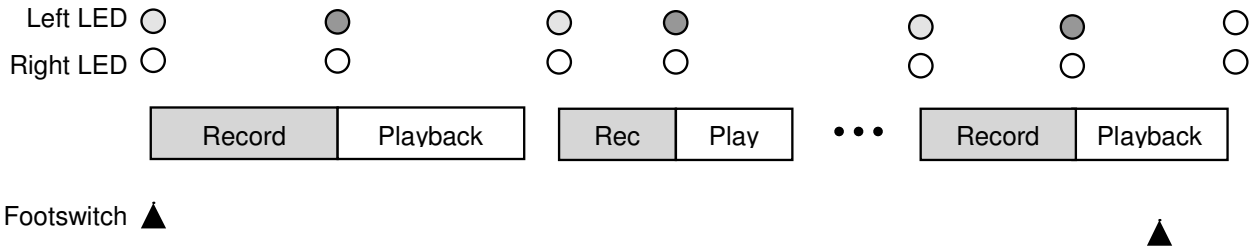
The first loop playback will fade in if operating mode 71 is active as shown in the figure below. This example assumes the record process continues until the event count is reached. During playback, if the footswitch is pressed once, loop recording is enabled during the next pass of the loop, at which time the right LED will turn yellow to indicate that layer recording has begun. Once

the new layer has been recorded, the right LED will turn green. This process can be repeated indefinitely. The playback can be stopped at any time with the double press of the footswitch.



Mode 74: Automatic Re-recording and Playback

In operating mode 74, after the loop is played back once, playback stops and the unit automatically becomes active to record another loop. The length of each loop can change depending on your playing. This process repeats indefinitely. In this example the record process continues until the event count is reached. During playback, if the footswitch is pressed once, playback stops at the end of the current loop. The playback can be stopped at any time with the double press of the footswitch.



Mode 75: Muting Playback

In some cases you may wish to record a loop and play it back at a later time during the song. To do this, use operating mode 75. You can record a loop just like operating mode 9, but once the loop is recorded, it will be muted during playback. You can stop the muted playback in the same way that

you stop the playback of other looping modes. At any time after that point, you can play the loop back once using MIDI CC #25 or resume continuous playback using MIDI CC #29 (see section 6).

Delay Effects

There are several delay effects that can be achieved with RiffBox. In operating mode 5 and operating modes 41-50, your playing can set the delay time. To do this, set the event count to 1. The delay time will then be set by the time between the first two notes that you play. Of course you can always use a higher event count to get longer delays (up to 80 seconds in mono or 40 seconds in stereo). Mode 5 gives you a single delay feedback. In modes 41-50, the higher mode numbers will give you higher levels of delay feedback.

Saving Presets

After you have determined settings that you like, you can store them in one of 100 present locations. If you make changes to any parameter while the preset value is set between 1 and 99, the decimal point will blink to show you that something has changed. You can save these values to a different preset location by changing the preset value while the decimal point is blinking. To return a preset to its original parameter values, press the right control knob while the decimal point is blinking. For this to work, make sure the MIDI channel is not zero and the Events/Notes slide switch is not active.

To save a preset, press the left control knob and the display will blink while waiting for you to confirm the save. Press the left knob again to confirm the save, or exit from saving by pressing the right knob. If you exit, this will also restore the original preset values as described above. When the unit is powered off, nothing is saved. When a preset is saved, all global parameters are also saved. Section 6 describes how to save all preset parameters into a MIDI sysex file.

Setting the Noise Gate

RiffBox contains a built-in noise gate function. When the right switch is in the headphone volume position, you can press the right control knob and the right LED will start flashing. Now you can set the value to 1 to turn on the built-in noise gate and to 0 to turn it off.

6 Using MIDI

RiffBox recognizes MIDI program change (PC) messages, MIDI continuous controller (CC) messages and MIDI start and stop messages. You can also backup and restore all of your presets using MIDI sysex files. This section describes how to use these MIDI messages to control RiffBox and backup preset data.

Setting the MIDI Channel

The MIDI input will only recognize MIDI commands that contain the correct MIDI channel number. To set the MIDI channel number, move the left selector switch to 'MIDI Channel' and adjust the left control knob. The channel number can range from 1 to 16. Make sure this channel number matches the channel number that your MIDI footswitch or controller is programmed to. For MIDI channels 1-15, MIDI program change messages will be recognized on the current MIDI channel, MIDI controller messages will be recognized on MIDI channel plus 1 as shown in the table below. This allows you to adjust control parameters on a footswitch or controller you are using to send MIDI PC messages without changing CC parameters in RiffBox. MIDI channel 16 can be used if you want RiffBox to recognize both MIDI program change and controller messages using the same MIDI channel.

To dump or receive MIDI sysex preset data, to change the global input level or to output a single audio loop, set the MIDI channel number to 0. MIDI channel 0 should not be used during normal operation as it can add audio artifacts to the signal. MIDI start, stop and clock messages will work with any MIDI channel.

RiffBox MIDI Channel	Program Change MIDI Channel	Continuous Controller MIDI Channel	PC Messages to Start Loop Recording
0	None	None	None
1-8	1-8	2-9	2
9-15	9-15	10-16	1
16	16	16	1

MIDI In and MIDI Out/Thru

There are two MIDI connectors on the back of the device. MIDI signals are captured by the MIDI In port and passed directly to the MIDI Out/Thru port. This allows you to place RiffBox in series with other MIDI devices in a daisy chain fashion. For example, if RiffBox is set to MIDI channel 1 and the MIDI Thru port is connected to a device using MIDI channel 2, all messages sent to RiffBox using MIDI channel 2 will simply pass through the RiffBox and will be passed on to the other device. All messages using MIDI channel 1 will control RiffBox and will do nothing to the other device.

Program Change Messages

Program Change messages can be used in place of a footswitch, which was described in section 5. In addition, they can be used to change the RiffBox preset number. When in standby mode, if “Preset Change” mode is on, a received PC message will not only change the active preset to the number specified by the PC message, it will activate the recording mode just as a footswitch does. The current MIDI channel will determine how the unit behaves when a MIDI PC message is received.

If the MIDI channel is less than 9, the recording mode is not activated until two identical preset change values are received as shown in the table above. This allows you to try different amp and effects settings (by sending different MIDI PC values) without activating RiffBox for recording. If the MIDI channel is greater than 8, the first received MIDI PC message acts the same as a footswitch press. This can be useful if you have a dedicated MIDI footswitch that is separate from the amp and effects MIDI foot controller. If you want MIDI PC messages to have no effect, set the unit to operating mode 76. This will prevent the unit from going into record mode.

While in record mode, the receipt of a single MIDI PC message will stop recording and start playback on the next event. If a second MIDI PC message is received before the next event, recording is aborted and the unit goes back into standby mode.

MIDI program change values determine the operation once playback has begun. RiffBox remembers the MIDI PC value used to start and playback the loop recording. If a different MIDI PC value is received during loop playback it has no effect. This allows you to switch amp tones during loop playback. If the same MIDI PC value is received, it is the same as pressing a footswitch to control loop playback as described in section 5. For example, after a loop is recorded and playback begins, the guitar tone can be changed with a new MIDI PC value without registering as a footswitch press. Once the same MIDI PC message is received again, the effect is the same as pressing a footswitch to end the loop or start layer recording etc.

Continuous Controller Messages

MIDI CC messages can be used to change various parameters in RiffBox when the unit is in standby mode. The parameters include the input level, the operating mode, the threshold, the record mode, the preset change value, the event count, the Notes value and the preset number. There are also several CC messages that can be used during loop playback to control the input volume, control the loop playback volume, change the operating mode, change the event count and send a single loop output. The CC numbers for these parameters are listed below.

Input Level	CC = 16 Value = 0-99 (Do not use as a volume expression pedal)
Operating Mode	CC = 17 Value = 0-76
Threshold	CC = 18 Value = 1-40
Record Mode	CC = 19 Value = 0 (Mono 2), 1 (Mono 1), 2 (Stereo) <Swap Off> Value = 3 (Mono 2), 4 (Mono 1), 5 (Stereo) <Swap On>
Preset Change	CC = 20 Value = 0 (off), 1 (on)
Event Count	CC = 21 Value = 0-99
Notes	CC = 22 Value = 0-99
Preset Number	CC = 23 Value = 0-99
Loop Playback Volume	CC = 24 Value = 0-99
Output Single Loop	CC = 25 Value = 0 (off), 1 (Output one loop)
Change Loop Length	CC = 26 Value = 0 (decrement), 1 (increment)
Start-Stop Recording	CC = 27 Value = 0 (stop), 1 (start)
Live Signal Volume	CC = 28 Value = 0-99
Resume Loop Playback	CC = 29 Value = 0 (off), 1 (Resume playback)

In standby mode, if the parameter listed above is currently active in the display, you can see the value change in response to these MIDI CC messages. By using MIDI CC messages, the preset number can be changed without triggering a footswitch event like a program change message can.

Controlling Loops During Playback

There are four MIDI CC message types that can be used during loop playback. MIDI CC=16 or MIDI CC=28 can be used to adjust the input volume, MIDI CC=17 can be used to transition to reverse or half-speed mode, MIDI CC=21 or MIDI CC=26 can be used to adjust the length of the loop and MIDI CC=24 can be used to adjust the loop playback volume. These can be used even though the control knobs are inactive during loop playback.

During loop playback, you can transition between any mode and reverse mode and/or half-speed mode. By sending a MIDI CC=17 with a value of 72, the next loop playback will be reversed. By sending a MIDI CC=17 with a value of 73, the next loop playback will be at half-speed. You can even change back and forth between these two modes. After this point, by sending a MIDI CC=17 with a value other than 72 or 73, the next loop will revert back to the original mode. The mode will change at the beginning of the next loop playback.

A loop is composed of a number of events that were identified when you record the loop. These events typically identify the time that you played a note or chord. During the first loop playback, all of the events are played back. You can change the number of events played back using MIDI CC=21. The minimum MIDI value is 1 and the maximum MIDI value is the number of events that you recorded. You can also increment or decrement the loop count during playback by using MIDI CC=26. The event count will change at the beginning of the next loop playback.

During a performance, you may wish to record a loop and then play the loop once at different time during the performance. You output the loop once by sending MIDI CC=25 with a value of 1. The loop can only be output when RiffBox is not recording and not playing back a loop. You can also resume continuous loop playback by sending MIDI CC=29 with a value of 1.

MIDI Start and Stop Messages

The beginning and end of the loop recording can be exactly timed to an external MIDI sequencer using MIDI continuous controller messages. This allows you to play along with a MIDI sequencer and time your playing to the start and stop of the MIDI sequence. When a MIDI start message (CC=27, value=1) is received, recording will start immediately and will not be timed to the next audio event. When a MIDI stop message (CC=27, value=0) is received, recording will stop immediately and loop playback will begin without being timed to the next audio event. Send MIDI program change messages to stop the loop playback.

Preset Change Mode

When the right switch is set to 'Record Mode', the preset change mode can be turned on or off as shown in the left side of the display. When preset change mode is on, the received MIDI program change (PC) message that starts the recording process will also change the preset number based on the MIDI PC value. This allows a single press of a MIDI footswitch to change the RiffBox preset number, change the preset number on another device such as an effects unit and start the recording process. For this to work, the preset number in RiffBox must match the preset number of the effects

device. After the MIDI PC message is received, the preset change mode will remain on even if the newly selected preset has it turned off.

Note: If you don't want the initial MIDI PC message to change the preset number, turn the preset change mode off. In this case, the preset number can still be changed with MIDI continuous controller (CC) messages.

Sending MIDI Clock Messages

An external drum machine can be synchronized to the loop playback timing using MIDI clock messages. Connect the MIDI output from RiffBox to the MIDI input on the drum machine. Make sure the drum machine is set up to receive MIDI clock messages. To make this work, set the Notes parameter to equal the number of quarter notes that will make up the loop you are going to record. During loop playback, each time the beginning of the loop is played, a MIDI stop and a MIDI start message are sent to the drum machine. This is followed by a series of MIDI clock messages that keep the drum machine in sync with the loop. If you want to use drum sequences that are longer than the loop playback time, you can do this by multiplying the loop using operating modes 61-70. If you want to turn off the MIDI clock output, set the Notes parameter to 0.

In operating mode 75, the loop audio playback is muted so that you can start a MIDI drum machine and play along with no loop playback and only the drum machine if desired. In this mode, the MIDI start message is sent only once, since it does not need to keep exact synchronization with the loop over a long period of time. By setting the event count and the note value to one, the first two notes that you play will start the drum machine and also set the drum tempo. You can use more events and notes to time the drum machine to longer passages as well.

Note: RiffBox combines the MIDI Thru and MIDI out data. If you are synchronizing to an external drum machine, it is best not to send other streams of MIDI data to RiffBox such as the output of a MIDI continuous controller pedal. This MIDI thru data may confuse the MIDI drum machine. MIDI program change message inputs are OK and can be used to control the operation of RiffBox.

Saving and Restoring Preset Data

All preset data can be saved using MIDI sysex files. To dump a MIDI sysex file containing all preset data, set the MIDI channel to 0 and press the left control knob. Make sure the left control switch is not set to Input Level, as this will set the unit to change the global input level. The resulting file should be 708 bytes in length. To restore all presets, set the MIDI channel to 0 and send the sysex file to RiffBox. The display will cycle through all 100 presets as they are being

restored. MIDI channel 0 should not be used during normal operation as it can add audio artifacts to the signal.

Note: Do not send MIDI data to the unit while dumping a sysex file. It is best to unplug the MIDI input cable while performing a MIDI sysex dump.

7 Operation Examples

This section gives some examples of how RiffBox could be used in various applications. Many more variations are possible including operating RiffBox as a traditional looper by setting the event count to 90.

Starting a Song With a Loop

If you want to start a song using a loop, such as building a rhythm loop and playing a lead on top of it, use the automatic start capability. Simply press the footswitch or send a MIDI program change message to arm the device. With the first note or chord you play, the unit will start recording the loop. You can start loop playback by pressing the footswitch again or sending another MIDI program change message. In this case, loop playback will begin on the event following the footswitch press. The event following the footswitch press should be the same part of the musical passage as the first event in the loop.

Loop in the Middle of a Song

If you want to create and playback a loop in the middle of a song, press the footswitch or send a MIDI program change message to start the loop recording on the next event. You can start loop playback by pressing the footswitch again or sending another MIDI program change message. In this case, loop playback will begin on the event following the footswitch press. The event following the footswitch press should be the same part of the musical passage as the first event in the loop.

Automatic Loop Playback

If you plan to automatically loop on the event count, it is a good practice to first determine the correct threshold setting of the passage that you plan to play. Once you have learned the threshold and events for a given passage, you can store them in a preset for future use.

To enable automatic loop playback, recall the correct preset or learn and set up the threshold and event count. Press the footswitch or send a MIDI program change message to arm the device. With the next note or chord you play, the unit starts recording the loop. When the programmed event count or note pitch is reached, recording stops and loop playback begins. You can also set RiffBox to automatically detect rhythm patterns or note patterns to detect a loop as was described in section2.

Additional Features Available with MIDI

MIDI messages add several new options when using RiffBox. If a MIDI controller is used and sends MIDI messages to both RiffBox and the attached guitar amp, a single press of the controller footswitch can both change the guitar tone and simultaneously set the RiffBox preset number and start loop recording. Also, MIDI CC messages can be used to change parameters.

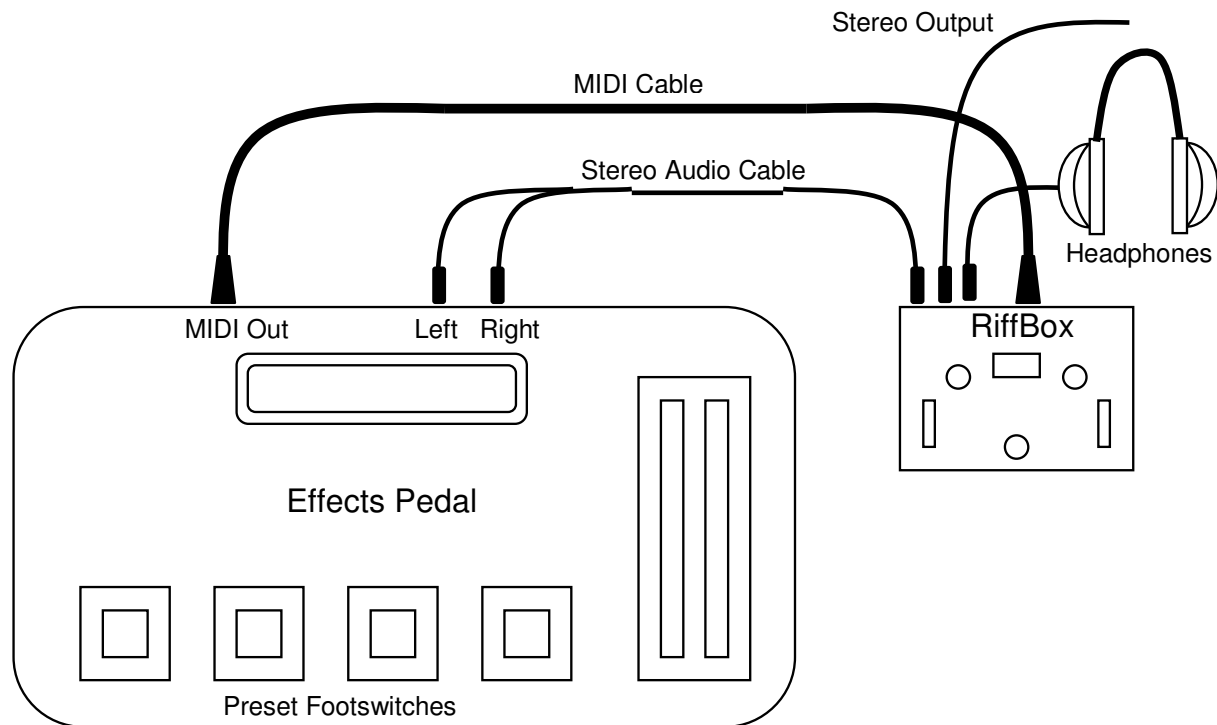
The following is an example application. It assumes that you have a guitar amp or effects setup that is controlled by MIDI. It also assumes you have RiffBox inserted in the audio chain after the tone shaping circuitry.

Let's say you want a guitar part in the middle of a song to loop 4 times as a clean rhythm tone. While it is looping, you want to play a lead part with a high gain tone. You press a MIDI footswitch just before the event where you want the loop recording to begin. This sets the RiffBox preset number, starts recording process and sets the amp tone to clean. Once you reach the point before the event at which you want the loop playback to start, you press another MIDI footswitch. This starts the loop playback and sets the amp to a lead tone. After four loops, you press the lead tone MIDI footswitch again, which stops the loop playback. An alternative approach is to set RiffBox to operating mode 14, which automatically stops playback after 4 loops. Or you could use operating mode 34 where the playback fades away during 4 loops. There are many possibilities. Also, a single song could contain several different looping parts since RiffBox can save up to 100 presets.

Appendix A: Application Examples

Using a Stereo Effects Pedal

There are several stereo effects pedals available on the market today. Many of these effects pedals have MIDI outputs that send a MIDI program change message when a new preset is selected. RiffBox can be connected to these pedals as shown in the figure below. Here, the left and right audio outputs of the effects pedal are sent through a Y cable to the ¼" TRS stereo input of RiffBox. The audio output can be monitored using headphones or sent to an amplification system using the ¼" TRS stereo output from RiffBox. In this case, set RiffBox to the Stereo recording mode. The MIDI output from the effects pedal is sent to the MIDI input of RiffBox. Make sure the MIDI channels of the two units are set to the same value. In this example, the MIDI channel is set to a value less than 9 so that the effects pedal preset can be changed without arming RiffBox.

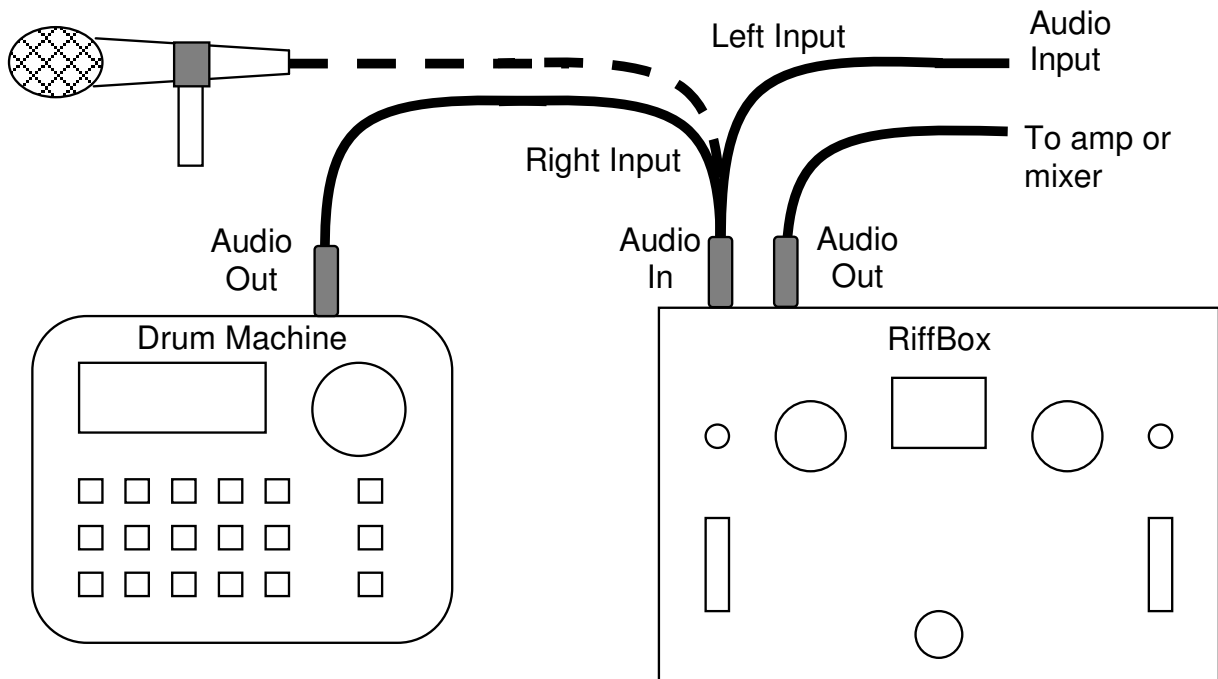


Before arming RiffBox, the user can change the effects pedal preset by pressing various preset footswitches. Once a given preset is pressed twice in a row, RiffBox will be armed for recording. If 'PC On' is active, the second press will also change the preset value in RiffBox. The next press of an effects pedal preset footswitch will stop RiffBox recording and start playback (if the specified event count has not been reached yet where playback starts automatically). This same footswitch press can change the effects pedal tone from, for example, a rhythm tone to a lead tone. While the loop is playing back, different preset footswitches can be pressed on the effects pedal with no effect on RiffBox. This allows the user to play various tones over the loop. Once a preset footswitch is pressed twice in a row (RiffBox also remembers the preset pressed to start loop playback), it acts the same as a single footswitch press as described in section 5. As you can see by this example, RiffBox is completely controlled by the effects pedal preset footswitches, which not only changes the tone, but also control loop recording and playback.

Synchronizing Loop Timing to an External Audio Source

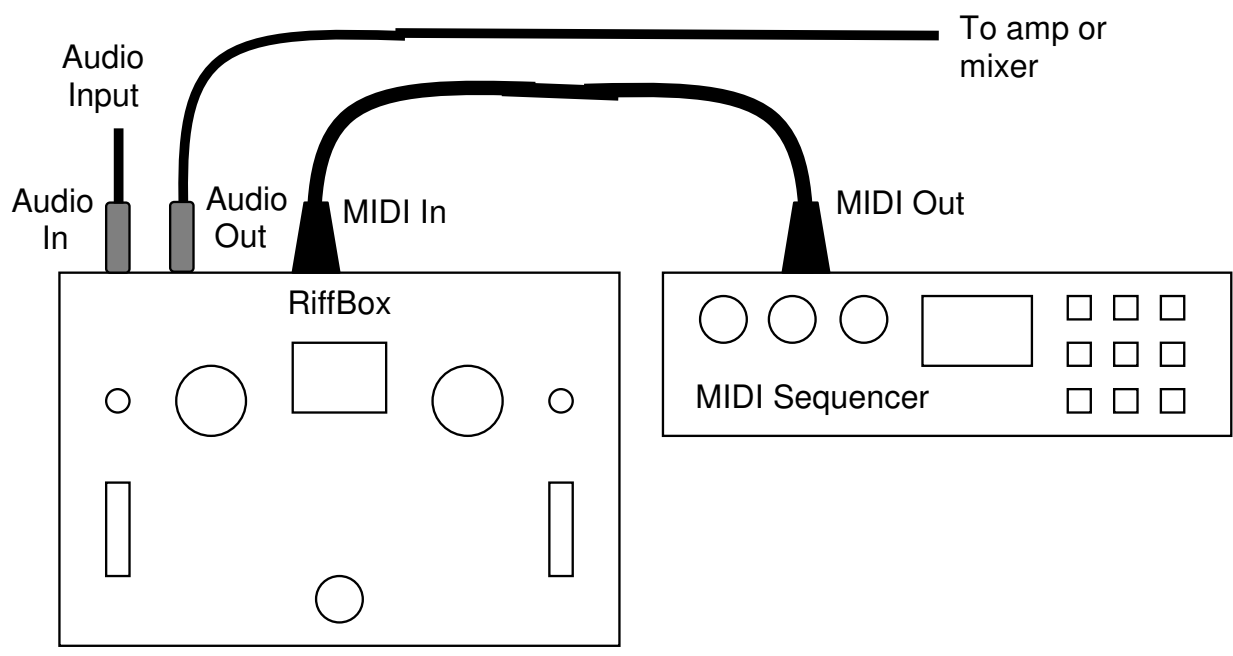
There are several ways to trigger loop recording and playback using an external audio source. The figure below shows how to use an external drum machine or another source such as a microphone on a drum kit as a loop trigger. In this case, set the record mode to Mono2 so that the right audio input is used to identify audio events and the left audio input is recorded as the loop audio. During loop playback, only the instrument audio will be played back (the drum beat will not be recorded or played back). Also, both the left and right outputs from RiffBox provide the same audio signal and can be sent to different amps if desired.

While the drumbeat is playing, when you press a footswitch to arm RiffBox, the next drumbeat will start the loop recording. When you want to end the loop, press the footswitch again. The loop will stop recording and start loop playback on the next drumbeat. By using automatic loop playback, you can program RiffBox to stop recording and start loop playback after a pre-programmed number of drum beats (events). You can use learn mode to set the threshold and determine the proper event count prior to loop recording. MIDI program change messages can also be used in place of a footswitch press.



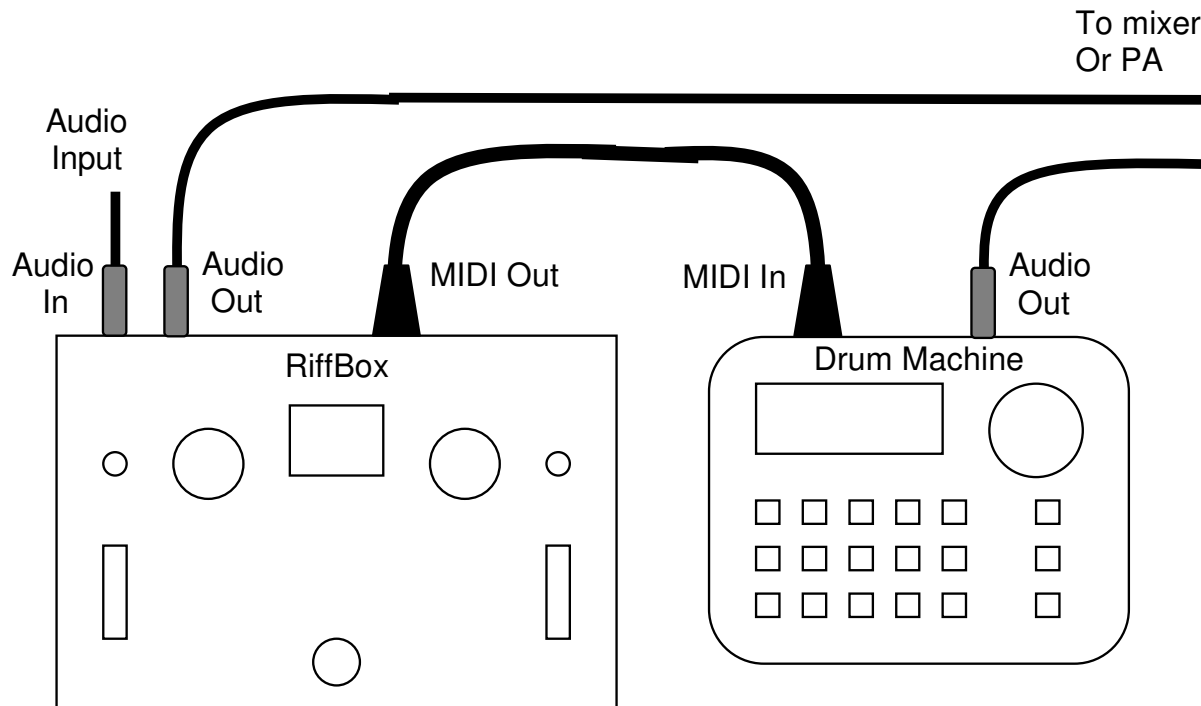
Synchronizing Loop Timing to a MIDI Sequencer

You can synchronize the loop recording and playback to a MIDI sequencer as shown in the figure below. In this case, connect the MIDI output of the sequencer to the MIDI input of RiffBox. Program the sequencer to send a MIDI start message (CC=27, 1) at the point loop recording should start, and a MIDI stop message (CC=27, 0) at the point loop recording should stop and loop playback should begin. In this case, loop recording and playback are not timed to audio events, but instead to the exact time the MIDI messages are received. This example assumes that the MIDI sequencer is controlling other MIDI audio devices that you will play along with. If you can time your playing to match the MIDI tempo, and assuming the MIDI start and stop messages are also timed to the MIDI tempo, fairly accurate loop timing can be achieved.



Synchronizing an External Drum Machine to RiffBox

You can greatly enhance your loop creation or practicing experience by synchronizing a drum machine to the RiffBox loop timing. To do this, connect the MIDI output from RiffBox to the MIDI input on the drum machine. The Notes parameter should equal to the number of quarter notes in the loop that you plan to record. If you want the drum machine to play twice as fast, double the Notes parameter. When RiffBox starts playing back the loop, it also starts to send MIDI clocks to the drum machine in order to synchronize the drum machine to your loop timing. If you want no loop playback, and only the drum machine to play along with, user operating mode 75. In this mode, you can start a long MIDI drum sequence with the first two notes that you play by setting both the event count and the Notes value to one.

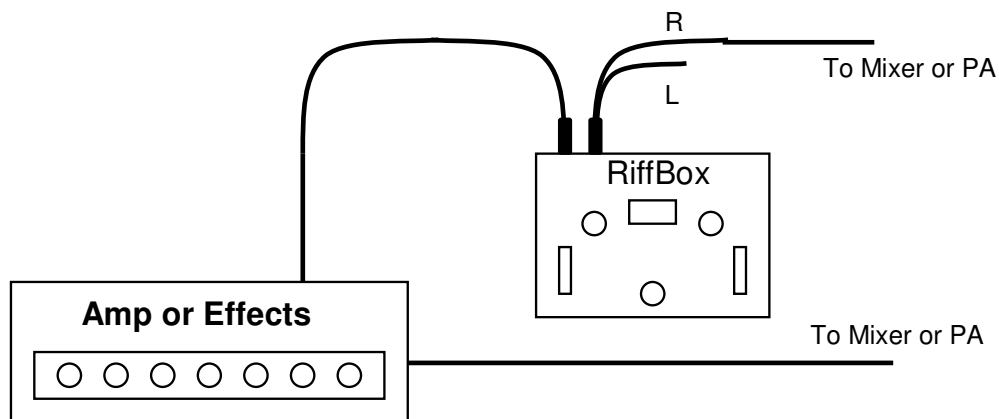


Each time the beginning of the loop plays back, the drum machine pattern is restarted in order to maintain long-term synchronization with RiffBox. Because of this, you should set the drum machine to a pattern that matches the number of quarter notes that you have selected. Or you could increase your loop length to match the drum machine pattern length.

You can also configure a more sophisticated MIDI setup if you want to play live in a one-man band performance. As mentioned previously in this manual, you can control RiffBox using MIDI program change messages. The MIDI thru capability of RiffBox allows you to connect a MIDI controller to the MIDI input of RiffBox and use the MIDI output to connect to the drum machine. If you want to control RiffBox separately from the drum machine, you can set up the devices using two separate MIDI channels. By setting RiffBox and the drum machine to the same MIDI channel, a single MIDI program change message can change a guitar amp setting, change the preset on RiffBox, start loop recording on RiffBox and change the drum set on the drum machine.

Parallel (Side-Chain) Operation

You can setup RiffBox in parallel with your audio path as shown in the figure below. In this case, a mono signal from an amp or effects unit is sent to both the mixing board and to RiffBox. A stereo Y cable is connected from the RiffBox output, but only the right channel is sent to the mixing board. By setting the RiffBox Record Mode so that 'Swap' is on and 'Mono 1' or 'Mono 2' is on, only the loop playback signal from RiffBox will be sent to the mixer and the direct signal will be muted (the direct signal is the left channel output of RiffBox which is unconnected).



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