MIXMASTER

USER MANUAL

MIND MELD


MIXMASTER
The MindMeld MixMaster is the most advanced, fully featured and customisable studio mixing console emulation available in VCV Rack.
The MixMaster's mission is to explore strange new sonic worlds and boldly go where no Rack mixer has gone before!
MIND MELD

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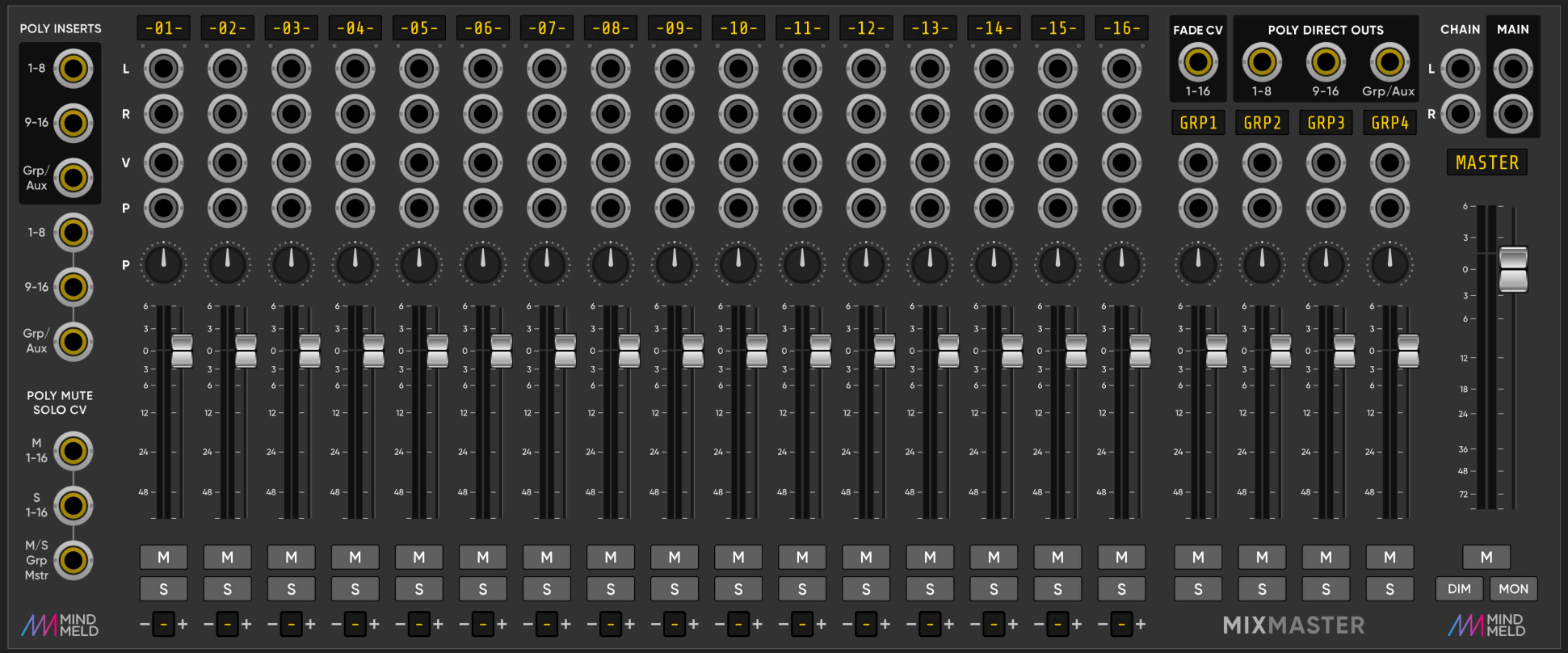
MIXMASTER

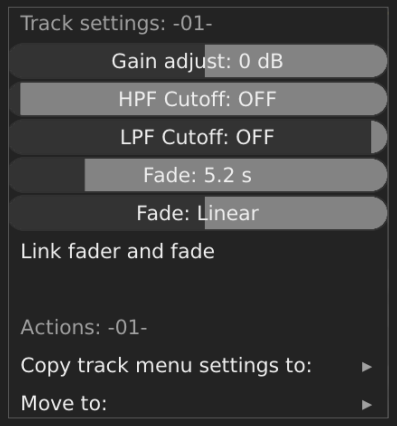


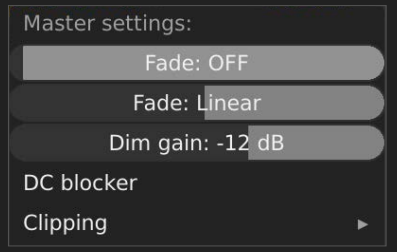
MindMeld MixMaster is an advanced, powerful and customisable studio mixing console emulation with a professional tool set which gives you the kind of precision and control over your mix which up to now could only be achieved in a DAW.

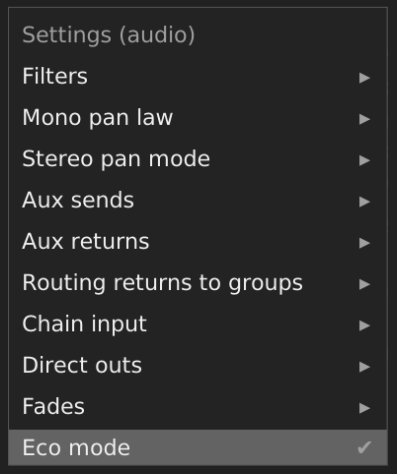
- 16 mono/stereo tracks
- 4 Group busses and 4 Aux busses (with AuxSpander)
- Editable Track Labels/Scribble Strips
- Gain adjustment (Trim) on every track (± 20dB)
- Hi Pass Filter (HPF) on every track (18 dB/oct.)
- Low Pass Filter (LPF) on every track (12 dB/oct.)
- Fade automation with lin/log/exp curves
- Track Re-ordering and copy/paste settings
- User selectable pan law
- Stereo balance and true stereo panning
- Accurate RMS and Peak VUs with peak hold
- User selectable VU colour and display colour
- Long fader runs and fader linking
- Inserts on every track and bus
- Direct outs for every track and bus
- Flexible signal routing options
- Chain Input (pre/post Master)
- Dim and fold to mono on the Master
- CV Visualisation
- CV control over just about everything...

QuickStart

The main things you need to know...







TRACK/BUS LABELS

Track/Bus labels are editable. Double click on the label text to select and edit it. These labels are automatically copied over to AuxSpander when it is attached.

TRACK/BUS MENU SETTINGS

Right-click on track/ bus labels (including the Master) to access the contextual track and bus menu settings. This is where you will find settings for gain adjustment, high pass and low pass filters and fade automation etc, as well as optional settings such as display colour and VU colour when they have been set to "Set per track" in the global menu settings.

AUXSPANDER

AuxSpander is an expander that adds 4 aux busses to MixMaster and it must be placed directly to the right of it.

ECO MODE

Eco mode is turned on by default on MixMaster (in the global settings menu) and it can save a considerable amount of CPU. Eco mode means that pan knob and fader movements (and their associated CV inputs) are sampled at audio rate / 4. When Eco mode is turned off, they are sampled at full audio rate. The audio signal itself is always at full audio rate.

The impact on sound quality is minimal – if you put a sine wave through the mixer and move the pan knob or fader back and forth very quickly (or modulate them quickly), then you may see a slight harmonic introduced at around 12kHz on an analyser. This is something that can be seen rather than heard we believe... In other words, it's fine to use Eco Mode for every-thing other than the most critical recordings.

OTHER WAYS TO SAVE CPU

Every effort has been made to make MixMaster CPU efficient to begin with, but along with Eco mode, there are a few other things you can do to cut down on CPU use if necessary.

- Set mono pan law to linear (either 0dB or 6dB)
- Set stereo pan mode to linear balance
- Turn off CV visualisation in global settings
- Turn on Cloaked mode in global settings which turns off all VUs except for the Master VU (it also turns off CV viz)

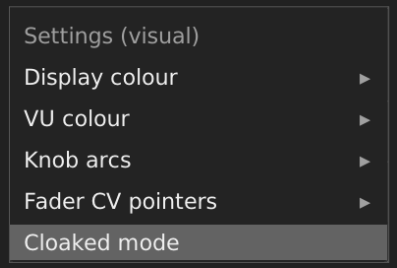
VU CALIBRATION AND HEADROOM

MixMaster has headroom built in. The VUs on the track, group and aux bus VUs are callibrated such that 0dB = 5 volts. This means they will not start clipping/distorting until they reach +6dB (10v). We recommend you aim to keep tracks below 0dB but the occasional peak above will not do any harm as long as it stays below +6dB.

On the Master bus it's different - there the VU is calibrated such that 0dB = 10v and anything above 0dB will clip (in hard clip mode) or above +1.58dB (in soft clip mode). For more details and explanation of these differences in calibration, see page 10.

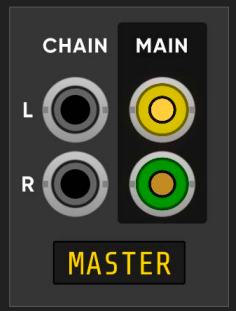
POLYPHONIC INPUTS & OUTPUTS

MixMaster utilises polyphonic inputs for Mute & Solo CV and also for CV control of the sends and busses on AuxSpander. It uses polyphonic outputs for inserts, direct outs and fade CV. Polyphonic jacks have a gold coloured ring inside making them easy to identify and differentiate from regular jacks which have a grey ring inside. They carry 16 channels each and should be used with VCV Merge and Split modules respectively.



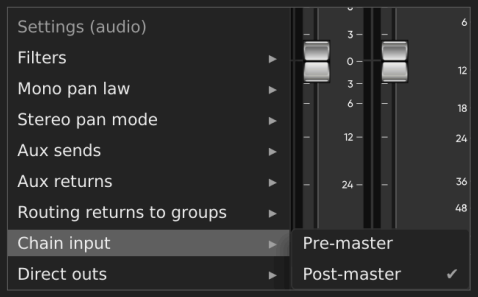
Audio Inputs & Outputs

Track Inputs, Chain Input, Main Out and Direct outs



Above: Track inputs with a mono input in Track 1 and a stereo input on Track 2

Right: Chain input and Main output



Chain input global menu settings

INPUTS

Track inputs: MixMaster has 16 mono/stereo track inputs, each with a Left (**L**) and Right (**R**) jack. For mono signals, use only the Left (**L**) jack. For stereo signals, use both the Left (**L**) and Right (**R**) jacks.

Poly Summing: Polyphonic signal inputs will be summed. Poly summing adds all the channels in a poly cable together, in order to pre-mix all the audio content being carried by a polyphonic Rack cable. With this feature, you can send a polyphonic voice directly into a track input and not lose any musical content.

Chain Input: The Chain input is designed to take a signal - usually another stereo mix or sub-mix which has been already been levelled - and combine it with the output of MixMaster.

The Chain input can be set to Pre-master or Post-master in the global settings. Pre-master means that the signal goes through the master fader - it will show on the master VU and be affected by all master fader controls and track menu settings. Post-master means that the signal bypasses the master fader and goes directly to the main out. For safety reasons however, the Post-master setting will still honour the DC Blocker and Clipping settings in the Master track menu settings (see page 15).

OUTPUTS

Main Out: The main output of MixMaster provides a stereo mix of all the signals passing through the mixer. There is a Soft Clip applied on the output by default and an option to add a DC Blocker - these settings can be managed in the Master track menu (see page 15).

Direct Outs: MixMaster features Direct Outputs for every track and bus - that's 16 tracks, 4 group and 4 aux busses (when Auxspander is connected), making a total of 24 stereo direct outs. The Direct Outs are very useful for multi-track recording.

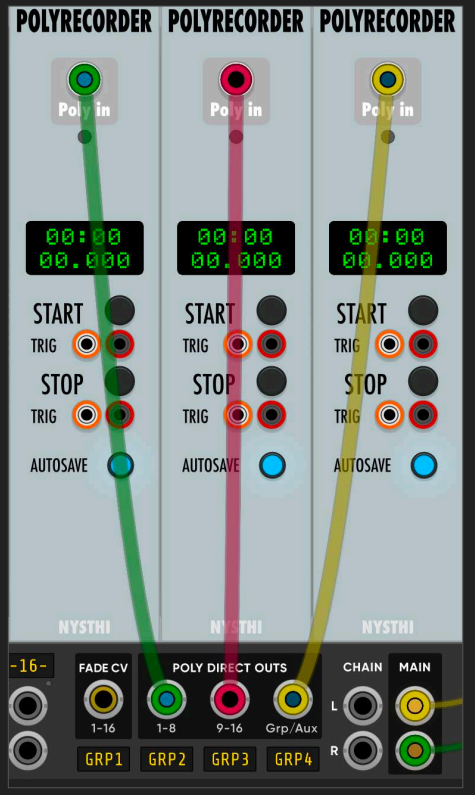
The Direct Out jacks on MixMaster are polyphonic meaning that 8 stereo tracks (16 channels) of audio can pass through each jack. The 3 polyphonic direct out jacks on MixMaster carry stereo signals for tracks 1-8, 9-16 and the Group/Aux bus tracks respectively. On the 1-8 jack, Track 1 will go out on channels 1 (L) and 2 (R), Track 2 will go out on channels 3 (L) and 4 (R) and so on up to Track 8 on channels 15 (L) and 16 (R). Then Track 9 will be on channels 1 (L) and 2 (R) of the 9-16 jack and so on.

Direct Outs (Global Setting)

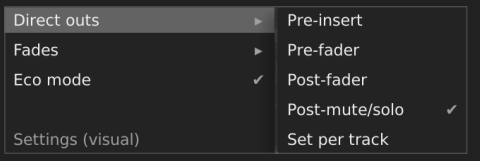
MixMaster's flexible signal routing offers 4 different 'tap points' from where track signals can be pulled and sent to the direct outs. You can select the tap point you want to use in the global settings menu. The 4 tap points are:

- Pre-insert
- Pre-fader
- Post-fader
- Post mute-solo

The tap points can all be 'Set per track' in global settings which means a Direct Outs setting will then appear in each track menu.



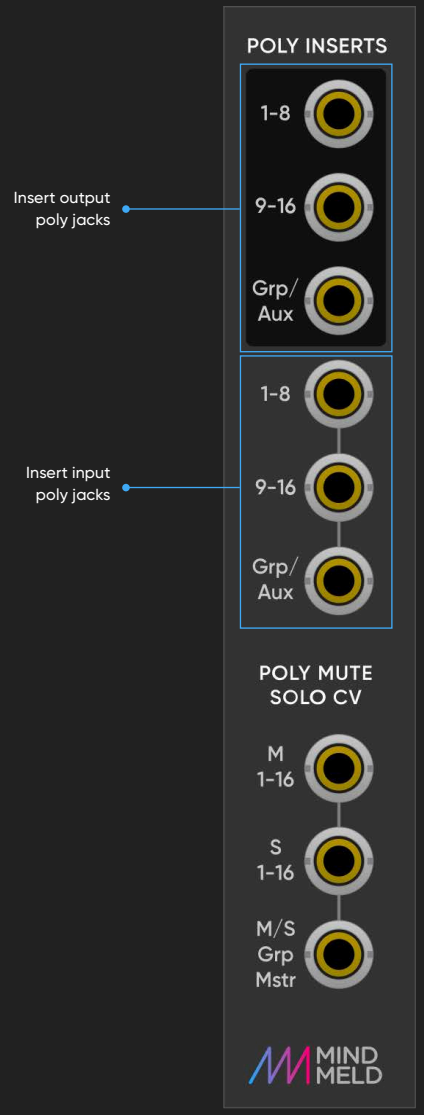
Polyphonic direct out jacks connected to Nysthi Polyrecorders for 24 tracks of multi-track recording



Direct outs global menu settings

Audio Inputs & Outputs

Inserts



INSERTS

MixMaster features Inserts on every track and bus - that's 16 tracks, 4 group and 4 aux busses (when Auxspander is connected), making a total of 24 mono/stereo inserts. Inserts can be used to add signal processors like EQs and compressors into the mixer track signal path.

Inserts are located in the "Poly Inserts" section on the left of the mixer. Insert jacks are polyphonic meaning each jack carries 8 stereo tracks (16 channels) of audio. It can help to think of these polyphonic audio jacks like ADAT ports (except that they carry 16 channels of audio rather than the 8 found in ADAT).

There are 3 poly insert out jacks corresponding to tracks 1-8, 9-16 and the 4 group busses and 4 aux return busses (when Auxspander is attached).

To split these polyphonic outputs into individual channels, use a VCV Split module. Each track on MixMaster will take up 2 channels on the split - so the 1-8 insert out will have Track 1 (L) on channel 1, Track 1 (R) on channel 2, Track 2 (L) on channel 3 etc up to Track 8 (R) on channel 16. Then Track 9 (L) will be on channel 1 of the 9-16 Insert out jack and so on.

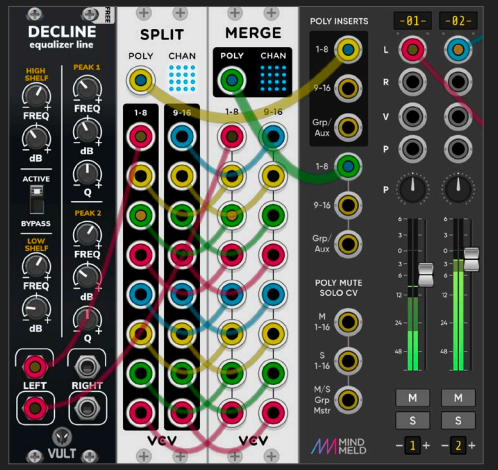
Mono signals will remain mono throughout the insert chain and will travel on the left channel only, so if you have a mono signal in Track 5 for example, it will come out on channel 9 and there will be no signal in channel 10.

Processed signals are then sent to a VCV Merge module (or a Stoermelder Infix module, see below) and from there to the corresponding poly insert input jack on MixMaster.

NB - IMPORTANT NOTE

The poly insert jacks carry 8 tracks of audio and when you use one of the insert points you interrupt the signal path through the mixer for all 8 of those tracks. Therefore all 8 tracks must be returned to the corresponding insert input jack - a signal circuit must be maintained for all 8 tracks or else tracks will be silenced in the mixer. This can be done by patching the unprocessed channels directly back from the Split module to the VCV Merge module. (see fig.X)

A better solution that does away with the need for much of the patching is to use the Infix module from Stoermelder's (Benjamin Dill) PackOne (available in the VCV Library) instead of a Merge module.



Adding an EQ on Track 1 using VCV Split & Merge

Adding an EQ on Track 1 using VCV Split & Stoermelder Infix - much less patching required!

Track Controls

Track Labels, Display Colour and Volume CV

Custom track labels and display colour on pan cv and group selectors

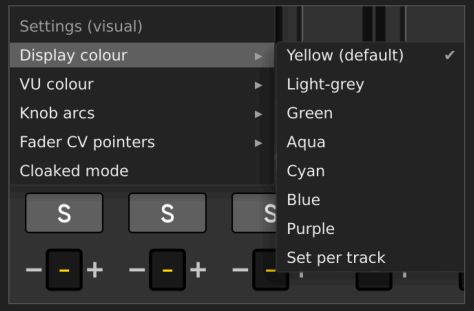


Fig. X: Display colour global menu setting

Display colour options

TRACK LABELS/SCRIBBLE STRIPS

At the top of each track is a label with 4 user-editable characters which are saved with the patch so you always know what's going in to each channel. Double click in label area to select the text or click and drag across it or just place the cursor before the first character and start typing (it will push the following characters out of the way).

When the Auxspander is attached, track labels are automatically copied over to it. Track and group names must be entered on the main mixer and cannot be entered directly into the Auxspander. However, the 4 track labels above the aux send/return jacks are editable on the Auxspander itself.

Display Colour (Global Setting)

The display colour used for track labels and group selectors (and also pan and volume cv visualisation) can be changed in the global settings menu. The options are:

- Yellow (default)
- Light-grey
- Green
- Aqua
- Cyan
- Blue
- Purple

These colours are applied globally by default but the user also has the option to set them 'per track'.

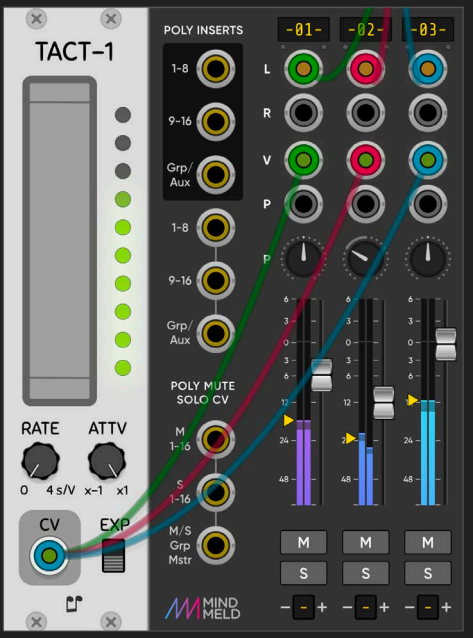
Yellow is the default colour. Light-grey is included to help those with poor eyesight. The other 5 colours match the VU colour options so tracks can have consistent display and VU colour if required.

VOLUME CV INPUTS

The third jack on each track is a volume CV control input (labelled **V**) which has a range of 0-10 volts. The position of the fader defines the maximum volume that a 10v CV input will produce.

The Volume Inputs on MixMaster are pre-scaling, which means that if you use a linear CV source like Impromptu Tact to modulate them, the cv will be scaled and volume changes will behave in a natural non-linear way which matches the way the MixMaster faders themselves behave.

VCA Fader Groups: MixMaster supports VCA Fader Groups which can be used to adjust the volume of multiple tracks by the same relative amount using a single CV source like Tact. VCA Fader Groups have an advantage over Fader Linking (see page XX) in that the relative levels of tracks within the group can be easily changed using the track faders without having to unlink and then relink them as required with Fader Linking.

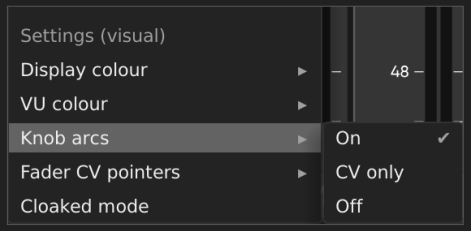


Creating a VCA fader group with Impromptu Tact modulating the Volume CV inputs.

Track Controls

Panning

Pan knobs, knob position arcs and knob CV arcs



Knob arcs global menu settings

MixMaster offers powerful control over panning including user definable pan law settings and true stereo panning.

PAN KNOB

The pan knob distributes the source signal (whether mono or stereo) into a new stereo sound field determined by the pan knob setting. As a mono signal flows through the mixer track, it becomes implicitly stereo at the pan knob.

Knob position arc: As you turn the pan knob, a grey arc indicator will appear which shows the position of the knob.

PAN CV INPUT

The 4th jack on each track is the pan CV input (labelled **P**) which has a range of ± 5 volts. This input allows you to modulate the pan position with a CV source such as an LFO or Sample & Hold.

Knob CV arc: When pan is modulated with a CV source, an arc indicator shows the range of the modulation. This CV arc appears in the selected display colour.

Knob arcs (Global Setting)

There are 3 options for the knob arcs in global settings:

- On
- CV only
- Off

When set to On, both the knob position arc and knob CV arc will show. When set to CV only, only the Knob CV arc will show and when set to Off, neither arc will show.

Mono Pan Law (Global Setting)

MixMaster allows the user to select their preferred Pan Law in the global settings. The following boost levels are available:

- 0dB (no compensation
- +3dB (equal power)
- +4.5dB (compromise)
- +6dB (linear).

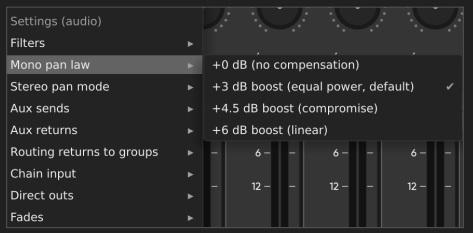
Pan Law is a principle that states that any signal of equal amplitude and phase that is played in both channels of a stereo system will increase in loudness up to 6.02 dBSPL, provided there is perfect response in the loudspeaker system and perfect acoustics in the room. In other words, as you pan a mono signal to the left or right, it becomes quieter. The pan law settings allow you to compensate for this by boosting the level of the signal as it is panned.

Stereo Pan Mode (Global Setting)

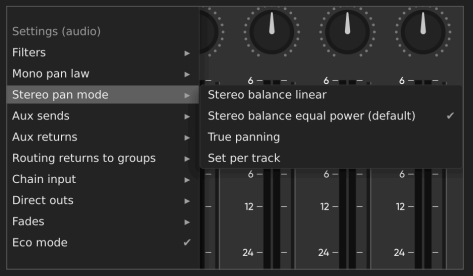
For stereo signals, MixMaster allows the user to select between two different methods of panning – Stereo Balance and True Panning. These can be set globally or on a 'per track' basis.

Stereo Balance is how pan knobs typically behave on stereo signals. As you pan to the left, the volume of the right ch annel decreases (and vice versa). There are linear and equal power options for stereo blance. In linear mode, panning left simply reduces the volume of the right channel whereas in equal power mode as you pan left, the volume of the left channel increases to compensate for the drop in volume of the right channel.

True Panning works by taking content from one channel and panning it over to the other. As you pan to the left, content from the right channel moves over into the left channel (and vice versa).



Mono pan law global menu settings



Stereo pan mode global menu settings

Track Controls

VUs and Faders

The difference in calibration between Track VUs and Master VU. Note the difference in position of the separator line at +1.58dB in soft clip mode and 0dB in hard clip mode on the Master VU.

TRACK VU METERS

MixMaster's VUs are accurately calibrated and range from -inf to +6dB.

RMS and Peak VUs: Mixmaster features both RMS and Peak VUs on each track. RMS VUs are the brighter coloured and Peak VUs are darker.

Peak hold: All VUs on mixmaster have a peak hold indicator which remains in place for 2 seconds.

IMPORTANT NOTE

On track, group and aux bus VUs, 0dB = 5 volts, which means you have plenty of headroom on tracks as they will not start clipping until they reach +6dB/10 Volts. This is why the 'warning' gradient from yellow to red is between 0dB and +6dB on track, group and aux VUs. While we recommend keeping at 0dB or below on tracks, occasional peaks above shouldn't do any harm, as long as they remain below +6dB.

On the Master VU it's different, 0dB = 10 volts, and anything above 0dB (in hard clip mode) or +1.58dB (in soft clip mode) will clip. This is why the 'warning' gradient from yellow to red is between -6dB and 0dB (in hard clip mode) or -4.44dB to 1.58dB (in soft clip mode) on the Master VU. Whenever a channel of the master VU clips, the entire master VU for that channel will turn red to let you know the channel is clipping.

The reason for this difference is the Rack voltage standard which recommends a maximum range of ±5v for internal audio signals, but the Audio module itself (which the master generally goes out to) has a maximum range of ±10v.

Cloaked mode (Global Setting)

Cloaked mode turns off all VUs except for the Master VU which can save a little CPU.

VU Colour (Global Setting)

MixMaster allows the user to select from 5 different VU colours in the Global Settings menu. The available colours are:

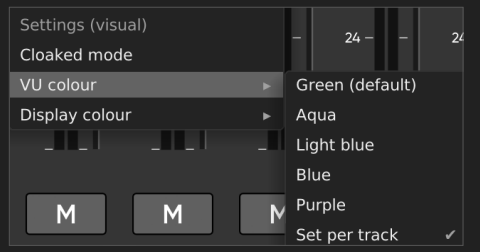
- Green (default)
- Aqua
- Cyan
- Blue
- Purple

These colours are applied globally by default but the user also has the option to set them 'per track'. Setting different VU colours per track can be a great way to visually distinguish different types of sounds in the mixer. One colour for drums, another for synths etc.

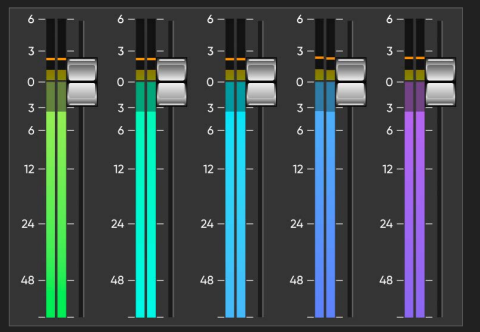
FADER LINKING

MixMaster allows faders to be linked so that moving one fader will move the other linked faders respectively by the same amount. Faders can be linked through the track menu (see page 12) but the quickest way to link them is by key command – Alt (Windows. Linux) or Option (Mac) clicking on a fader will add it to the group of linked faders. When a fader is linked, a red line will appear across the centre of it. To unlink a fader, Alt/Option click it again. To quickly unlink all linked faders, Alt/Option + Shift click on any of them.

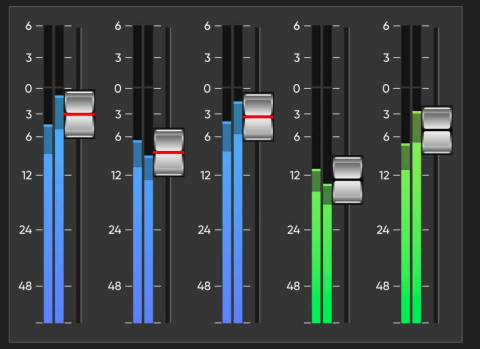
When faders are linked, their fades are also linked. This means that when one linked fader which has fade enabled is triggered, the fades on the other linked faders which have fade enabled are also triggered.



VU colour global settings menu



VU colour options

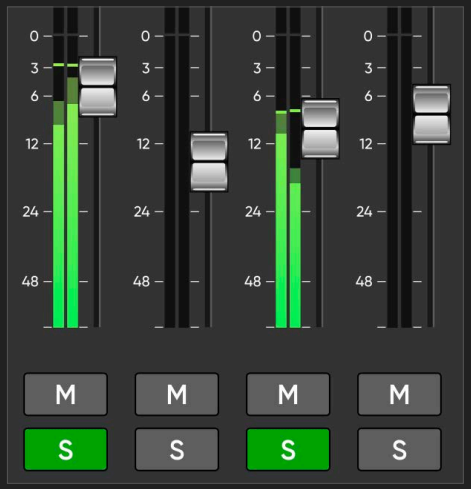


Linked faders with red line across centre

Track Controls

Mute & Solo

The 4 different mute button states; mute off, mute on, fade out armed and fade in armed.



MixMaster has flexible soloing capabilities: multi-solo is seen here.

MUTE

The Mute (M) button below the fader will mute the track. The button will turn red to show the track is muted. Click on it again to unmute.

Fade: When fade automation is turned on in the track menu settings (see page XX), the 'M' changes to an 'F' button to indicate fade is active.

Unmute all: Ctrl/Cmd + shift clicking on a muted button will unmute all tracks. Ctrl/Cmd + shift clicking on an unmuted button will unmute all tracks and turn mute on for the button you clicked.

SOLO

The Solo (S) button below the mute button will solo the track. The button will turn green to show the track is Solo'd. Click on it again to unsolo.

Multi-solo: Mixmaster supports multi-solo which means that more than one track or group can be solo'd at a time.

Solo in solo'd groups: When you solo a group, all tracks in that group will remain active, but if you then solo one of the tracks in the group, only that solo'd track will be active. If you then unsolo that track, all tracks in the group will be active again.

Solo A/B: If one or more tracks are solo'd and you Ctrl/Cmd + Click on another track that is not solo'd, the new track will solo. If you then Ctrl/Cmd + Click on the new track again, you will return to the previous solo state.

Unsolo all: Ctrl/Cmd + shift clicking on a solo'd track will unsolo all tracks. Ctrl/Cmd + shift clicking on an unsolo'd track will unsolo all tracks and turn on solo for the one you clicked.

MUTE & SOLO CV CONTROL

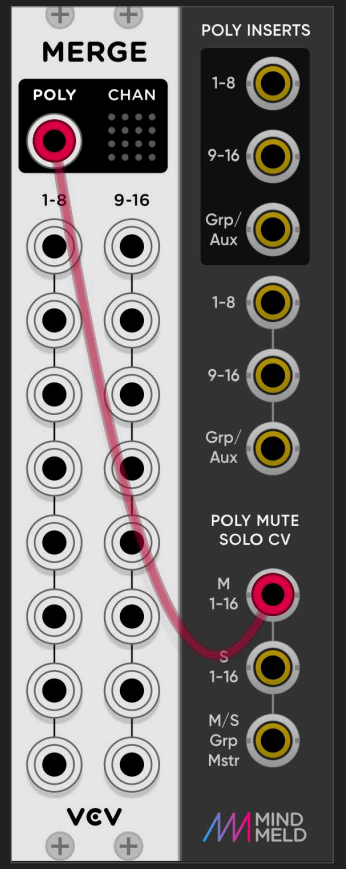
Mute & Solo CV for Tracks, Groups and the Master channel is located in the 'Poly Mute Solo CV' section on the left side of MixMaster. These 'gold' jacks are polyphonic and carry 16 channels of CV each. Plug a VCV Merge module into the relevant input (see below) and use the 16 inputs on the Merge to send CV to the track you want.

Track Mute CV: Mute CV for tracks 1-16 is through the first poly jack labelled 'M 1-16'. Mute CV for track 1 is on channel 1, track 2 on channel 2 and so on. Mutes are toggled on and off by the rising edge of a trigger pulse.

Track Solo CV: Solo CV for tracks 1-16 is through the second poly jack labelled 'S 1-16'. Solo CV for track 1 is on channel 1, track 2 on channel 2 and so on. Solos are toggled on and off by the rising edge of a trigger pulse.

Mute & Solo CV for Groups and Master CV: The third poly jack labelled 'M/S Grp Mstr' allows mute and solo of the group tracks and mute, dim and mono for the Master as follows:

- Channels 1-4: Mute Groups 1-4
- Channels 5-8: Solo Groups 1-4
- Channel 9: Mute Master
- Channel 10: Dim Master
- Channel 11: Mono Master
- Channel 12: Master Volume
- Channels 13-16: Unused



Use a VCV Merge module with the Mute & Solo poly input jacks

Track Menus

Track Settings

Track menu showing track settings for Gain, Fiilters, Fade and Fader/Fade Linking

Track menus can be accessed by right-clicking on a track label. Track menus give you access to individual track settings and actions.

TRACK SETTINGS

Gain adjustment: +/- 20dB of gain adjustment available enabling you to balance your signal levels before you start mixing.

High Pass Filter (HPF): 20Hz to 1kHz 18dB/Octave filter that enables you to remove unwanted low frequencies from your signal.

Low Pass Filter (LPF): 20kHz to 1kHz 12dB/Octave filter that enables you to remove unwanted high frequencies from your signal.

Pro tip: When filters are turned on for a track, small LEDs appear just below the track label. The green LED on the left indicated that the High Pass Filter is active and the blue LED on the right indicates that the Low Pass Filter is active.

Filters (Global Setting)

Filters can be set to either pre-insert or post-insert in the global settings. They can also be 'Set per track', which means a Filters setting will appear in each track menu.

Fade - on/off and fade time: Turn fade on to create automated fade-ins and fade-outs over a period of 0.1s to 30s of fade time. When enabled, the Mute (M) button changes into a Fade (F) button. Fades range between -inf and the current position of the fader. An orange pointer appears to the left of the VU which depicts the fade animation. The pointer disappears when it reaches the fader position but remains visible at -inf.

Fade curves: By default, fades happen in a linear fashion which means the fade happens at a constant speed. The fade curve slider allows you to set your fade curve to be logarithmic (fast to slow) or exponential (slow to fast) and to blend in the amount of log/exp curve you wish to apply. This curve will apply to both fade-ins and fade-outs.

Link fader and fade: Turn this on to add the track's fader to a group of linked faders. For more details on fader linking, see page 10. This also activates fade linking - when faders are linked and they have fade enabled, triggering the fade button on one will also trigger the fade button for the other linked faders.

Fades (Global Setting)

Symmetrical fades: If you want your fades to be slow-to-fast when fading in, and fast-to-slow when fading out (or vice versa), turn on 'Symmetrical' in the global Fades settings.

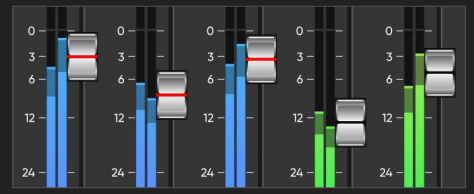
Include vol cv in fade cv out: MixMaster has a polyphonic fade cv output which outputs the fade CVs for Tracks 1-16. Turning this option on will include the track volume CVs in the fade CV output. It is possible to get some interesting interactions between the fade CVs and Volume CVs.

Optional track settings

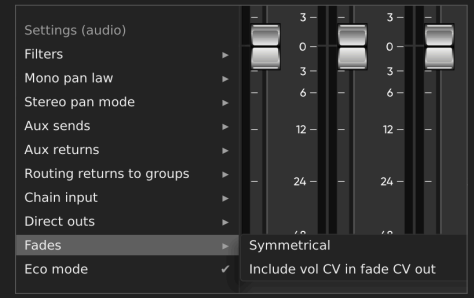
You will find the following additional track settings in the track menu if they have been set to "Set per track" in the Global menu:

- **Direct outs** (See page 6)
- **Filters** (See opposite))
- **Aux sends** (See page 20)
- **Stereo pan mode** (See page 9)
- **VU Colour** (See page 10)
- **Display Colour** (See page 8)

Linear, exponential and logarithmic fade curve settings



Linked faders have a central red line



Fades global menu settings

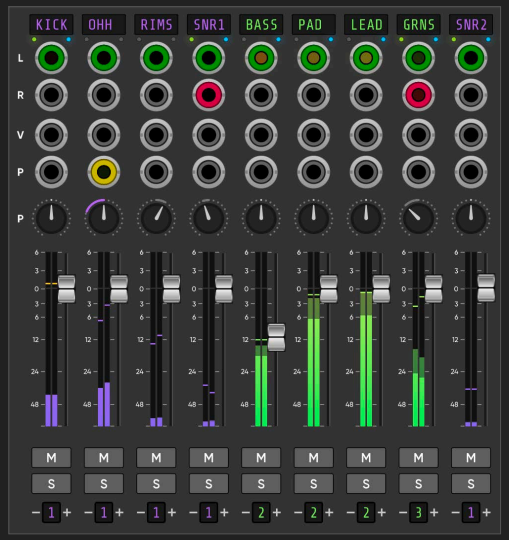
Track Menus

Track Actions

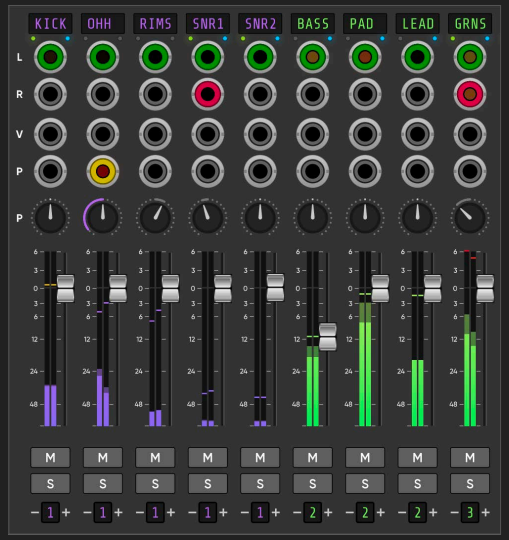
TRACK ACTIONS

Copy track menu settings to: Use this menu action to quickly copy track menu settings from one track to another. Note this only copies the menu settings - it does not copy track label, pan or fader position.

Move to: Use this menu action to reorder your mixer tracks (even while the track is playing!). The 'move to' action moves the entire track including all menu settings, label name, pan and fader position and even the cables from one place in the mixer to another. Aux send settings for tracks are also moved in the AuxSpander when attached.



The problem: Track 9 (SNR2) is a new drum track added later in the production process and is therefore separated from the original drums on tracks 1-4

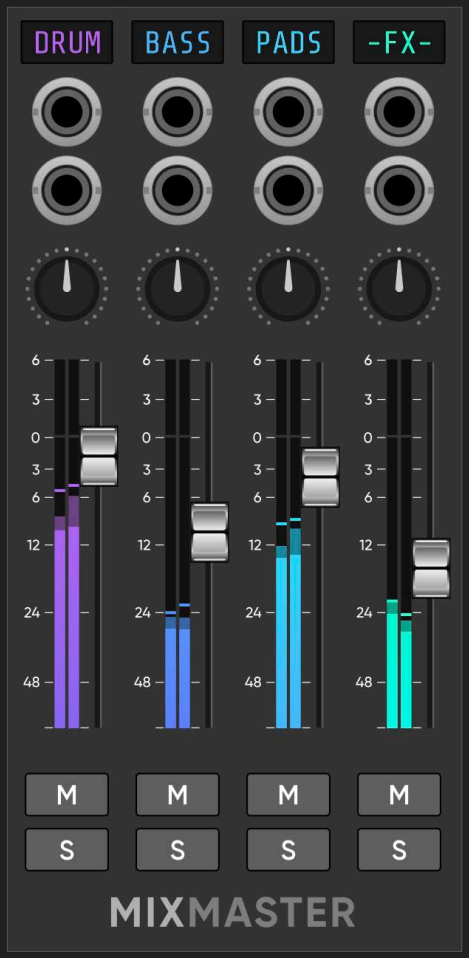


The solution: Track 9 (SNR2) from the image above has been moved to track 5 so it is next to the other drums using the "Move to" track action in the track menu. All track menu settings, pan and fader positions, group destination and even cables are moved along with it.

Bus Controls

Groups and Master

Group selectors with one being mapped



MixMaster's 4 group busses.

GROUP SELECTORS

Group Selectors are found at the bottom of each track, below the mute and solo buttons. The Group busses are numbered 1-4 and you can use the plus (+) and minus (-) buttons to select the group you want to route the track to. The default state - a dash - means the track is routed directly to the Master.

Pro tip: If you hover your cursor over the group selector display window you can use your keyboard to type in the number of the group you want - this enables you to change a routing from say Group 2 to Group 4 without the signal passing through Group 3.

Group Selector mapping: Please note that when mapping Group Selectors to a controller, it is the display window itself which is mapped (ideally to a knob) and not the plus (+) and minus (-) buttons.

GROUP BUSSES

MixMaster features 4 Group Busses which tracks can be routed to. Group track controls in MixMaster are mostly identical to regular tracks - the only differences are:

- They have no Left (L) and Right (R) jack inputs (as signals are routed internally from tracks to groups).
- There are no gain adjustment or filtering options in the group track settings menus. (see page 15)

THE MASTER BUS

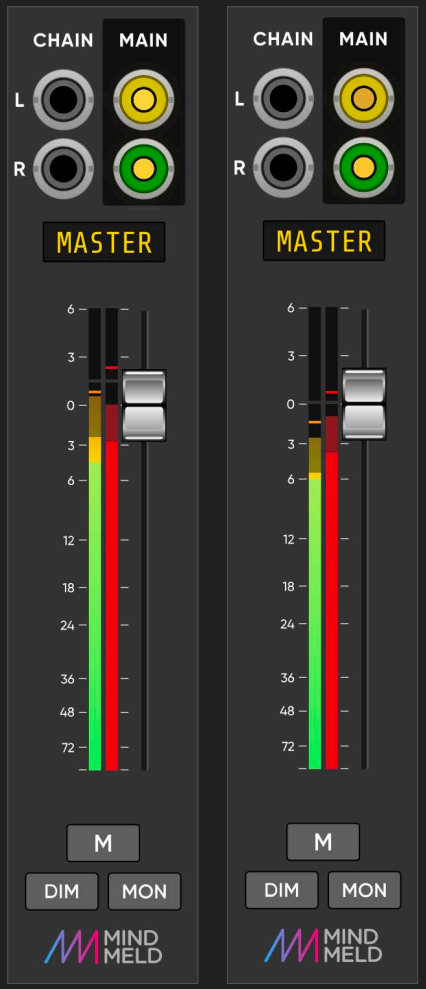
The master track in MixMaster has a larger VU and fader run to distinguish it from other tracks. It is important to note that 0dB = 10 volts on the master and anything above 0dB will therefore clip (in hard clip mode). This is why the 'warning' gradient from yellow to red is between -6dB and 0dB on the Master VU (in hard clip mode).

When soft-clipping is on (default), the warning gradient goes from -4.44dB (6V) to 1.58dB (12V). Also note that the VU is pre-soft clipper (provided it is activated), such that 12V is actually output at a level of 10V on the main output jacks. See page 15 for the soft-clipper response curve.

Whenever a channel of the master VU peaks above 0dB (in hard clip mode) or 1.58dB (in soft clip mode), the entire master VU for that channel will turn red to let you know the channel is clipping.

Dim: This button reduces the level of the main output by the amount specified (from -1dB to -30dB) in the master track settings (see page 15). Default is -12dB.

Mono: This button folds the main output to mono so you can hear how your mix sounds in... mono.

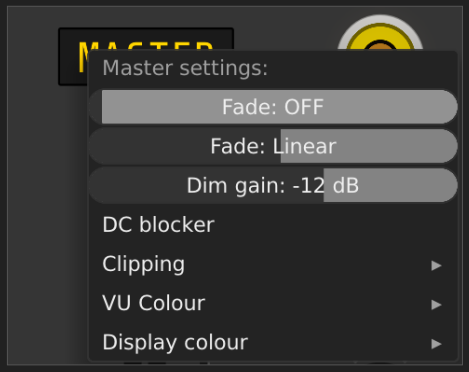


The Master VU in soft clip mode (left) and hard clip mode (right). Note the difference in position of the separator line at +1.58dB in soft clip mode and 0dB in hard clip mode.

Bus Menus

Groups and Master

Group bus menu settings



Master bus menu settings

GROUP BUS MENU

Right-click on the group bus labels to access the group bus menus. Group bus menus only include settings for **fade**, **fade curve** and **link fader and fade** – they do not include menu settings for gain, high pass filter or low pass filter (the idea being these would be set in the track menus of the tracks sent to the groups).

Additionally there are no 'copy to' or 'move to' track actions in group track menus.

Optional group bus settings

You will find the following additional settings in the group bus menus if they have been set to "Set per track" in the Global menu:

- **Direct outs** (See page 6)
- **Aux sends** (See page20)
- **Stereo pan mode** (See page 9)
- **VU Colour** (See page 10)
- **Display Colour** (See page 8)

MASTER BUS MENU

Right click on the Master bus labe; to access the Master bus menu. The Master bus menu includes settings for **fade** and **fade curve** – it does not include settings for, gain, high pass filter, low pass filter or link fader and fade. There are also some settings which are unique to the master track menu, these are:

Dim gain: Set the amount of gain reduction for the Dim button from -1dB to -30dB. Default is -12dB.

DC blocker: You can add a DC blocker to the main outs which will prevent DC signals passing through the mixer and potentially damaging equipment. When DC blocker is on, only AC signals will pass.

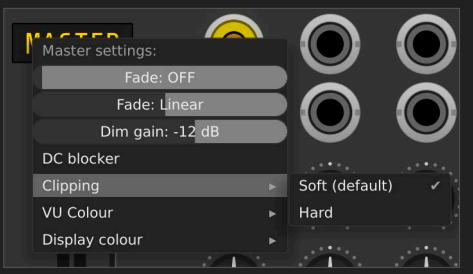
Clipping: There are 2 clipping options, Soft Clip (default) and Hard Clip

- **Soft clip** adds warm harmonic distortion to your audio by gently transitioning between the unclipped section of the waveform and the clipped section. Soft clipping starts at -4.44dB (6V) and audio will not actually hard clip until it reaches +1.58dB (12V). Even then, although there's still distortion, it's much less harsh-sounding than it would be if you hard-clipped the signal because the junction between the normal, curved portion of the wave and the flat, clipped portion will be curved rather than transitioning at an angle. It generates fewer high-pitched harmonics and makes the audio sound much smoother and warmer.
- **Hard Clip** limits the amount of voltage the main output can put out to protect your speakers and ears to ±10 volts. Anything above 0dB will distort in an unpleasant way.

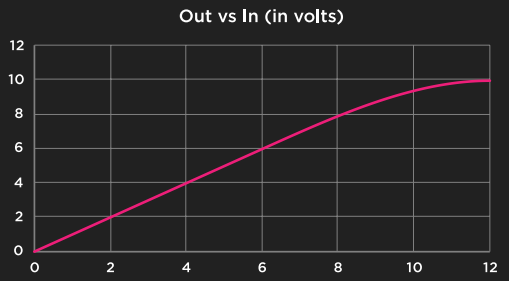
Optional master bus settings

You will find the following additional settings in the master bus menu if they have been set to "Set per track" in the Global menu:

- **VU Colour** (See page 10)
- **Display Colour** (See page 8)



Clipping settings in the Master bus menu

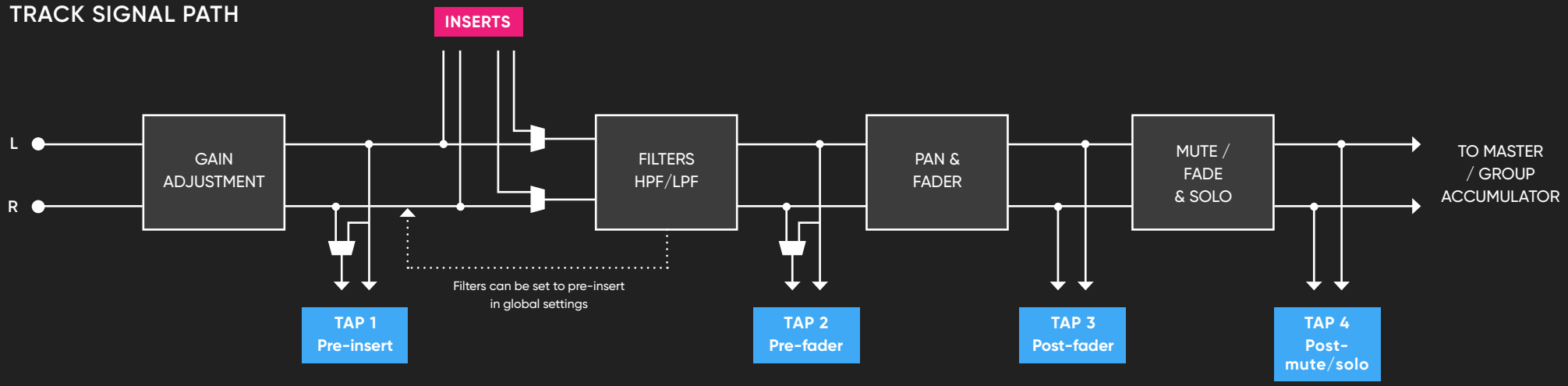


The soft clip response curve

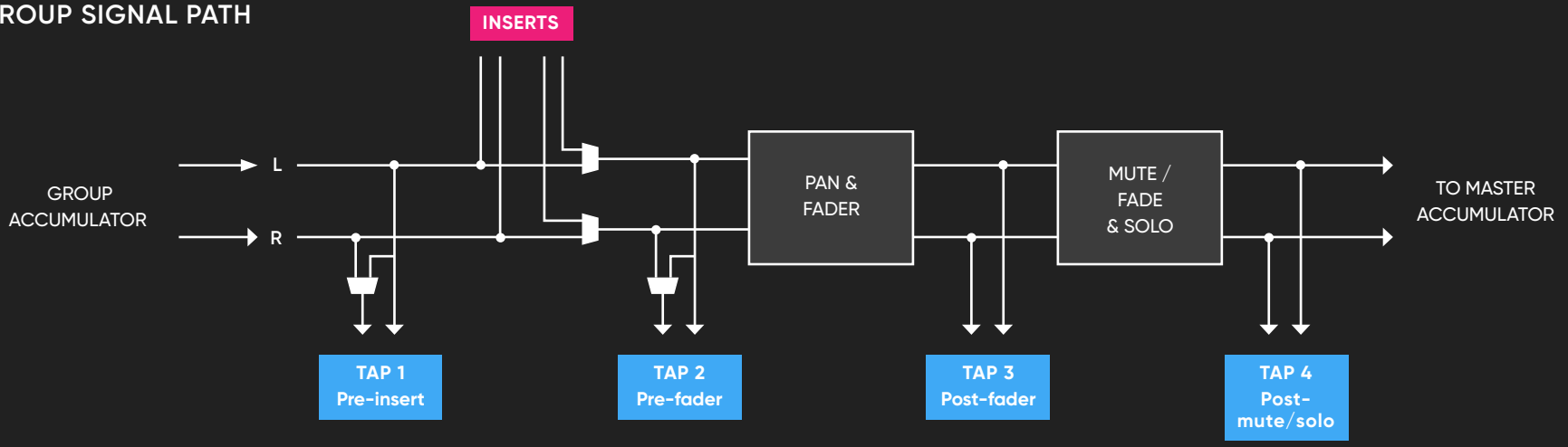
Signal paths and tap points

Tracks and Groups

TRACK SIGNAL PATH



GROUP SIGNAL PATH



AUXSPANDER

AuxSpander adds 4 Aux Send/Return busses to MixMaster. It must be placed directly to the right of the main mixer.

- 4 mono/stereo aux send/return busses
- Editable Bus Labels/Scribble Strips
- Track/Group labels pulled automatically from MM
- Hi Pass Filter (HPF) on each return (18 dB/oct.)
- Low Pass Filter (LPF) on each return (12 dB/oct.)
- Master send level control (up to +12dB gain)
- Stereo balance and true stereo panning
- Accurate RMS and Peak VUs with peak hold
- User selectable VU colour and display colour
- Inserts on each aux return bus
- Direct outs for each aux return bus
- Flexible signal routing options (4 send tap points)
- Comprehensive mute/solo options
- Route returns to groups for adding FX to your FX (with built in feedback protection)
- CV Visualisation
- CV control over just about everything...

MIND MELD

Aux Bus Controls

Labels, Jacks, Global Sends, Pan, Returns, Mute & Solo

MixMaster's 4 aux busses

TRACK LABELS/SCRIBBLE STRIPS

At the top of each send/return bus is a track label with 4 user-editable characters which are saved with the patch so you always know what's connected to each bus. Double click in the label area to select the text or click and drag across it or just place the cursor before the first character and start typing (it will push the following characters out of the way).

The track labels for the 16 track and 4 group send knobs are automatically copied over from MixMaster. Track and group names must be entered on the main mixer and cannot be entered directly into the Auxspander.

SEND & RETURN JACKS

Each of the 4 aux busses has a pair of send jacks and a pair of return jacks. The first pair are the Left (**L**) & Right (**R**) sends and the following pair are the corresponding returns.

MixMaster supports stereo to stereo, mono to stereo and mono to mono effects processors. When the return is stereo, use both the Left (**L**) & Right (**R**) return inputs. When the return is mono use the Left (**L**) input only - the signal will then be normalised to the right channel automatically.

GLOBAL SEND BUS LEVEL KNOBS

The global send bus level knobs appear directly below the return jacks. The knobs have a range from -inf to +12dB and their default position is centred at 0dB. Use these knobs to globally control the signal level sent to each effects processor.

RETURN BUS PAN KNOBS

Aux returns are implicitly stereo at the pan knob and will therefore follow the global menu stereo panning settings as described on page 9.

VUs & RETURN FADERS

The fader runs and VUs on Auxspander are a little shorter than on MixMaster, but otherwise they are the same as described on page 10 other than the fact that AuxSpander faders cannot be linked and have no fade automation.

MUTE & SOLO

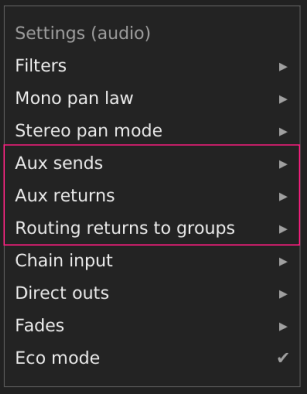
The Mute and Solo buttons on AuxSpander are independent of those on MixMaster - thus soloing an aux return will not mute all the tracks by default, it will just mute the other aux returns. However this can be achieved via a global menu setting...

NB - AUXSPANDER GLOBAL MENU

When AuxSpander is added to MixMaster, 3 new custom settings appear in the MixMaster global menu. These are:

- Aux sends
- Aux returns
- Routing returns to groups

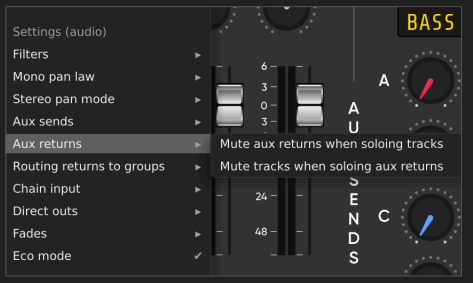
Please note that these custom settings appear in the MixMaster global menu, not the AuxSpander global menu.



These 3 settings are added to the global menu on Mixmaster when AuxSpander is attached

Aux returns (Global Setting)

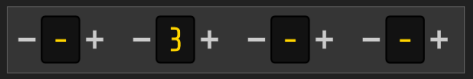
- Mute aux returns when soloing tracks: When this option is enabled, you will only hear the dry signal when you solo a track
- Mute tracks when soloing aux returns: When this option is enabled, you will only hear the wet signal when you solo an aux return



Aux returns global menu settings

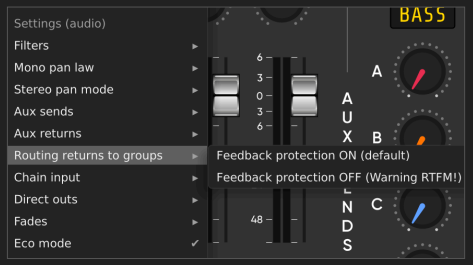
Aux Bus Controls

Group Selectors, Routing returns to groups, Aux Bus Menus



Aux return group selectors

Aux B (DLAY) return routed to Group 3 (-FX-)



Routing returns to groups global menu settings

GROUP SELECTORS

MixMaster allows you to route an aux return back to a group.

Pro tip: One of the best uses of routing a return to a group is to add effects to your effects! For example, you can add reverb to your delay by routing the delay return to a group and then adding a reverb send on the group.

When routing a return to a group, there is the potential to create a feedback loop. For example, if you route a reverb return to a group and then add more of the same reverb send on that group, things will get nasty very quickly... therefore MixMaster offers built in Feedback Protection to prevent this.

Routing returns to groups (Global Setting)

This setting has 2 options for feedback protection, On and Off.

How feedback protection works: If you route say Aux return B to Group 3, then Aux send B on Group 3 will be muted. This prevents you adding more of the Aux B effect to the Aux B return thus preventing a feedback loop. To show that feedback protection is active on a group send, a small red LED will light up at the bottom left of that group send knob.

At your own risk, If you are confident you know what you are doing then you can turn feedback protection off (and it is quite possible to get some interesting feedback effects with delays etc).

AUX BUS MENUS

As with MixMaster, track menus can be accessed by right-clicking on the aux bus labels. The following menu settings are available on the 4 aux busses:

High Pass Filter (HPF): 20Hz to 1kHz 18dB/Octave filter that enables you to remove unwanted low frequencies from your signal.

Low Pass Filter (LPF): 20kHz to 1kHz 12dB/Octave filter that enables you to remove unwanted high frequencies from your signal.

Optional aux bus menu settings

You will find the following additional track settings in the aux bus track menus if they have been set to "Set per track" in the Global menu:

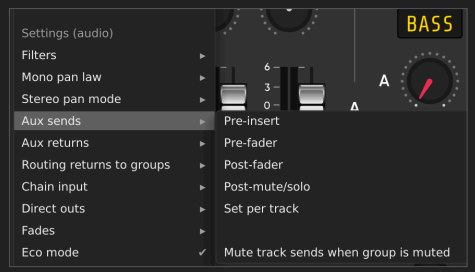
- **Direct outs**: (See page 6)
- **Stereo pan mode**: (See page 9)
- **VU Colour**: (See page 10)
- **Display Colour**: (See page 8)

Aux bus menu settings

Aux Send Controls

Track Labels, Send Knobs, Tap Points, Mutes, Poly Aux CV

Aux bus menu settings



Aux Sends global menu settings

AUX SEND TRACK LABELS

The Aux send track labels are imported automatically from MixMaster - they cannot be edited directly.

AUX SEND KNOBS

There are 16 sets of 4 send knobs for tracks, and 4 sets of 4 send knobs for groups, arranged in 2 rows. For each track and group, the 4 knobs correspond to Aux Sends A, B, C and D and are colour coded. The knobs range from -inf when full left (no send) to 0dB when full right (100% send).

Knob position arc: As you turn an aux send knob, a grey arc indicator will appear which shows the position of the knob.

AUX SEND TAP POINTS

MixMaster offers 4 different tap points in the signal path from which the aux send can be taken.

Aux Sends (Global Setting)

Select your preferred tap point:

- Pre-Insert (post gain)
- Pre-fader
- Post-fader
- Post-mute/solo
- Set per track

When 'Set per track' is selected, you can select your preferred tap point in the MixMaster track and group menus.

There is one further option in the Aux Sends menu settings called 'Mute track sends when group is muted' - this will mute aux sends for tracks which are sent to a group when that group is muted.

AUX SEND MUTES

Below each set of 4 send knobs is a mute button. When activated, this will mute all the aux sends for that track or group which will result in you just hearing the dry signal.

POLY AUX CV

There are 9 polyphonic CV inputs on the right side of AuxSpander. Each input carries 16 channels of CV and you will need a VCV Merge module to utilise them. They enable CV control of the following:

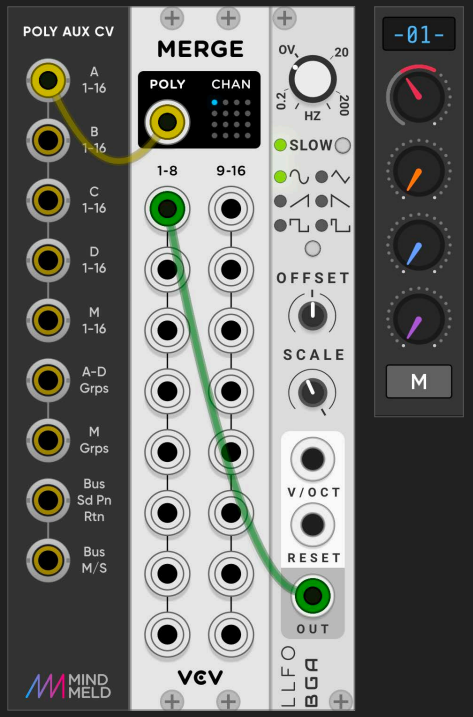
A 1-16, B 1-16, C 1-16, D 1-16: These 4 jacks control the send levels for the 16 tracks for Aux Sends A, B, C and D respectively. They are bi-polar additive inputs with a range of ± 10v. This means a +10v signal will take the level from -inf to 0dB, a -10v signal will take the level from 0dB to -inf and when an aux send knob is at 12 0'clock, a ±5v signal will make it range from -inf to 0dB.

M 1-16: This jack controls the aux send mutes for tracks 1-16. It behaves as an on/off toggle and responds to the rising edge of a trigger or gate. The first rising edge will turn the mute on, the next rising edge will turn it off.

A-D Grps: This jack controls the send levels of Aux A, B, C and D for the 4 Groups. Channel 1 is Group 1 Aux A send, Channel 2 is Group 2 Aux A send, Channel 5 is Group 1 Aux B send up to channel 16 wich is Group 4 Aux D send. As with the track send CV jacks they are bi-polar additive inputs with a range of ±10v.

M Grps: This jack controls the aux send mutes for groups 1-4. It behaves the same as the M 1-16 jack above except only the first 4 channels are used.

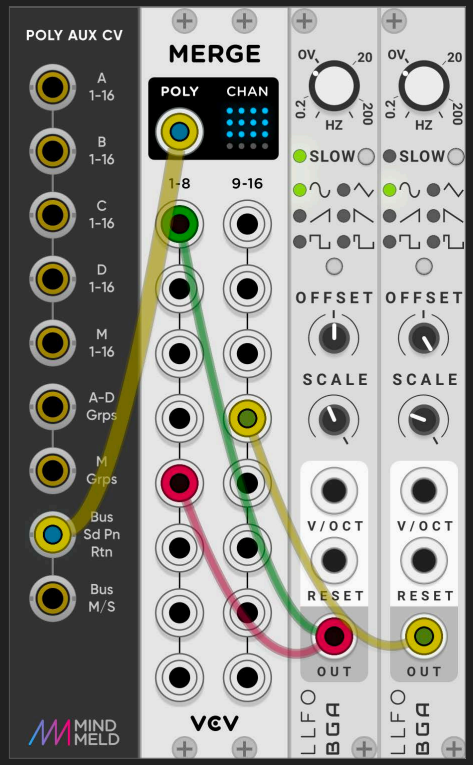
Aux Send mutes - tracks 3 and 6 have their sends muted



Using an LFO and VCV Merge module to modulate Aux A on Track 1. Use the 16 inputs on merge to modulate the 16 tracks.

Aux Send Controls

Poly Aux CV continued



Modulating the global send level and pan of Aux A with one LFO and using another LFO to modulate the return level of Aux D. See image opposite for the result. Note the CV indicators showing the -inf levels of Aux A, B and C.

POLY AUX CV (Continued)

Bus Sd Pn Rtn: This jack controls the Aux Bus Send, Pan and Return levels. Channels 1-4 control the global send levels of Aux A, B, C and D respectively via a bipolar additive CV with a range of ±5v. Channels 5-8 control the pan of Aux returns A, B, C and D respectively also via a bipolar additive CV with a range of ±5v. Channels 9-12 control the return levels via a unipolar multiplied CV with a range of 0-10v. Channels 13-16 are unused.

Bus M/S: This jack controls the Aux Bus Mute and Solo states for Aux A, B, C and D. Channels 1-4 control the mutes and channels 5-8 control the solos. Channels 9-16 are unused. These inputs behave as on/off toggles and respond to the rising edge of a trigger or gate. The first rising edge will turn the mute or solo on and the next rising edge will turn it off.

NB - IMPORTANT NOTE

Due to the way polyphonic signals work in VCV Rack, if you add a CV input into a given channel of a VCV Merge module, all channels below that channel are 'activated'. This can create some issues with unipolar CV signals as an active channel will send out 0v from the Merge even when that channel has no input on the Merge.

In practise, this means for example that if you add a CV into channel 12 of the Merge module that feeds the 'Bus Sd Pn Rtn' poly jack input, with the aim of controlling the return level of Aux D, all channels from 1-12 will be activated and channels 1-11 will send out 0v even though they have no input. This causes no issues with channels 1-8 which are bi-polar and additive, thus 0v will mean the current knob value is unchanged. It will however cause an issue with channels 9-11 which are unipolar and multiplied and therefore 0v will mean that the return levels become -inf on those channels and you will need to feed them a constant 10v signal (or modulate their level with positive CV) in order to hear them.

This can be a little confusing if you are not expecting it!

The result of the modulation setup shown opposite

MIND MELD

MindMeld Modular is a designer/ developer collaboration for VCV Rack between Marc '*Spock*' Boulé (coding and development) and Steve '*Make it so*' Baker (concept and design).

facebook.com/MindMeldModular