# DIRECTRE

Operation Manual

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DIRECTRE

Introduction

DIRECTRE is an audio routing utility device for Reason that allows switching of eight audio channels. Enabling and disabling of the eight audio channels can be locked to tempo, which makes Directre suited for timing critical situations of a live performance. Additionally there are two global fade in/fade out controls selectable per channel.

Directre can serve as a 1x8 splitter device or as an 8x1 summing bus. Additionally, you can patch directly into a channel and use the quantized switch control as an insert on an audio signal.

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Control Overview
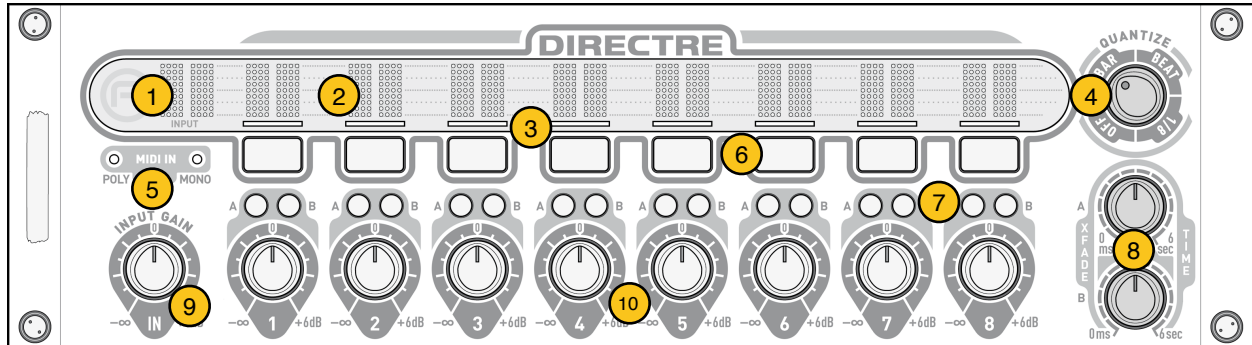
#	Control	Function
1	**Main Display**	Input and Output VU Meters
2	**Channel VU Meters**	Output Level VU Meters (Ch 1-8)
3	**Channel Status Lamps**	Channel Routing Indicator Lamp (Ch 1-8)
4	**Quantize**	Switch Synchronization Mode
5	**MIDI Activity**	Indicators for Poly and Mono mode activity
6	**Channel Switches**	Manual Activator Switches (Ch 1-8)
7	**Channel Xfade Selectors**	Selects Xfade A or B Time (Ch 1-8)
8	**Xfade Time**	Xfade A and B duration adjustment 0ms to 6 sec
9	**Input Gain**	Stereo Input Gain Control
10	**Channel Level Knobs**	Output Level Control (Ch 1-8)

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Rear Panel Connections
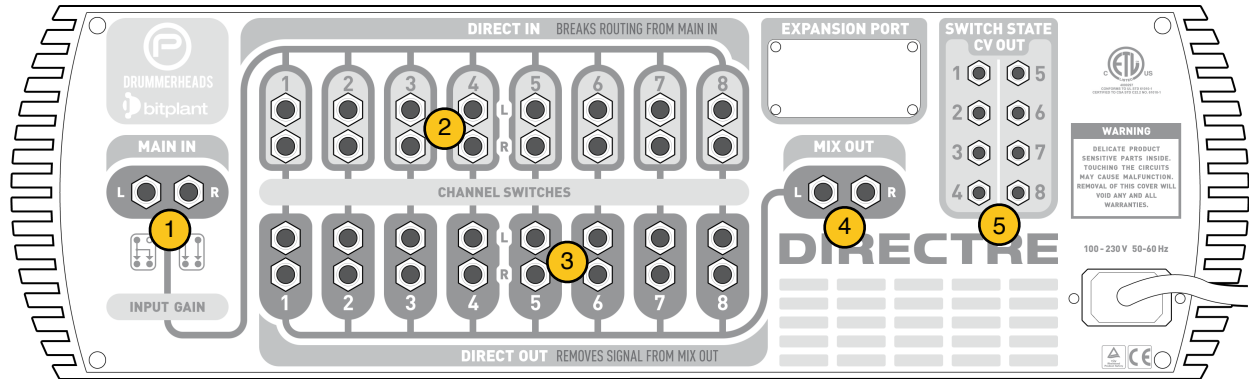
#	Connection	Function
1	**Main Input**	Stereo Audio Input that distributes to all Channels
2	**Direct Inputs (ch 1-8)**	Channel Direct Input Sockets
3	**Direct Outputs (ch 1-8)**	Channel Direct Output Sockets
4	**Mix Output**	Summed Output of Channels 1-8
5	**Switch State CV Outs**	CV Out - Channel 1-8 Switch On/Off States

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MIDI Functionality

The Channel Switches respond to incoming MIDI Note information. Directre channel triggers are duplicated along two ranges: When triggered in the range of C1 to C2, multiple channels are activated. When triggered in the range of D2 to D3, only one channel is activated while others are muted - essentially a solo channel mode. MIDI key control is subject to the Quantize Mode parameter, so channel switching can be locked to the tempo of the track.

When MIDI note information is received, the indicator LEDs on the front panel will illuminate.

The POLY LED will indicate when notes are in the range of C1 to C2 .

The MONO LED indicates when notes are in the range of D2 to D3.

Key	Action	
D3	Channel 8 Only	
C#3		
C3	Channel 7 Only	
B2	Channel 6 Only	
A#2		
A2	Channel 5 Only	
G#2		MONO MODE
G2	Channel 4 Only	
F#2		
F2	Channel 3 Only	
E2	Channel 2 Only	
D#2		
D2	Channel 1 Only	
C#2		
C2	Channel 8 On	
B1	Channel 7 On	
A#1		
A1	Channel 6 On	
G#1		
G1	Channel 5 On	POLY MODE
F#1		
F1	Channel 4 On	
E1	Channel 3 On	
D#1		
D1	Channel 2 On	
C1	Channel 1 On	

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Channel Switch Behavior

MIDI Keyboard control is designed as additional mechanism to trigger Directre Channel Switches momentarily, in real-time. When MIDI notes are received from a keyboard or sequencer lane, the Channel Switches may or may not change depending on the current switch state. The following section describes these scenarios and the mechanics of Directre switch behaviors.

Channel Control
Each Channel Switch can be closed (enabled) in one of three ways: via the Channel Enable Button on the front panel, a single MIDI note in the POLY range, or a single MIDI note in the MONO range. For example Channel 1 can be activated by clicking on the Channel 1 Enable Button, by sending MIDI note C1, or by sending MIDI note D2. If the Channel 1 Enable button is ON, *and* Directre receives a MIDI Note ON C1 message, the channel switch simply stays on. *Provided that two* <u>single</u> *control events cause a similar action, there is no apparent change to the switch states.*

Multi Channel ON Overlaps
Because the POLY Keys and Channel Enable Buttons both serve to close multiple channel switches, the two event types work in tandem to enable routings. For example if POLY Keys C1 through F1 are pressed, channel switches 1 through 4 are closed. Then by clicking on Channel Enable Buttons 5 through 8, channel switches 5 to 8 are closed without affecting channels 1 through 4. Provided there are no overlapping event conflicts between the POLY keys and Channel Enable Buttons, the two can work together. However when there are overlaps in controls that conflict, certain rules will determine the result.

Last Event Priority
Directre responds to the last event received from a MIDI source or the Channel Enable Buttons, and in most situations this is how the outcome is determined for events which may cause conflicting switch states. For example if Directre is receiving a MIDI NOTE ON C1 message which causes Channel Switch 1 to close, and then the Channel 1 Enable button is disabled, the channel switch will open. The Enable Button OFF change comes *after* the MIDI ON event, so *the last control event has priority over channel switch control.*

Channel Enable Buttons, POLY Keys, and MONO Keys function in groups of controls, and the 'Last Event Priority' rule can function slightly differently based on event arrangement. Channel Enable Buttons and POLY Keys work to close (turn on) multiple switches simultaneously, while a MONO Key opens (turn off) multiple switches simultaneously. If a group of POLY Keys are held, and then a MONO Key is pressed, the MONO channel will close while all other channels are opened. When the MONO Key is released, the POLY Keys and the Channel Enable Buttons states will become active. If a MONO key is held first before a range of POLY Keys, the Last Event Priority

rule will take effect, and the POLY Key as well as Channel Enable Button states will become active.

Channel Enable Button vs. MONO/POLY Keys

Pressing a Channel Enable Button can disable an active MONO Key event. If a MONO Key is held and any Channel Enable button is clicked either ON or OFF, the MONO mode is interrupted. The only way to restore MONO mode is to release the key and press it again. This behavior functions similarly if you are holding a POLY Key to close a channel switch. If the Channel Enable Button is changed to an OFF state, the Last Event Priority rule will take precedence and the channel switch opens while a POLY Key is held.

POLY Keys Legato OFF Mode

As described above, POLY Keys and Channel Enable Buttons normally work together to close the channel switches, however there is one situation where POLY Keys can override Channel Enable Button States and open channel switches. If multiple POLY Keys are held and released one-by-one, the channel switches associated with the key will open until all keys are released. This is an extension of the Last Event Priority rule that takes precedence over the multi-channel on behavior. For example, Channel Enable 1 through 6 are on, and all POLY Keys are held down, all channel switches will be active. When keys D1 and E1 are released, the corresponding channel switches open even though the Channel Enable buttons are active.
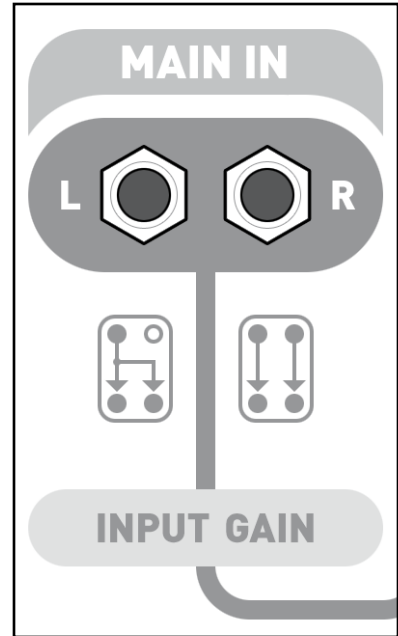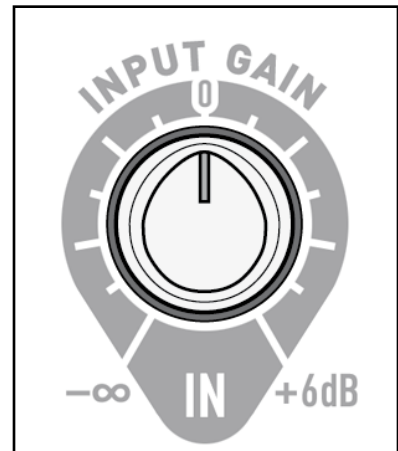
Main Input and Input Gain

MAIN IN SOCKETS
The Directre Main In is a stereo or normalled mono audio input.

Typically you will be connecting stereo sources to this input, however A mono audio source, such as Subtractor, should be cabled to the Left input only. Cabling to only the Right socket will not function.
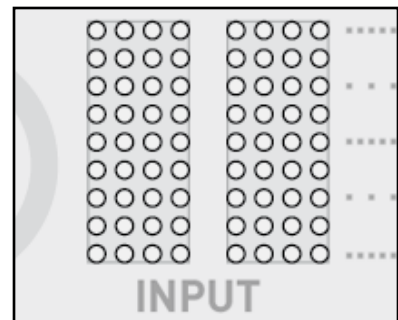
INPUT GAIN KNOB
The Main In signal level is controlled by the Input Gain on the front panel. The Level scaling ranges from –∞ dB to +6dB with a center detent at 0dB unity gain.

INPUT VU METER
The Main In VU meter will show the signal level after the Input Gain knob. This is the signal level that is distributed to the eight channels in Directre.

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Channel Controls

VU METER
Each Channel on Directre has a VU Meter that displays the signal level, post-switch, and post-gain.

INDICATOR LAMP
The Yellow Lamp under the VU indicates the status of the switch.
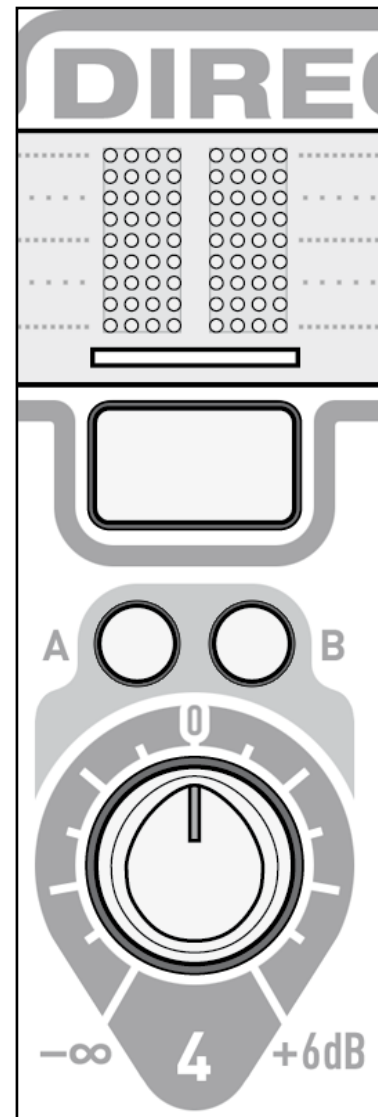
ENABLE BUTTON
The large button on each channel triggers the switch on or off.

XFADE SELECT
You can select one of two fade in - fade out times for each channel.

GAIN KNOB
The Level scaling ranges from –∞ dB to +6dB with a center detent at 0dB unity gain.

Tip: Put Directre in a combinator, and map a rotary control to two Channel Gain knobs. Set the modulation on one to a minimum value of +6dB and a maximum value of -inf dB. This creates an even crossfader between the two channels.

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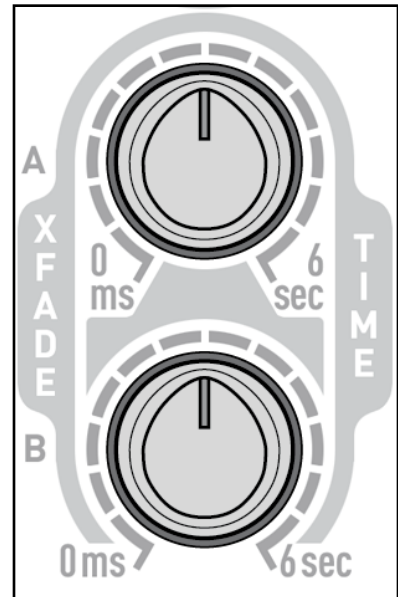# DIRECTRE

Global Controls

QUANTIZE
This knob will set the synchronization resolution of the channel switches. The BAR resolution is synchronized to a measure. BEAT setting synchronizes the switches to the time signature division. In most cases this is a 1/4 note. 1/8 setting synchronizes to an eighth note. The OFF setting disables synchronization, and the channel switches activate instantaneously.

XFADE TIME A & B
These controls set the global crossfade times. Both controls have a range of zero milliseconds (0ms) to six seconds (6000ms). By default, each channel is set to XFADE TIME A.

The fade in starts when a channel switch is activated, and the fade out starts when a channel switch is deactivated. This means the audio signal will fade out after the channel switch lamp goes off, and you will see the VU meter show the signal levels taper down.

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Signal Flow

The signal path through Directre is rather unconventional, primarily because it is designed to serve three main applications. Rather than creating three separate Rack Extension devices, the signal path is designed to handle multiple tasks dependent on how sound modules and effect devices routings.
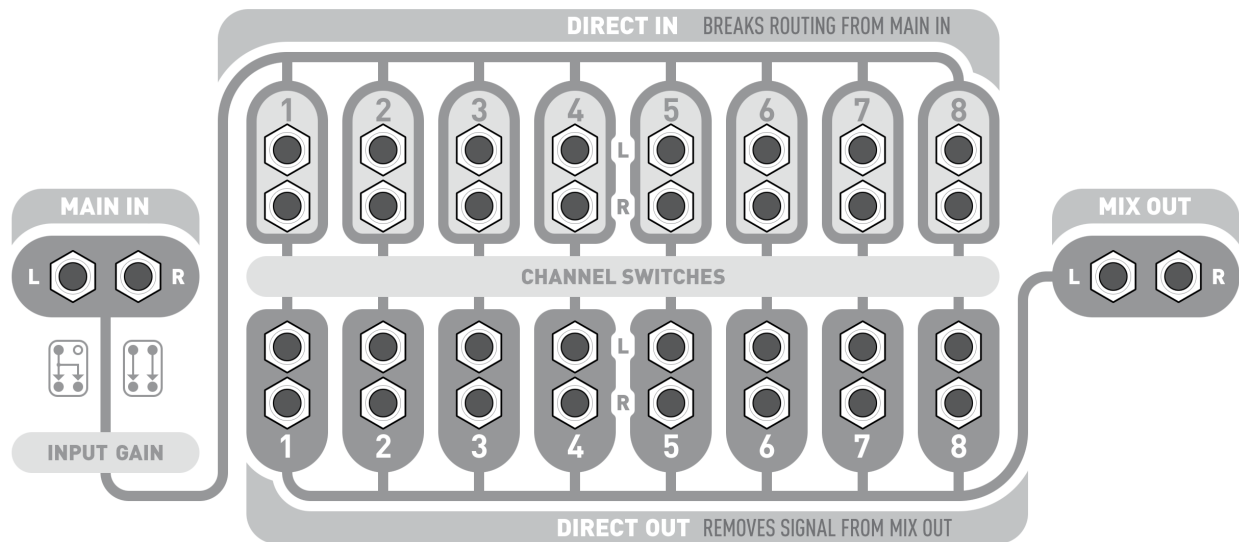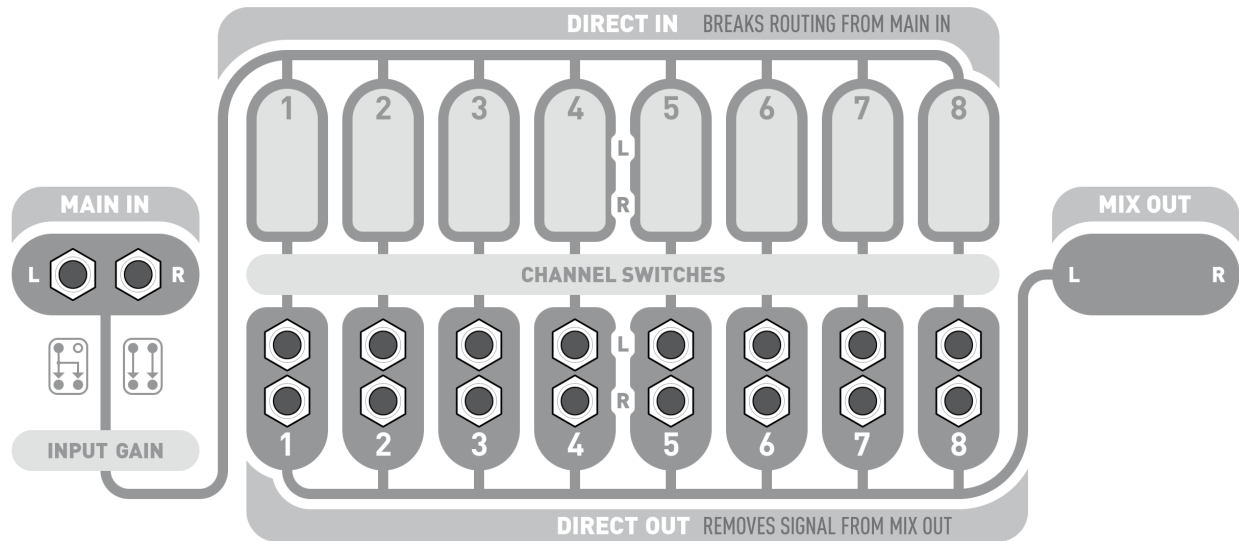

A signal connected to the MAIN IN sockets is routed to a distribution bus that feeds the signal to eight channels. The eight channels pass through their respective CHANNEL SWITCHES and then are mixed on a summing bus that connects to the MIX OUT sockets.

If a sound source is connected to a DIRECT IN socket, the signal from the MAIN IN is disabled to the channel.   When a Channel DIRECT OUT socket is connected to another device, the Channel signal is taken off the summing bus that goes to the MIX OUT sockets. You can completely bypass the distribution and summing buses by connecting a source to the DIRECT IN and routing the DIRECT OUT to a different signal path.

In the following pages, this manual will describe in better detail the practical applications of this design.

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Splitter

Directre can act as a 1x8 channel splitter, similar to the concept of the Spider Audio Splitter which is a 1x4 audio splitter.   With Directre, you can take one input signal and connect it to eight different signal paths. For example, you can take a Thor Synthesizer and route it to several reverbs, delays, compressors, etc. to create a heavily layered tone. In this manner, Directre becomes an FX send bus.

A signal connected to the MAIN IN sockets is routed through the distribution bus to the eight channels. The DIRECT OUT sockets are then the taps from the splitter which are then connected to various target devices or mix channels.   In this configuration, the summing bus and MIX OUT are not used, nor are the DIRECT IN sockets.

The Channel Enable buttons should be ON for the signals to pass to each of the splitter taps.

For a splitter configuration, the DIRECT IN sockets and MIX OUT sockets are not used, which means the summing bus is completely bypassed.

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Splitter

Directre can function as splitter for AUX SENDs of rack devices such as Kong Drum Designer or Redrum Drum Computer.   This allows you to expand the external processing functionality while maintaining the work flow in the rack.

In the example pictured below, Kong's AUX SEND 1 is routed into Directre and the DIRECT OUT sockets are connected to a battery of effects.

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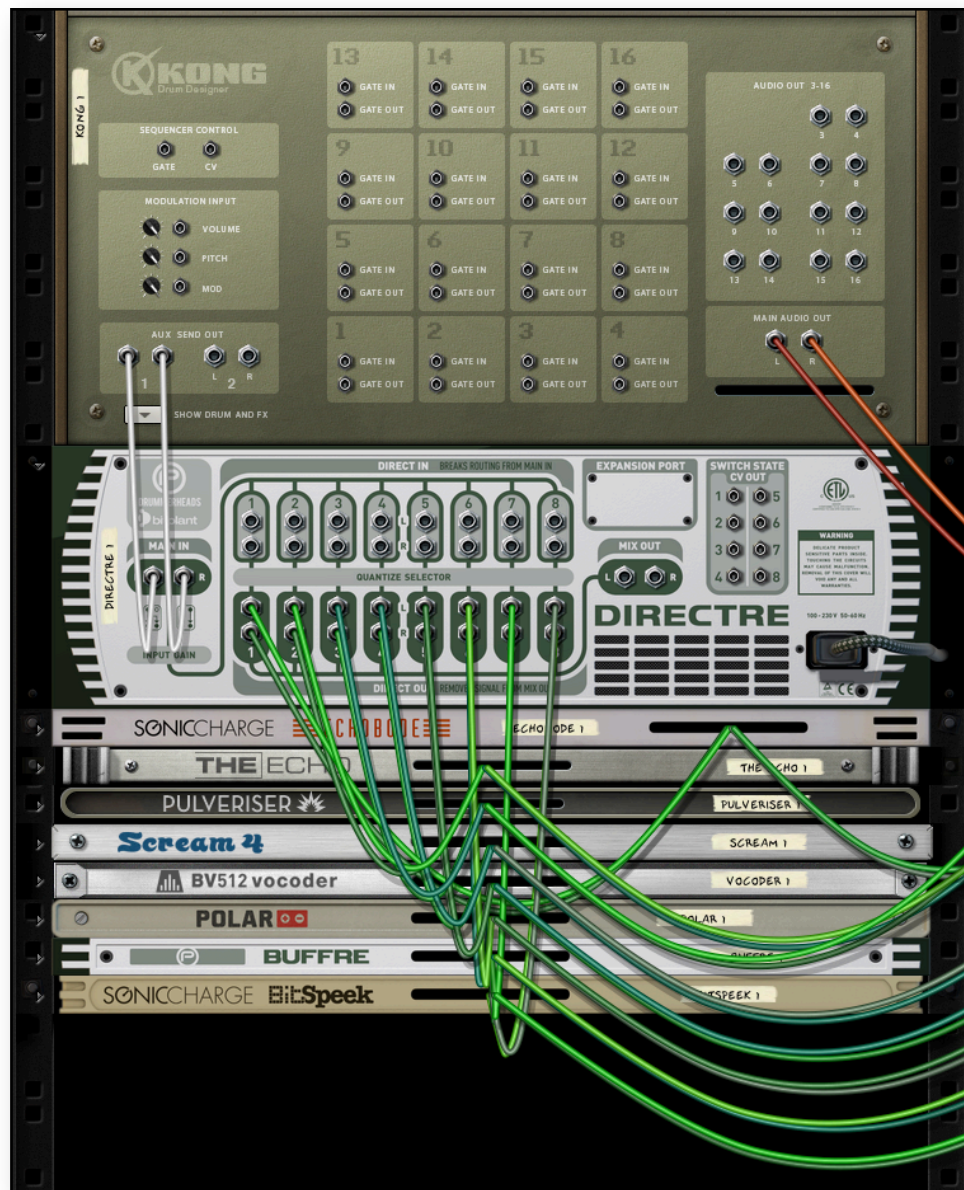
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Summing Bus/Mixer

Directre can combine different signals like a mixer or Spider Audio. Technically this is not a full fledged mixer, because panning and fx send functionality is omitted from the design, however the Channel Switches can be configured for mute or solo action via MIDI. This 8x1 summing bus configuration is the most common way to use Directre.
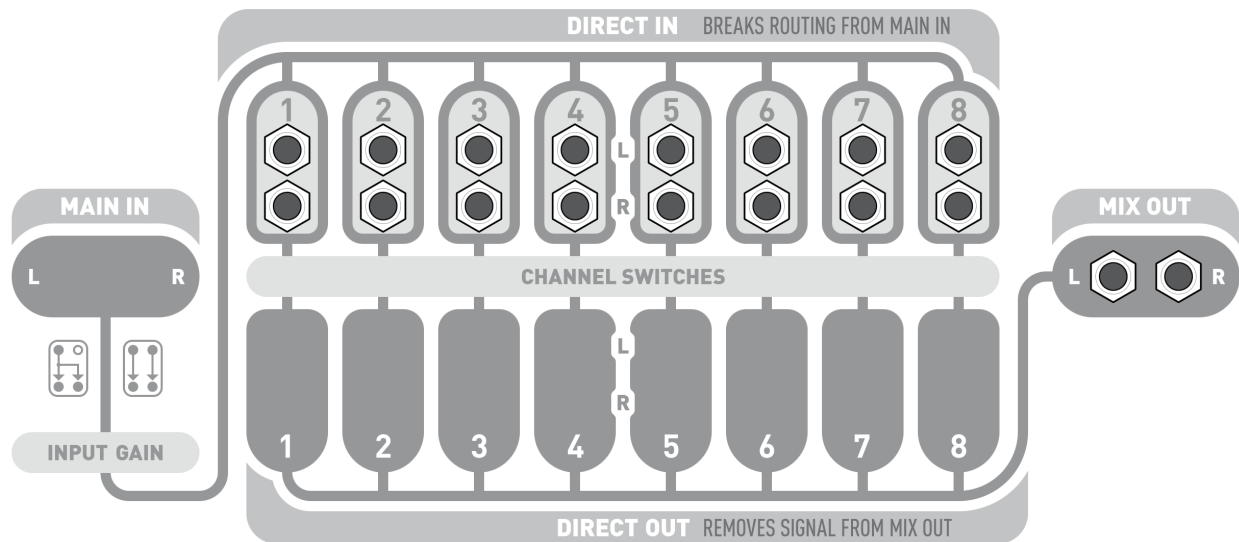
Incoming signal sources are connected to the Channel 1 - 8 DIRECT IN sockets. These signals pass through the Channel Switches and are combined on the summing bus which passes to the MIX OUT sockets.
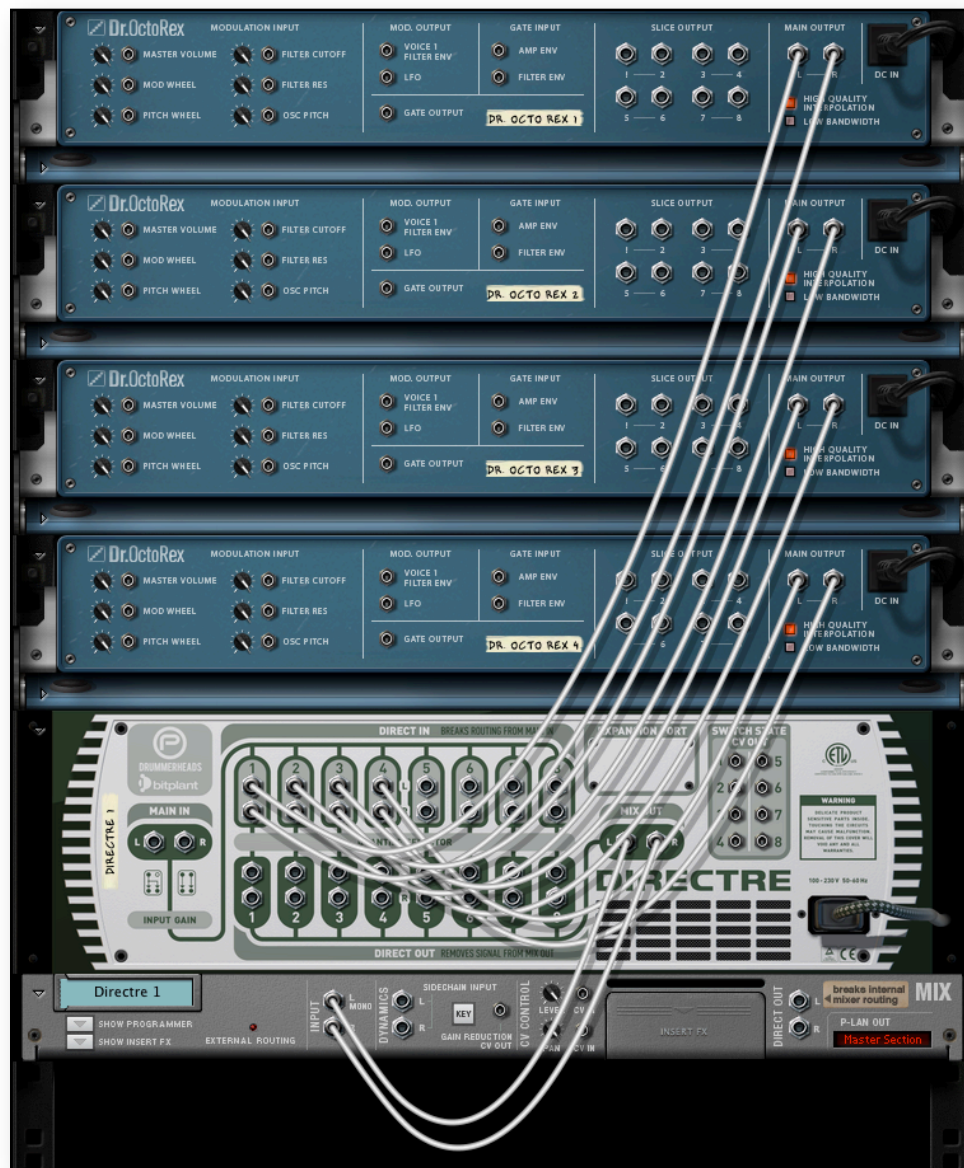
The Channel Enable Button now function as Mute controls (in reverse). Also MIDI Note messages can be used to trigger a solo function so that only one of the input signals passes to the summing bus.

In this application, the MAIN IN and DIRECT OUT connections are not used, and therefore the distribution bus is completely out of the signal path.

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Summing Bus/Mixer

Directre's synchronized switching and summing capabilities make it ideally suited for sub mixing Dr.OctoREX loop players. In the example below, the loop players are constantly playing, and the audio is switched in and out of the sub mix on Directre. The sub mix is then routed into a MIX CHANNEL.

This type of configuration allows for loop chopping, mixing, and real-time arrangement of loop material.

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Quantized Switch Inserts

The heart of Directre is the synchronized switching capabilities, and each individual channel can be used as an insert on a signal chain allowing you to create a performance switching system without sacrificing routings to mixer channels.
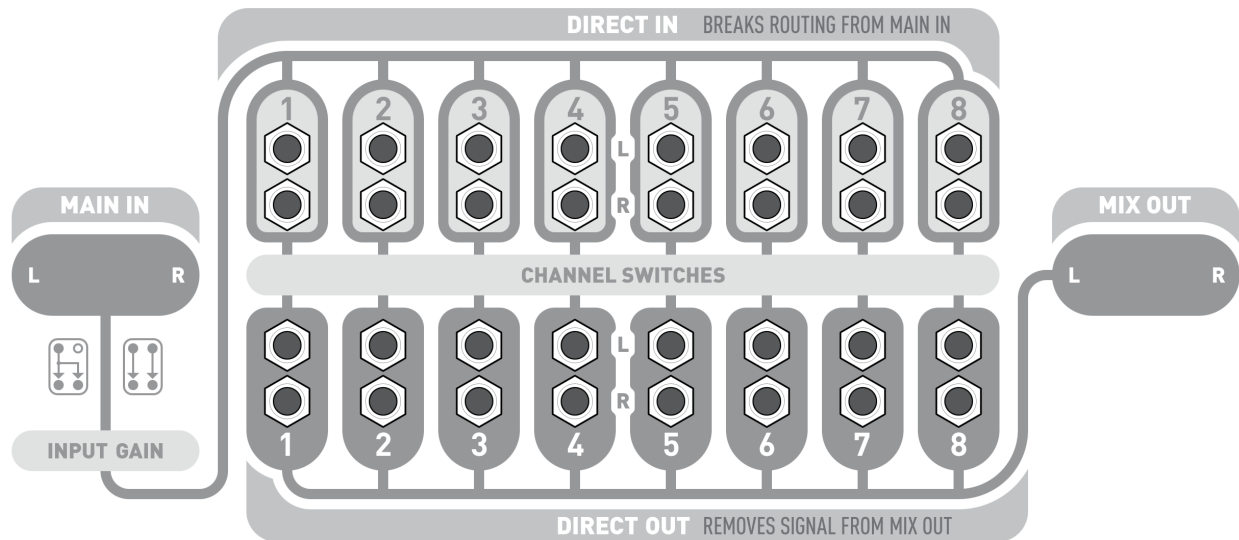
Incoming signal sources are connected to the Channel 1 - 8 DIRECT IN sockets. These signals pass through the Channel Switches then to external signal chains connected to the DIRECT OUT sockets.

The Channel Enable Button now function as Mute controls (in reverse). Also MIDI Note messages can be used to trigger a solo function so that only one of the input signals passes to the summing bus.

In this application, the MAIN IN and MIX OUT connections are not used, and therefore the distribution and summing busses are bypassed.

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*v1.0.1 operation manual*

Quantized Switch Inserts

The DIRECT IN and DIRECT OUT connections can be used to route individual channel switches as inserts between a source and the Reason Main Mixer. The image below illustrates a Redrum Drum Computer connected into Directre, with each of the channels routed to MIX CHANNEL devices.

This particular configuration is useful for those who want the real-time control of Directre as well as the fidelity and audio control of the Main Mixer.

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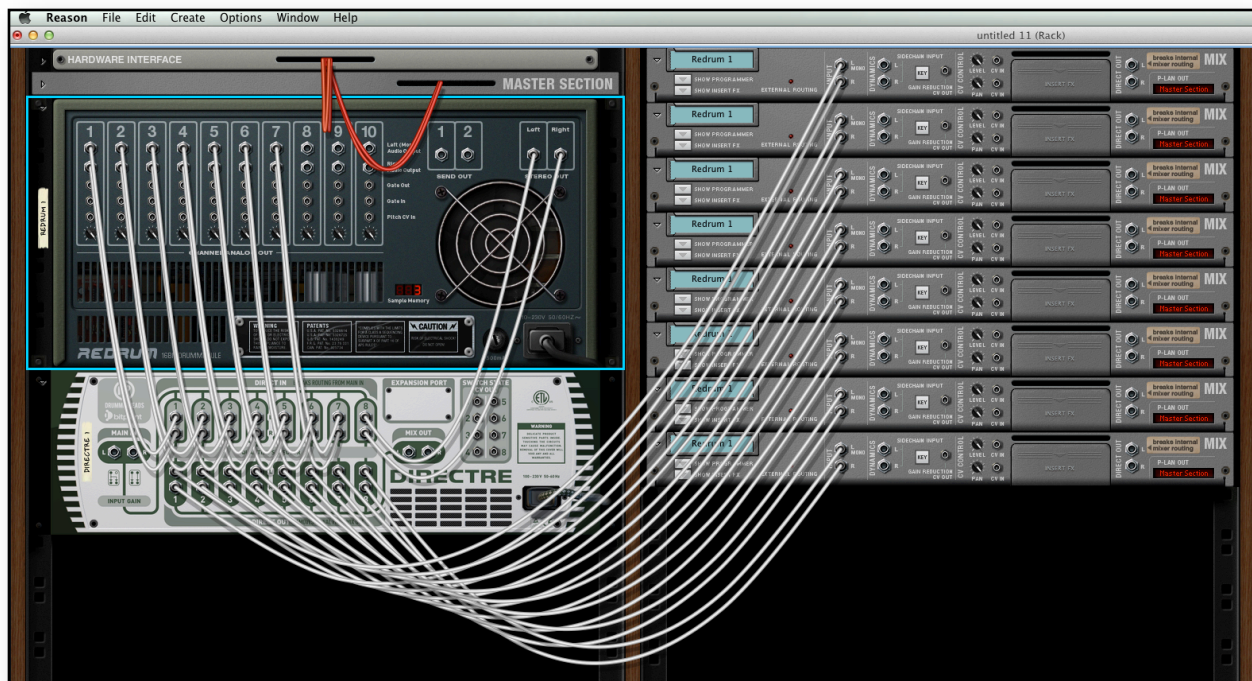
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Hybrid Splitter/Merger - Not Always a Good Idea

The summing and splitting capabilities can be used simultaneously if you're partially using signals. However please be aware that using one instance of Directre to act as a splitter and merger will induce latency on the signal path.
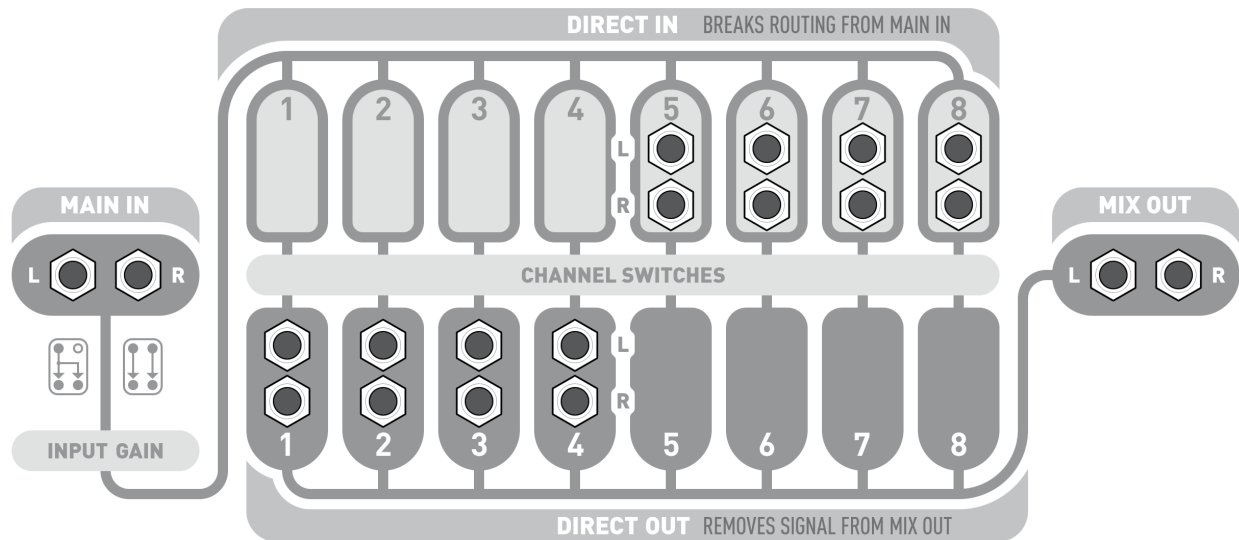

In the configuration above, the MAIN IN signal is split on the distribution bus to channels 1 through 4. Channels 1-4 are then routed to different signal paths via connections on DIRECT OUTs 1-4. This isolates the MAIN IN signal from the summing bus.

Channels 5-8 are isolated from the distribution bus by connections on the DIRECT IN sockets, this isolates channels 5-8 from the distribution bus and isolates the MAIN IN from the MIX OUT sockets.

Again, it is not recommended that you route signals from DIRECT OUT 1-4 to paths that connect back into DIRECT IN 5-8. This will induce latency on your signal path. Instead, use two instances of Directre, one as a dedicated splitter and another as a dedicated mixer.

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Splitter/Merger Recommended Usage

For creating a parallel fx array, it's recommended that you use two instance of Directre. The first instance acts as a splitter, and the second instance acts as a summing mixer. This will avoid any latency issues that arise if you create an audio loop through a single instance of Directre.
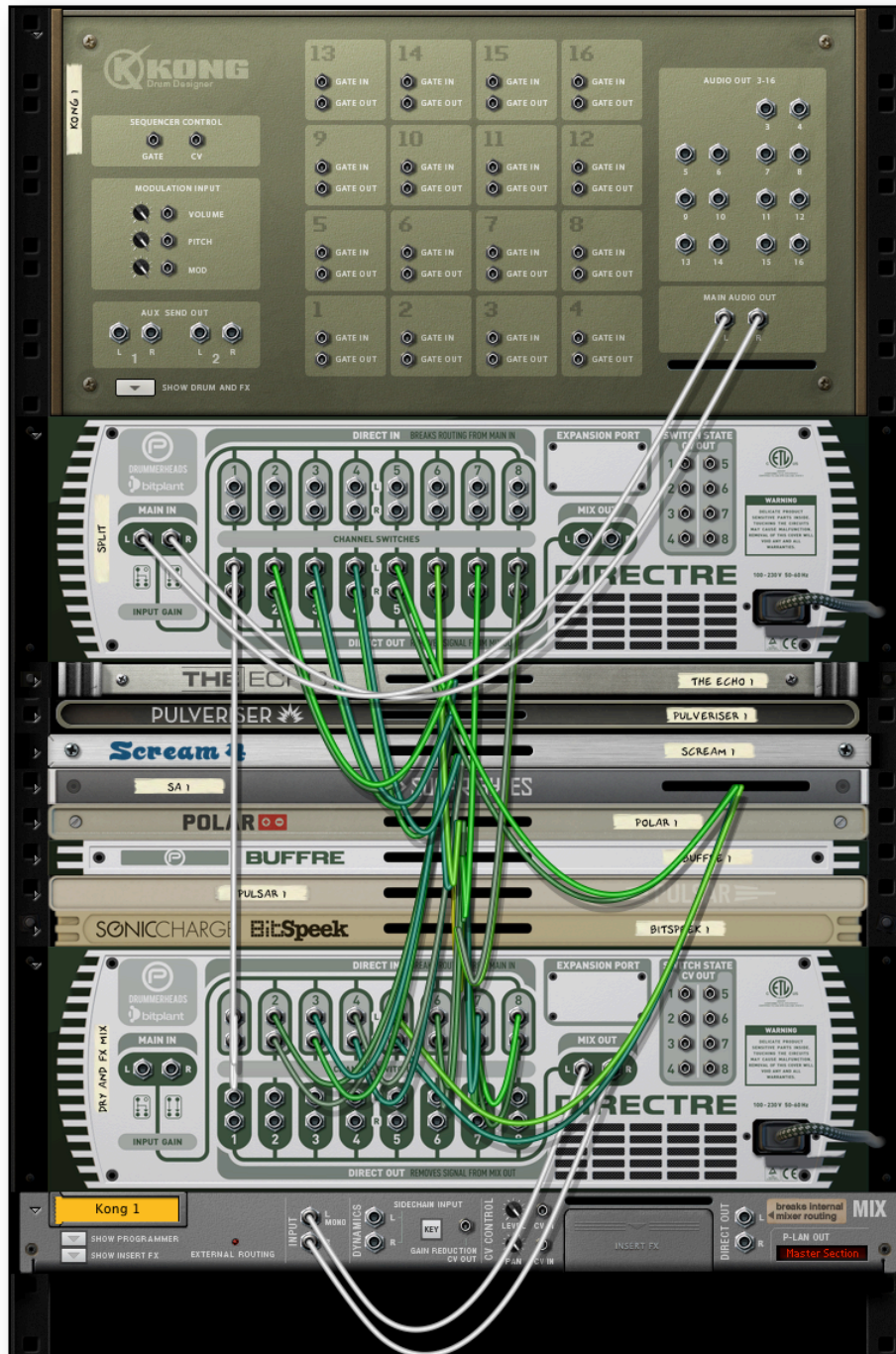
Stepped Attenuator

Not Originally Designed for this function, but Directre can be used as a stepped attenuator. With a source connected to the MAIN IN socket and the summed output routed from the MIX OUT. Because the distribution bus and summing bus will combine the same audio signal, the result is a boost in gain when each channel switch is enabled. This has limited applications, however it is important to note that a signal can become extremely loud if you use Directre in this manner.

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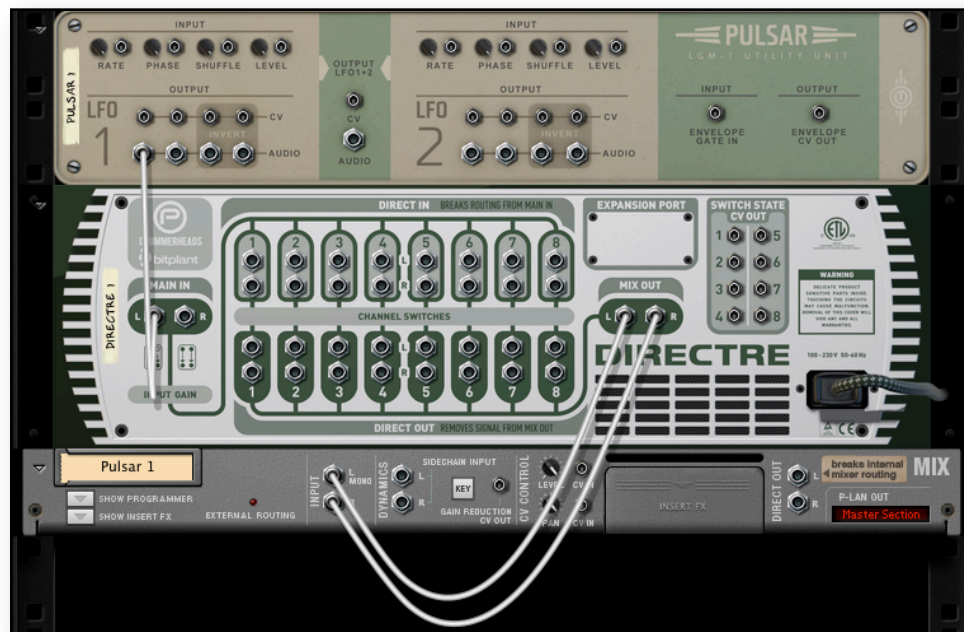
Control Voltage Connections

SWITCH STATE CV OUT

8 Control Voltage outputs are available which correspond to the status of each Channel Switch. This is a unipolar signal that is at zero when a switch is off and at 127 (1.0f) when a channel switch is active.

Because these CV outs are tied to switch activity, they are also locked to track tempo. The CV value mirrors the Channel Indicator lamps and are not affected by XFADE time.

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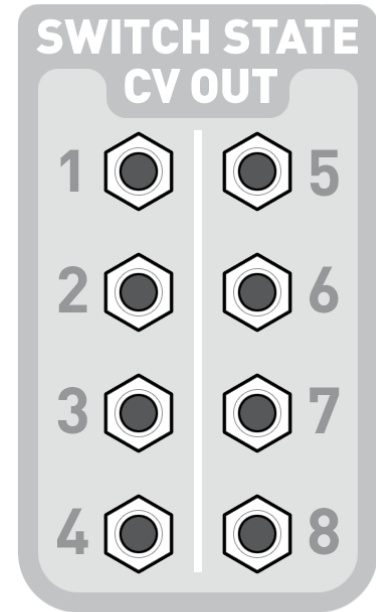
Control Voltage Connections

The Switch State CV Output sockets can be used to trigger a Buffre Beat Repeater with a Spider CV Splitter and Merger.

The image below shows the SS CV out connected to a Spider Splitter. One tap of the CV splitter is routed to the Buffre Gate input. The second tap of the splitter is routed into the merger, and the merger is then connected to the Buffre Note CV input. The trim knob is adjusted to a value of 44 which scales the Directre CV down to a Note CV value of G#1.

This technique could also be applied to trigger other devices in the Reason rack, such as synths, samplers, or other creative FX devices that respond to CV/Gate sequencer control.

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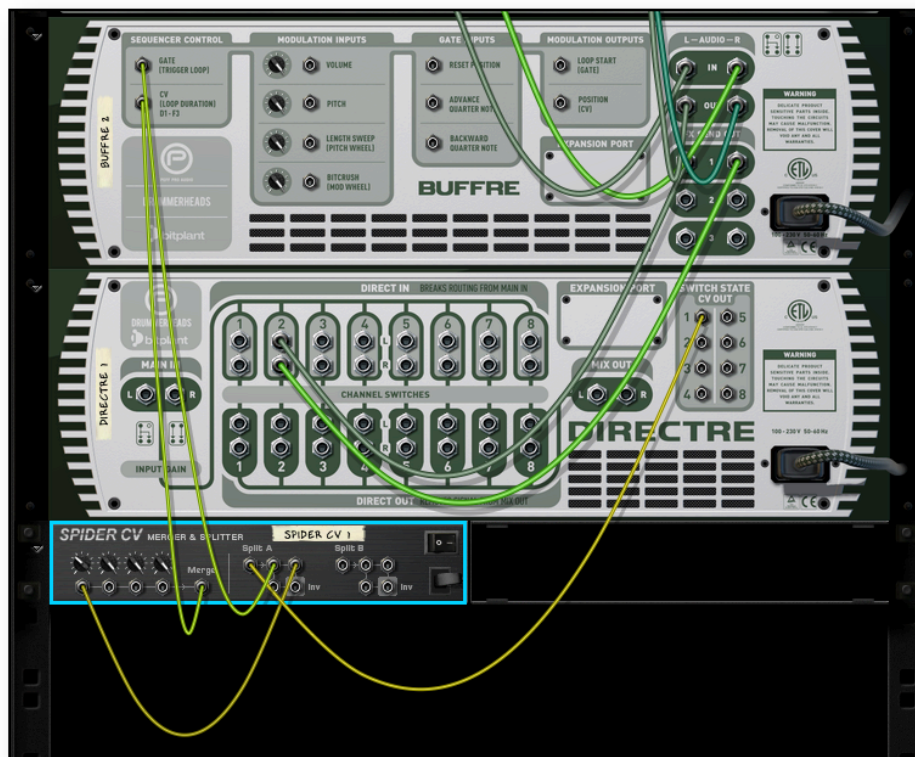
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MIDI Controller Chart

MIDI Controller #	DIRECTRE
7	Input Gain
12	Channel 1 Gain
13	Channel 2 Gain
14	Channel 3 Gain
15	Channel 4 Gain
16	Channel 5 Gain
17	Channel 6 Gain
18	Channel 7 Gain
19	Channel 8 Gain
20	Channel 1 Enable
21	Channel 2 Enable
22	Channel 3 Enable
23	Channel 4 Enable
24	Channel 5 Enable
25	Channel 6 Enable
26	Channel 7 Enable
27	Channel 8 Enable
28	Xfade A Time
29	Xfade B Time
30	Quantize Mode
40	Channel 1 Xfade
41	Channel 2 Xfade
42	Channel 3 Xfade
43	Channel 4 Xfade
44	Channel 5 Xfade
45	Channel 6 Xfade
46	Channel 7 Xfade
47	Channel 8 Xfade

Full MIDI implementation details have yet to be determined. These are the preliminary settings established for Directre but are subject to change.

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Remote Mapping for Generic MIDI Controllers

Remote Item
Quantize Mode
Enable 1
Enable 2
Enable 3
Enable 4
Enable 5
Enable 6
Enable 7
Enable 8
Crossfade Length A
Crossfade Length B
Crossfade Select 1
Crossfade Select 2
Crossfade Select 3
Crossfade Select 4
Crossfade Select 5
Crossfade Select 6
Crossfade Select 7
Crossfade Select 8
Input Gain
Gain 1
Gain 2
Gain 3
Gain 4
Gain 5
Gain 6
Gain 7
Gain 8

Code Snippet example for modifying remote maps.

```
Scope  Peff   com.peff.Directre
//     Control Surface Item      Key     Remotable
Item   Scale  Mode

Map    CC 7           Input Gain
Map    CC 12          Gain 1
Map    CC 13          Gain 2
Map    CC 14          Gain 3
Map    CC 15          Gain 4
Map    CC 16          Gain 5
Map    CC 17          Gain 6
Map    CC 18          Gain 7
Map    CC 19          Gain 8
Map    CC 20          Enable 1
Map    CC 21          Enable 2
Map    CC 22          Enable 3
Map    CC 23          Enable 4
Map    CC 24          Enable 5
Map    CC 25          Enable 6
Map    CC 26          Enable 7
Map    CC 27          Enable 8
Map    CC 28          Crossfade Length A
Map    CC 29          Crossfade Length B
Map    CC 30          Quantize Mode
Map    CC 40          Crossfade Select 1
Map    CC 41          Crossfade Select 2
Map    CC 42          Crossfade Select 3
Map    CC 43          Crossfade Select 4
Map    CC 44          Crossfade Select 5
Map    CC 45          Crossfade Select 6
Map    CC 46          Crossfade Select 7
Map    CC 47          Crossfade Select 8
```

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Remote Mapping

Koshdukai offers some more information on customizing Remote Maps:

http://koshdukaimusicreason.blogspot.pt/2012/06/rack-extensions-remote-side-of-it.html

```
//Remote Map template for    Utilities   PEFF: Directre Audio
Router
Scope Peff  com.peff.Directre
//    Control Surface Item   Key   Remotable Item    Scale Mode
//Map _control_         Quantize Mode
//Map _control_         Enable 1
//Map _control_         Enable 2
//Map _control_         Enable 3
//Map _control_         Enable 4
//Map _control_         Enable 5
//Map _control_         Enable 6
//Map _control_         Enable 7
//Map _control_         Enable 8
//Map _control_         Crossfade Length A
//Map _control_         Crossfade Length B
//Map _control_         Crossfade Select 1
//Map _control_         Crossfade Select 2
//Map _control_         Crossfade Select 3
//Map _control_         Crossfade Select 4
//Map _control_         Crossfade Select 5
//Map _control_         Crossfade Select 6
//Map _control_         Crossfade Select 7
//Map _control_         Crossfade Select 8
//Map _control_         Input Gain
//Map _control_         Gain 1
//Map _control_         Gain 2
//Map _control_         Gain 3
//Map _control_         Gain 4
//Map _control_         Gain 5
//Map _control_         Gain 6
//Map _control_         Gain 7
//Map _control_         Gain 8
```

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Be Cool and Make Music!

TECHNOLOGY

Propellerhead REASON and Rack Extensions
Propellerhead Software AB, Stockholm, Sweden

PEFF - Rack Extension Design and Development
Hayden Bursk, Kurt Kurasaki, Thomas Merkle, Wolfgang Merkle

thanks to ddrex, dice, and mihara for localization help!

made in Sweden, Germany, and California

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