



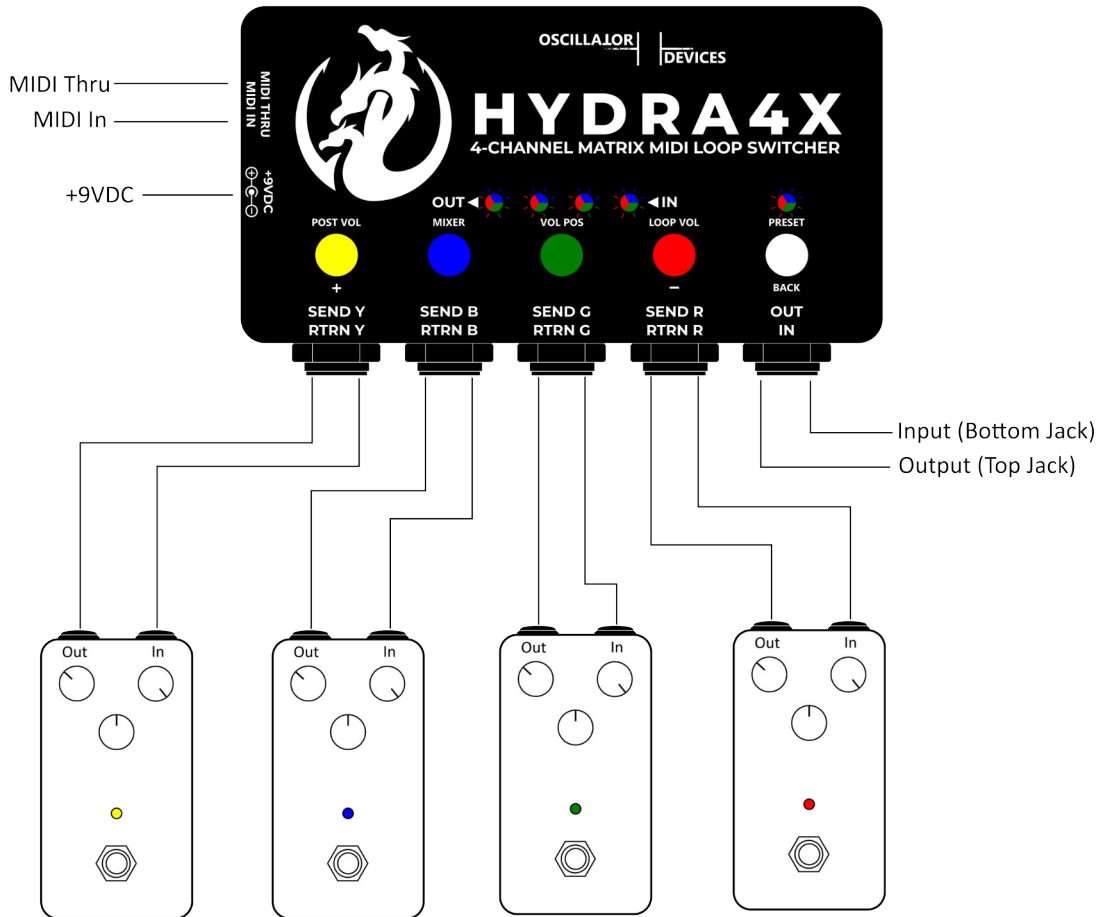
HYDRA4X

User Manual

Connections.....	1
Signal Path and Switching.....	2
Mixer.....	2
Parallel Loops.....	2
Trails/Carry Over.....	3
Volume Control.....	3
Split Loops.....	3
Controlling the Device.....	3
Loop Order.....	3
Loop Volume.....	4
Loop Volume Position.....	4
Mixer.....	5
Post Volume.....	5
Locking the Buttons.....	5
Presets.....	5
MIDI Control.....	6
Setting the MIDI Channel.....	6
MIDI Commands for Controlling the Loops.....	6
MIDI Command for Setting the Loop Order.....	6
MIDI Command to Swap Loops.....	7
MIDI Command for Volume.....	7
MIDI Command for Loop Volume Position.....	7
MIDI Command for Mixer Trails.....	7
MIDI Command for Mixer Parallel Clean Blend.....	7
MIDI Command for Mixer Parallel Loops.....	8
MIDI Command for Split Loops.....	8
Troubleshooting.....	8

The **Oscillator Devices HYDRA4X** is an easy to use, MIDI controlled loop switcher with four reorderable loops, volume controls and advanced mixing functionalities. The four loops are buffered with high quality, low noise buffers. The order of the effects can be chosen freely, either manually or with MIDI commands. The **HYDRA4X** contains two volume control blocks. One is fixed at the very end and a second one can either be at the very beginning, or can be assigned to any loop. The integrated mixer can either be used to have multiple loops with trails, or to realize parallel signal paths or a clean blend.

All these functions can be controlled manually, without sending a single MIDI command. After setting up the **HYDRA4X**, all settings can be saved to a preset.

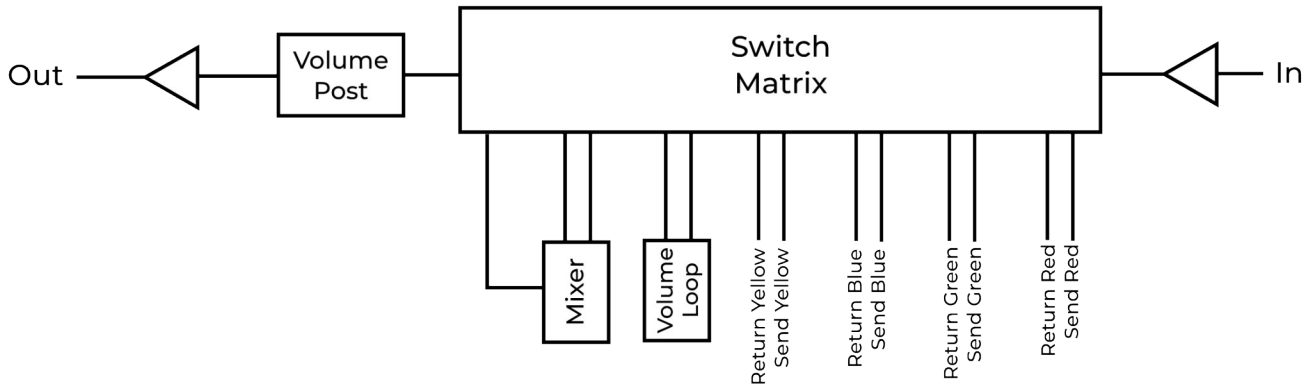


Connections

- **Input:** A mono (TS) instrument input with an input impedance of 1MΩ. Connect a guitar, bass, or the output of any instrument or pedal here.
- **Output:** A mono (TS) output with an output impedance of approx. 100Ω. Connect an amplifier or the input of any subsequent effects or audio devices here.
- **SEND R/G/B/Y:** Connect the input of your effects devices here. As the output these are mono (TS) outputs with an output impedance of approx. 100Ω. These can also be used as a regular output, for example, to use the HYDRA4X as a splitter.
- **RTRN R/G/B/Y:** Connect the outputs of your effects devices here. As the input, these are mono (TS) instrument inputs with an input impedance of 1MΩ. These can also be used as a regular input, for example, to use the HYDRA4X as an input selector.
- **+9VDC:** Power Supply. 9VDC only, Center Negative, Boss Style. Min. 150mA.
- **MIDI In:** 3.5mm (1/8") MIDI Input according to MIDI Standard **MIDI TRS Type-A**.
- **MIDI Thru:** 3.5mm (1/8") , latency free MIDI Thru according to MIDI Standard **MIDI TRS Type-A**.

Signal Path and Switching

The heart of the **HYDRA4X** is a switch matrix that connects the in and output to the four loops, the volume loop and the mixer. All inputs and outputs are buffered with high quality, low noise buffers. That means that all returns can be used as inputs and all sends can be used as outputs.



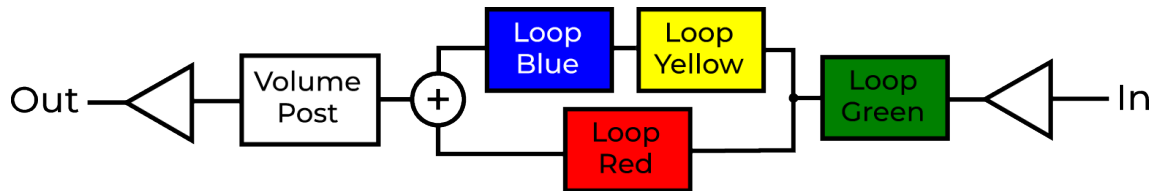
The switch matrix switches all loops in the exact same moment, when a preset is recalled. It switches instantaneously, so there is no gap between the presets and the transition is seamless. The switch latency (that's the time between sending the MIDI command and the actual switching), is below 50ms.

Mixer

The mixer has two functions. It can be used to merge parallel loop paths, or to realize trails (carry over). The mixer position is automatically set, depending on its use as parallel loop mixer or trails mixer.

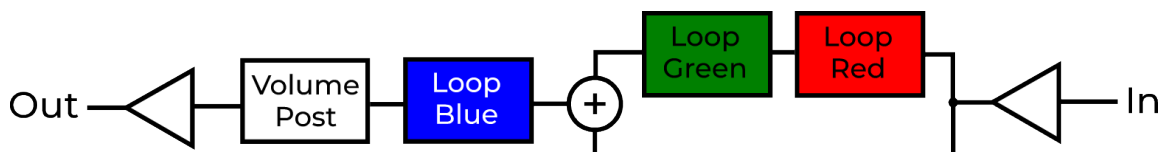
Parallel Loops

A typical setup with parallel loops looks like that (mixer is shown as circle with a + sign):



Loop Green is in series with the input. The signal is split after that and routed to Loop Yellow followed by Loop Blue on one side (let's call that *Branch 1*) and routed to Loop Red on the other side (let's call that *Branch 2*). Both signals get merged by the mixer after that and send to the Volume Post block.

Every loop can be parallel to any other loop in every possible combination. You can even use the mixer to create a clean blend like that:

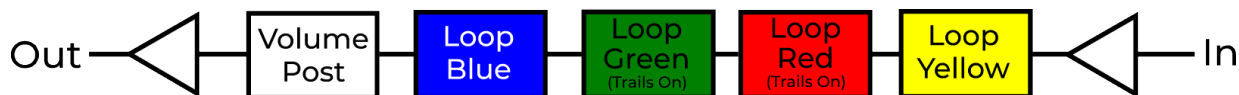


There are two limitations:

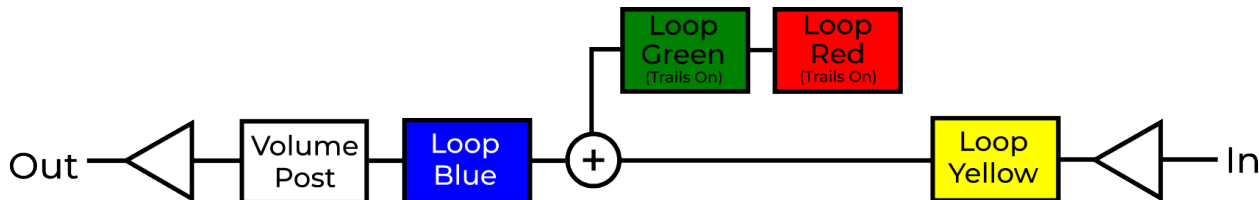
1. There is no possibility of phase reversal. So, if you want to have two signals with inverted phases in parallel, parts of the signal will cancel out which lead to a thin sound.
2. There is only one mixer, so you can only have one parallel path. For example, you can't have two loops in parallel, then a loop in series followed by a clean blend. This would require a second mixer. Also, if you have signed two or more loops to a *Branch*, these loops have to be consecutive. If not, the loops won't be enabled if you try.

Trails/Carry Over

This function means, that when a loop is deactivated its output stays connected. That way delay or reverb trails aren't cut off. The trails function uses the mixer to merge the output of the deactivated loops with the output or consecutive loops. Let's assume the following signal path, with all loops activated and trails activated for loops Green and Red:



If we now switch off loops Green and Red, the signal path changes to this:



Like with the parallel loops there is the limitation that there is only one mixer, so you can't have trails on two not consecutive points in the signal chain. For example the trails feature would only work for loop red (not for loop Green), when loop Yellow and loop Red switches places.

Volume Control

The **HYDRA4X** has two volume controls. The *Post Volume* block is fixed at the very end. The *Loop Volume* block can be moved at any position. It's either right behind the input before any of the loops, or it is tied to front or back of one of the loops.

Both can be set to mute or anywhere between -24dB (attenuation) and +12dB (boost). Attenuation goes in -3dB steps and boost goes in +2dB steps.

Split Loops

Starting with version 1.1.1 loops can be set to split. That means that the return can stay open and the loop following a split loop has the same signal on its send. This comes with a few limitations. Split loops can't be parallel and split loops are ignored for trails. While the volume block can be used for split loops, only the position before the loop can be used. Split loops can be saved, but they can only be set via MIDI (see chapter MIDI Command for Split Loops).

Controlling the Device

All features can be controlled with the buttons on the top of the HYDRA4X.

Loop Order

Controlling the loop order is as easy as it can get. Press the button corresponding to the loop you want to set. This will be the first in the signal path. The next button you press is the second in the signal path and so on. Press the white button (labeled *Back*) to reset the loops.

As a visual feedback there are four multicolored LEDs, that show the state of the loops. It looks like this:



Here's an example. Press the white button to reset the loops. Press button Yellow, followed by button Red. You get this result:



And this is what your signal path looks like:

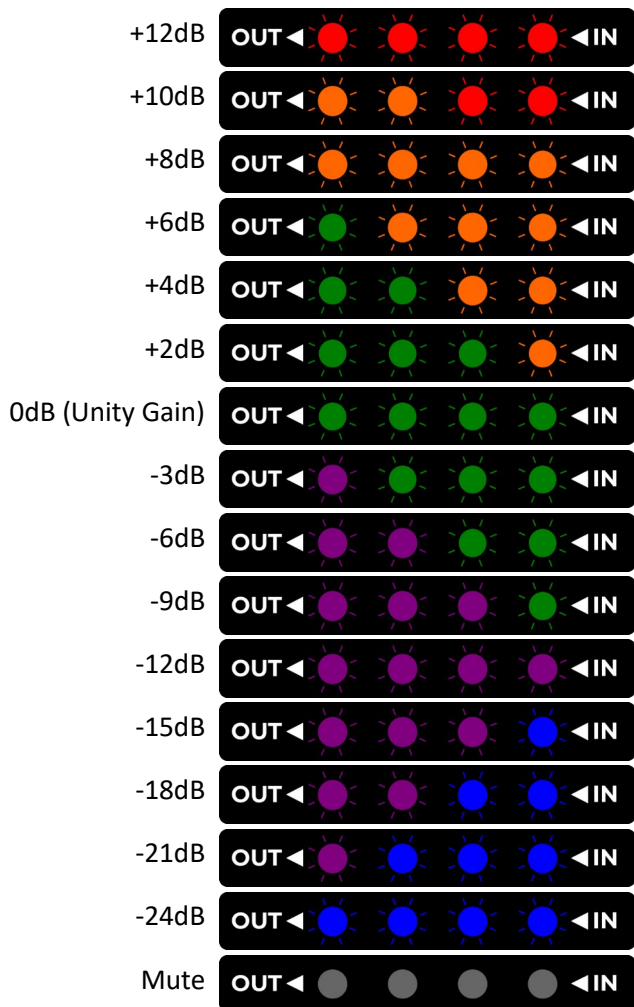


Loop Volume

To set the volume of the *Loop Volume* block, press and hold the red button. It is labeled **Loop Vol**. The rightmost LED starts flashing red. You can now set the volume with the red and yellow buttons (labeled + and -). At 0dB the volume block is switched off and removed from the signal path automatically.

When you're done setting up the volume, press the white button (labeled *Back*), to leave volume setting.

Volume LEDs

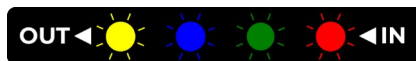


Loop Volume Position

The position of the volume block can be chosen freely. You can set it to the front of the signal path, right after the input or it can be attached to one of the loops. Either in front, or behind it.

To set that up press and hold the green button. It is labeled **Vol Pos**. You can now select the loop to which the volume loop is tied to using the red and yellow buttons (labeled + and -). Lighting up means volume is in front, blinking means volume is behind the corresponding loop.

Loop Volume behind input, before all loops



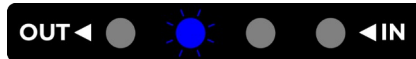
Loop Volume tied to Red Loop



Loop Volume tied to Green Loop



Loop Volume tied to Blue Loop



Loop Volume tied to Yellow Loop

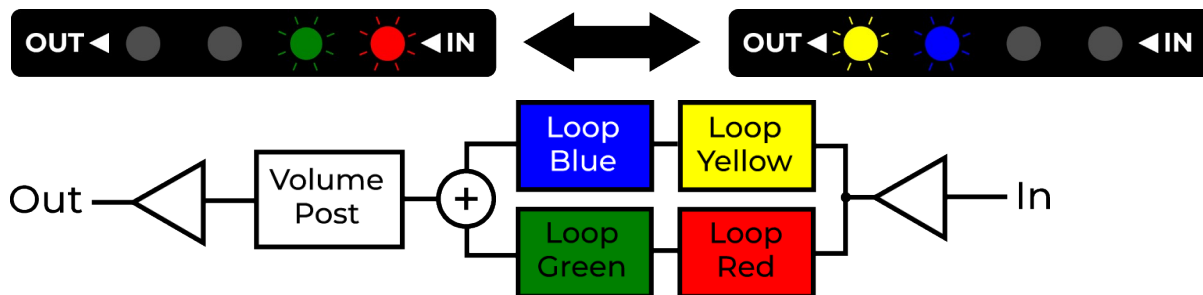


When you're done setting up the position, press the white button (labeled *Back*), to leave volume position setting.

Mixer

The mixer can be used for trails or for parallel loops. To set that up press and hold the blue button. It is labeled **Mixer**. The rightmost LED starts flashing blue.

- **Trails:** To select a loop as Trails loop, just press the corresponding button. To deselect the loop, press the button again.
- **Parallel Loops:** To select parallel loops, press and hold the corresponding buttons for the first parallel branch, then press and hold the corresponding buttons for the second branch. If you want to have more than one loop in a branch, hold the corresponding buttons together. The LEDs are slowly flashing and alternate between the first and second branch. For example, hold buttons Red and Green followed by Yellow and Blue and you get loops Red and Green parallel to Yellow and Blue:



If you want to select only one branch for a clean blend, press and hold the buttons a second time.

When you're done setting up the mixer, press the White button (labeled *Back*), to leave mixer settings.

Post Volume

To set the volume of the *Post Volume* block, press and hold the yellow button. It is labeled **Post Vol**. The rightmost LED starts flashing yellow. Setting the volume is just like Loop Volume.

Locking the Buttons

When mounting the **HYDRA4X** under a pedalboard, there is the chance of unwanted button presses. To prevent that, the buttons can be locked. For that press and hold the white button, just like when saving a preset. Press the following button combination: Red → Blue → Green → Yellow. The backlight of the buttons will go out. The buttons are now locked until unlocked again.

To unlock the buttons, restart the **HYDRA4X** and do the same procedure as when locking the buttons. Be aware that this only works with a freshly restarted device, without any other buttons pressed. Also, there is no visual feedback.

Presets

The **HYDRA4X** can save the current setting to one of 128 presets to be recalled with a MIDI PC command.

Press and hold the white button. All LEDs start flashing white. Now simply send a PC command and the setting is saved and can be recalled with that exact PC command.

By recalling a preset, the following settings will get recalled: loop state, loop order, loop- and post volume, loop volume position and the mixer state. To prevent the **HYDRA4X** to recall one or more of these settings, do the following: Restart the **HYDRA4X** with all four colored buttons pressed. All LEDs will start to flash fast. Select or deselect which one of the preset settings will be recalled or not recalled.

Yellow LED	Blue LED	Green LED	Red LED	White LED
Post Volume	Mixer	Volume Position	Loop Volume	Loop Position

MIDI Control

Setting the MIDI Channel

The **HYDRA4X** ships in omni mode (i.e. it responds to any channel).

To change the MIDI channel, proceed as follows:

1. Disconnect the device from the power supply
2. Press and hold the **White Button** and restore the power while the button is pressed.
3. After the boot process is complete, the LED above the white button starts to flash white. Press the white button according to the number of the desired channel (e.g. twice for channel 2). The **HYDRA4X** acknowledges this by emitting short flashing pulses corresponding to the number of the channel.
4. Once the desired channel is set, press and hold the white button until the LED stops flashing.
5. Disconnect the supply voltage. The next time the **HYDRA4X** is started, it reacts to the selected MIDI channel.

To put the **HYDRA4X** in omni mode skip step 3.

MIDI Commands for Controlling the Loops

To enable or disable the loops by MIDI command, or choose a position in the signal chain, use the following CC commands:

CC	#	Function
Loop Red: CC 20 Loop Green: CC 21 Loop Blue: CC 22 Loop Yellow: CC 23	0	Disable Loop
	1	Enable Loop
	2	Toogle Loop (On to Off and Off to On)
	10	Set Loop to Position 1 and keep state
	11	Set Loop to Position 1 and enable it
	20	Set Loop to Position 2 and keep state
	21	Set Loop to Position 2 and enable it
	30	Set Loop to Position 3 and keep state
	31	Set Loop to Position 3 and enable it
	40	Set Loop to Position 4 and keep state
	41	Set Loop to Position 4 and enable it

MIDI Command for Setting the Loop Order

The order of all loops can be set with a single command:

CC	#	Order				#	Order			
CC 24	0	Yellow	Blue	Green	Red	12	Yellow	Green	Red	Blue
	1	Blue	Yellow	Green	Red	13	Green	Yellow	Red	Blue
	2	Yellow	Green	Blue	Red	14	Yellow	Red	Green	Blue
	3	Green	Yellow	Blue	Red	15	Red	Yellow	Green	Blue
	4	Blue	Green	Yellow	Red	16	Green	Red	Yellow	Blue
	5	Green	Blue	Yellow	Red	17	Red	Green	Yellow	Blue
	6	Yellow	Blue	Red	Green	18	Blue	Green	Red	Yellow
	7	Blue	Yellow	Red	Green	19	Green	Blue	Red	Yellow
	8	Yellow	Red	Blue	Green	20	Blue	Red	Green	Yellow
	9	Red	Yellow	Blue	Green	21	Red	Blue	Green	Yellow
	10	Blue	Red	Yellow	Green	22	Green	Red	Blue	Yellow
	11	Red	Blue	Yellow	Green	23	Red	Green	Blue	Yellow

MIDI Command to Swap Loops

To swap the order of two loops, use the following command:

CC	#	Trails Loops	#	Trails Loops
CC 25	0	Red ↔ Green	3	Green ↔ Blue
	1	Red ↔ Blue	4	Green ↔ Yellow
	2	Red ↔ Yellow	5	Blue ↔ Yellow

MIDI Command for Volume

To set the volume use the following commands:

CC	#	Boost/Att.	#	Boost/Att.	#	Boost/Att.	#	Boost/Att.
Loop Vol: CC 26 Post Vol: CC 27	0	Mute	4	-15dB	8	-3dB	12	+6dB
	1	-24dB	5	-12dB	9	Unity Gain	13	+8dB
	2	-21dB	6	-9dB	10	+2dB	14	+10dB
	3	-18dB	7	-6dB	11	+4dB	15	+12dB

MIDI Command for Loop Volume Position

The position of the loop volume can be set with the following command:

CC	#	Loop Vol. Pos.	#	Loop Vol. Pos.
CC 28	0	After the input buffer, before all loops	9	After loop Red
	1	Before loop Red	10	After loop Green
	2	Before loop Green	11	After loop Blue
	3	Before loop Blue	12	After loop Yellow
	4	Before loop Yellow		

MIDI Command for Mixer Trails

To set the mixer to trails, use the following command:

CC	#	Trails Loops	#	Trails Loops	#	Trails Loops	#	Trails Loops
CC 29	0	Off	4	Blue	8	Yellow	12	Yellow + Blue
	1	Red	5	Blue + Red	9	Yellow + Red	13	Yellow + Blue + Red
	2	Green	6	Blue + Green	10	Yellow + Green	14	Yellow + Blue + Green
	3	Red + Green	7	Blue + Red + Green	11	Yellow + Red + Green	15	Yellow + Blue + Green + Red

MIDI Command for Mixer Parallel Clean Blend

The following command sets the mixer to a single branch, so it works like a clean blend.

CC	#	Loop Parallel to Clean	#	Loop Parallel to Clean	#	Loop Parallel to Clean	#	Loop Parallel to Clean
CC 30	0	Off	4	Blue	8	Yellow	12	Yellow + Blue
	1	Red	5	Blue + Red	9	Yellow + Red	13	Yellow + Blue + Red
	2	Green	6	Blue + Green	10	Yellow + Green	14	Yellow + Blue + Green
	3	Red + Green	7	Blue + Red + Green	11	Yellow + Red + Green	15	Yellow + Blue + Green + Red

MIDI Command for Mixer Parallel Loops

With the following command the mixer is set to two branches, so they're parallel to each other.

CC	#	Parallel Loops	#	Parallel Loops
CC 31	0	- -	13	Blue Red + Yellow
	1	Red Green	14	Blue Green + Yellow
	2	Green Blue	15	Blue Red + Green
	3	Blue Yellow	16	Yellow Red + Green
	4	Green Yellow	17	Yellow Red + Blue
	5	Red Blue	18	Yellow Green + Blue
	6	Red Yellow	19	Red + Green Blue + Yellow
	7	Red Green + Blue	20	Red + Blue Green + Yellow
	8	Red Green + Yellow	21	Yellow + Red Green + Blue
	9	Red Blue + Yellow	22	Red Green + Blue + Yellow
	10	Green Red + Blue	23	Green Red + Blue + Yellow
	11	Green Red + Yellow	24	Blue Red + Green + Yellow
	12	Green Blue + Yellow	25	Yellow Red + Green + Blue

MIDI Command for Split Loops

To save the split loops setting send the following MIDI CC commands one after another without sending anything else in between: CC 09 18, CC 09 52, CC 09 03.

CC	#	Trails Loops	#	Trails Loops	#	Trails Loops	#	Trails Loops
CC 32	0	No Split Loops	4	Loop 3	8	Loop 4	12	Loop 3 + 4
	1	Loop 1	5	Loop 1 + 3	9	Loop 1 + 4	13	Loop 1 + 3 + 4
	2	Loop 2	6	Loop 2 + 3	10	Loop 2 + 4	14	Loop 2 + 3 + 4
	3	Loop 1 + 2	7	Loop 1 + 2 + 3	11	Loop 1 + 2 + 4	15	All Loops

Troubleshooting

Problem	Possible Solution
One or more of the loops won't turn on, when I send MIDI commands or use the buttons.	You might have set up a parallel path and enabling these loops will break the rules for parallel paths. In that case these loops won't turn on. Disable the mixer and try again.